Internal Location Protocol

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Contents

1. SCOPE 12
2. REFERENCES 13
2.1 NORMATIVE REFERENCES 13
3. TERMINOLOGY AND CONVENTIONS 15
3.1 CONVENTIONS 15
3.2 DEFINITIONS 15
3.3 ABBREVIATIONS 15
4. INTRODUCTION 17
5. DETAILED FLOWS – IMMEDIATE SERVICE 18
5.1 NETWORK INITIATED – PROXY MODE 18
5.1.1 Non-Roaming Successful Case 19
5.1.2 Roaming with V-SLP Positioning Successful Case 21
5.1.3 Roaming with H-SLP Positioning Successful Case 24
5.1.4 Non-Roaming Successful Case, Notification/Verification based on current location 28
5.1.5 Roaming with V-SLP Positioning Successful Case, Notification/Verification based on current location 30
5.1.6 Roaming with H-SLP Positioning Successful Case, Notification/Verification based on current location 34
5.2 NETWORK INITIATED – NON-PROXY MODE 36
5.2.1 Non-Roaming Successful Case 37
5.2.2 Roaming with V-SPC Positioning Successful Case 39
5.2.3 Roaming with H-SPC Positioning Successful Case 42
5.2.4 Non-Roaming Successful Case, Notification/Verification based on current location 46
5.2.5 Roaming with V-SPC Positioning Successful Case, Notification/Verification based on current location 48
5.2.6 Roaming with H-SPC Positioning Successful Case, Notification/Verification based on current location 52
5.3 EXCEPTION PROCEDURES 56
5.3.1 SET Does Not Allow Positioning for Non Roaming 56
5.3.2 SET Does Not Allow Positioning for Roaming with V-SLP 57
5.3.3 SET Does Not Allow Positioning for Roaming with H-SLP 59
5.3.4 SUPL Protocol Error 59
5.3.5 Timer expiration 60
5.4 SET INITIATED – PROXY MODE 60
5.4.1 Non-Roaming Successful Case 60
5.4.2 Roaming with V-SLP Positioning Successful Case 62
5.4.3 Roaming with H-SLP Positioning Successful Case 65
5.4.4 SET-Initiated Location Request of another SET 68
5.4.5 Location Request of Transfer Location to Third Party 68
5.5 SET INITIATED – NON-PROXY MODE 68
5.5.1 Non-Roaming Successful Case 69
5.5.2 Roaming with V-SPC Positioning Successful Case 71
5.5.3 Roaming with H-SPC Positioning Successful Case 73
5.5.4 SET-Initiated Location Request of another SET 76
5.5.5 Location Request of Transfer Location to Third Party 76
5.6 EXCEPTION PROCEDURES 76
5.6.1 SET Authorization Failure 76
5.6.2 SUPL Protocol Error 76
5.6.3 Timer expiration 76
5.7 EMERGENCY SERVICES LOCATION REQUEST – PROXY MODE 76
5.7.1 Non-Roaming Successful Case 77
5.7.2 Roaming with V-SLP Positioning Successful Case 79
5.8 EMERGENCY SERVICES LOCATION REQUEST – NON-PROXY MODE 81
5.8.1 Non-Roaming Successful Case 82
5.8.2 Roaming Successful Case with V-SPC Positioning 84
6. DETAILED FLOWS - TRIGGERED SERVICES: PERIODIC TRIGGERS 88

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6.1 NETWORK INITIATED – PROXY MODE 88
6.1.1 Non-Roaming Successful Case 89
6.1.2 Roaming with V-SLP Positioning Successful Case 93
6.1.3 Roaming with H-SLP Positioning Successful Case 99
6.2 NETWORK INITIATED – NON-PROXY MODE 105
6.2.1 Non-Roaming Successful Case 105
6.2.2 Roaming with V-SPC Positioning Successful Case 109
6.2.3 Roaming with H-SPC Positioning Successful Case 115
6.3 EXCEPTION PROCEDURES 121
6.3.1 SET does not allow Triggered Position 121
6.3.2 Network cancels the triggered location request 121
6.3.3 SET cancels the triggered location request 122
6.4 SET INITIATED – PROXY MODE 123
6.4.1 Non-Roaming Successful Case 123
6.4.2 Roaming with V-SLP Positioning Successful Case 125
6.4.3 Roaming with H-SLP Positioning Successful Case 128
6.5 SET INITIATED – NON-PROXY MODE 131
6.5.1 Non-Roaming Successful Case 132
6.5.2 Roaming with V-SPC Positioning Successful Case 134
6.5.3 Roaming with H-SPC Positioning Successful Case 137
6.6 SET INITIATED PERIODIC LOCATION REQUEST WITH TRANSFER TO 3RD PARTY – PROXY MODE 140
6.6.1 Non-Roaming Successful Case 141
6.6.2 Roaming with V-SLP Positioning Successful Case 145
6.6.3 Roaming with H-SLP Positioning Successful Case 150
6.7 SET INITIATED PERIODIC LOCATION REQUEST WITH TRANSFER TO 3RD PARTY – NON-PROXY MODE 155
6.7.1 Non-Roaming Successful Case 155
6.7.2 Roaming with V-SPC Positioning Successful Case 158
6.7.3 Roaming with H-SPC Positioning Successful Case 163
6.8 RETRIEVAL OF HISTORICAL POSITIONS AND/OR ENHANCED CELL SECTOR MEASUREMENTS 168
6.8.1 Retrieval of Historical Position Results – non-roaming successful case 168
6.8.2 Retrieval of Historical Position Results – roaming successful case 170
6.9 V-SLP TO V-SLP HANDOVER 171
6.10 V-SPC TO V-SPC HANDOVER 171
7. DETAILED FLOWS - TRIGGERED SERVICES: AREA EVENT TRIGGERS 172
7.1 NETWORK INITIATED – PROXY MODE 172
7.1.1 Non-Roaming Successful Case 173
7.1.2 Roaming with V-SLP Positioning Successful Case 176
7.1.3 Roaming with H-SLP Positioning Successful Case 180
7.2 NETWORK INITIATED – NON-PROXY MODE 184
7.2.1 Non-Roaming Successful Case 185
7.2.2 Roaming with V-SPC Positioning Successful Case 188
7.2.3 Roaming with H-SPC Positioning Successful Case 191
7.3 SET INITIATED – PROXY MODE 195
7.3.1 Non-Roaming Successful Case 196
7.3.2 Roaming with V-SLP Positioning Successful Case 198
7.3.3 Roaming with H-SLP Positioning Successful Case 202
7.4 SET INITIATED – NON-PROXY MODE 204
7.4.1 Non-Roaming Successful Case 205
7.4.2 Roaming with V-SPC Positioning Successful Case 207
7.4.3 Roaming with H-SPC Positioning Successful Case 210
7.5 NETWORK/SET CAPABILITIES CHANGE FOR AREA EVENT TRIGGERED SCENARIOS 213
8. DETAILED FLOWS – SLC/SPC HEARTBEAT 214
8.1 SUCCESSFUL PALIVE EXCHANGE 214
8.2 PALIVE ERROR HANDLING 214
9. SECURITY CONSIDERATIONS 216
9.1 SLC-SPC SECURITY 216

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9.2 NON-PROXY MODE MUTUAL AUTHENTICATION KEY REFRESH MECHANISM 216
9.2.1 Mutual Authentication Key Refresh Mechanism for non roaming 216
9.2.2 Mutual Authentication Key Refresh Mechanism for roaming with V-SLP 217
9.2.3 Mutual Authentication Key Refresh Mechanism for roaming with H-SLP 218
10. PROTOCOLS AND INTERFACES 219
10.1 TCP/IP 219
10.2 LLP 219
10.2.1 Positioning Control 219
10.2.2 Positioning Data 220
11. ILP MESSAGE DEFINITIONS (NORMATIVE) 221
11.1 COMMON PART 221
11.2 MESSAGE SPECIFIC PART 221
11.2.1 PREQ 222
11.2.2 PRES 223
11.2.3 PRPT 224
11.2.4 PLREQ 224
11.2.5 PLRES 224
11.2.6 PINIT 225
11.2.7 PAUTH 226
11.2.8 PALIVE 227
11.2.9 PEND 227
11.2.10 PMESS 227
12. PARAMETER DEFINITIONS (NORMATIVE) 229
12.1 VERSION 229
12.2 SESSION ID2 229
12.2.1 SLC Session ID 230
12.2.2 SET Session ID 230
12.2.3 SPC Session ID 231
12.3 POSITIONING METHOD 231
12.4 SLP MODE 232
12.5 LOCATION ID 233
12.5.1 GSM Cell Info 233
12.5.2 WCDMA/TD-SCDMA Cell Info 234
12.5.3 LTE Cell Info 236
12.5.4 CDMA Cell Info 237
12.5.5 HRPD Cell Info 237
12.5.6 UMB Cell Info 238
12.5.7 WLAN AP Info 238
12.5.8 WiMAX BS Info 239
12.6 POSITION 241
12.7 TRIGGER PARAMS 242
12.8 SPC_SET_KEY 242
12.9 SPC-TID 242
12.10 SPC_SET_KEY_LIFETIME 242
12.11 QOP 243
12.12 SPC STATUS CODE 243
12.13 NUMBER OF FIX 243
12.14 SET CAPABILITIES 244
12.15 REQUESTED ASSISTANCE DATA 246
12.16 POSITIONING PAYLOAD 252
12.17 MULTIPLE LOCATION IDS 252
12.18 VELOCITY 253
12.19 UTRAN GPS REFERENCE TIME RESULT 254
12.20 UTRAN GANSS REFERENCE TIME RESULT 254
12.21 UTRAN GPS REFERENCE TIME ASSISTANCE 255
12.22 UTRAN GANSS REFERENCE TIME ASSISTANCE 256

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12.23 GNSS POSITIONING TECHNOLOGY 258
12.24 APPROVED POSITIONING METHODS 258
12.25 SUPPORTED POSITIONING METHODS 260
12.26 PREFERRED POSITIONING METHOD 261
12.27 STATUS CODE 262
13. ASN.1 ENCODING OF ILP MESSAGES (NORMATIVE) 263
13.1 COMMON PART 263
13.2 MESSAGE SPECIFIC PART 264
13.2.1 PREQ 264
13.2.2 PRES 265
13.2.3 PRPT 265
13.2.4 PLREQ 265
13.2.5 PLRES 266
13.2.6 PINIT 266
13.2.7 PAUTH 269
13.2.8 PALIVE 269
13.2.9 PEND 269
13.2.10 PMESS 270
13.3 COMMON ELEMENTS 270
APPENDIX A. CHANGE HISTORY (INFORMATIVE) 283
A.1 APPROVED VERSION HISTORY 283
A.2 DRAFT/CANDIDATE VERSION 2.0 HISTORY 283
APPENDIX B. STATIC CONFORMANCE REQUIREMENTS (NORMATIVE) 287
B.1 SCR FOR SLC 287
B.1.1 SLC Procedures 287
B.1.2 ILP Protocol Interface 287
B.1.3 ILP Messages 287
B.1.4 Support of Parameters for Optional Functions 287
B.2 SCR FOR SPC 289
B.2.1 SPC Procedures 289
B.2.2 ILP Protocol Interface 289
B.2.3 ILP Messages 289
B.2.4 Support of Parameters for Optional Functions 289
APPENDIX C. TIMER TABLES 292
C.1 ILP TIMERS 292
C.2 ULP TIMERS 293

Figures

Figure 1: Network Initiated Non-Roaming Successful Case – Proxy Mode 19

Figure 2: Network Initiated Roaming Successful Case – Proxy mode with V-SLP positioning 22

Figure 3: Network Initiated Roaming Successful case – Proxy mode with H-SLP positioning 25

Figure 4: Notification/Verification based on current location, Network Initiated Non-Roaming Successful Case – Proxy Mode 28

Figure 5: Notification/Verification based on current location, Network Initiated Roaming Successful Case – Proxy mode with V-SLP positioning 31

Figure 6: Notification/Verification based on current location, Network Initiated Roaming Successful case – Proxy mode with H-SLP positioning 34

Figure 7: Network Initiated Non-Roaming Successful Case – Non-Proxy mode 37

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Figure 8: Network Initiated Roaming Successful Case – Non-Proxy-mode with V-SPC positioning 40

Figure 9: Network Initiated Roaming Successful Case – Non-Proxy-mode with H-SPC 43

Figure 10: Notification/Verification based on current location, Network Initiated Non-Roaming Successful Case – Non-Proxy mode 46

Figure 11: Notification/Verification based on current location, Network Initiated Roaming Successful Case – Non-Proxy-mode with V-SPC positioning 49

Figure 12: Notification/Verification based on current location, Network Initiated Roaming Successful Case – Non-Proxy-mode with H-SPC positioning 53

Figure 13: Network Initiated SET User Rejects Positioning for Non-Roaming 56

Figure 14: Network Initiated SET User Denies Positioning for Roaming with V-SLP 58

Figure 15: SET-Initiated Non-Roaming Successful Case - Proxy mode 60

Figure 16: SET-Initiated Roaming Successful Case – Proxy mode with V-SLP positioning 63

Figure 17: SET-Initiated Roaming Successful Case – Proxy mode with H-SLP positioning 66

Figure 18: SET-Initiated Non-Roaming Successful Case – Non-Proxy mode 69

Figure 19: SET-Initiated Roaming Successful Case – Non-Proxy mode with V-SPC positioning 71

Figure 20: SET-Initiated Roaming Successful Case – Non-Proxy mode with H-SPC positioning 74

Figure 21: Network Initiated Emergency Services Non-Roaming Successful Case – Proxy Mode 77

Figure 22: Network Initiated Emergency Services Roaming Successful Case – Proxy Mode with V-SLP positioning 79

Figure 23: Network Initiated Non-Roaming Successful Case – Non-Proxy mode 82

Figure 24: Network Initiated Roaming Successful Case – Non-Proxy-mode with V-SPC positioning 85

Figure 25: Network Initiated Periodic Trigger Service Non-Roaming Successful Case – Proxy Mode (Part I) 89

Figure 26: Network Initiated Periodic Trigger Service Non-Roaming Successful Case – Proxy Mode (Part II) 90

Figure 27: Network Initiated Periodic Trigger Service Roaming Successful Case – Proxy with V-SLP positioning (Part I) 94

Figure 28: Network Initiated Periodic Trigger Service Roaming Successful Case – Proxy with V-SLP positioning (Part II) 95

Figure 29: Network Initiated Periodic Trigger Service Roaming Successful Case – Proxy with H-SLP positioning (Part I) 100

Figure 30: Network Initiated Periodic Trigger Service Roaming Successful Case – Proxy with H-SLP positioning (Part II) 101

Figure 31: Network Initiated Periodic Trigger Service Non-Roaming Successful Case – Non-Proxy Mode (Part I) 105

Figure 32: Network Initiated Periodic Trigger Service Non-Roaming Successful Case – Non-Proxy Mode (Part II) 106

Figure 33: Network Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning (Part I) 110

Figure 34: Network Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning (Part II) 111

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Figure 35: Network Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning (Part I) 116

Figure 36: Network Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning (Part II) 117

Figure 37: Network Initiated Triggered location, Network cancels the triggered location request 121

Figure 38: Network Initiated Triggered location, SET cancels the triggered location request 122

Figure 39: SET Initiated Periodic Trigger Service Non-Roaming Successful Case – Proxy Mode 123

Figure 40: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with V-SLP positioning 126

Figure 41: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with H-SLP positioning 129

Figure 42: SET Initiated Periodic Trigger Service Non-Roaming Successful Case – Non-Proxy Mode 132

Figure 43: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning ..135

Figure 44: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning .138

Figure 45: SET Periodic Trigger Service Non-Roaming Successful Case – Proxy Mode (Part I) 141

Figure 46: SET Periodic Trigger Service Non-Roaming Successful Case – Proxy Mode (Part II) 142

Figure 47: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with V-SLP positioning (Part I) 145

Figure 48: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with V-SLP positioning (Part II) 146

Figure 49: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with H-SLP positioning (Part I) 150

Figure 50: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with H-SLP positioning (Part II) 151

Figure 51: SET Initiated Periodic Trigger Service Non-Roaming Successful Case – Non-Proxy Mode (Part I) 155

Figure 52: SET Initiated Periodic Trigger Service Non-Roaming Successful Case – Non-Proxy Mode (Part II) 156

Figure 53: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning (Part I) 159

Figure 54: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning (Part II) 160

Figure 55: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning (Part I) 164

Figure 56: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning (Part II) 165

Figure 57: Retrieval of historical positions and/or enhanced cell/sector measurements – non-roaming 169

Figure 58: Retrieval of historical positions and/or enhanced cell/sector measurements – roaming 170

Figure 59: Network Initiated Area Event Trigger Service Non-Roaming Successful Case – Proxy Mode 173

Figure 60: Network Initiated Area Event Trigger Service Roaming Successful Case – Proxy with V-SLP positioning 177

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Figure 61: Network Initiated Area Event Trigger Service Roaming Successful Case – Proxy with H-SLP positioning 181

Figure 62: Network Initiated Area Event Trigger Service Non-Roaming Successful Case – Non-Proxy Mode 185

Figure 63: Network Initiated Area Event Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning 188

Figure 64: Network Initiated Area Event Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning 192

Figure 65: SET Initiated Area Event Trigger Service Non-Roaming Successful Case – Proxy Mode 196

Figure 66: SET Initiated Area Event Trigger Service Roaming Successful Case – Proxy with V-SLP positioning 199

Figure 67: SET Initiated Area Event Trigger Service Roaming Successful Case – Proxy with H-SLP positioning 202

Figure 68: SET Initiated Area Event Trigger Service Non-Roaming Successful Case – Non-Proxy Mode 205

Figure 69: SET Initiated Area Event Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning 208

Figure 70: SET Initiated Area Event Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning 211

Figure 71: Successsful PALIVE exchange 214

Figure 72: PALIVE Error handling 214

Figure 73: Mutual authentication key refresh mechanism for non roaming 216

Figure 74: Mutual authentication key refresh mechanism for roaming with V-SLP 217

Tables

Table 1: Llp Positioning Control 219

Table 2: Llp Positioning Data 220

Table 3: Common Part 221

Table 4: PREQ Message 223

Table 5: PRES Message 223

Table 6: PRPT Message 224

Table 7: PLREQ Message 224

Table 8: PLRES Message 224

Table 9: PINIT Message 226

Table 10: PAUTH Message 227

Table 11: PALIVE Message 227

Table 12: PEND Message 227

Table 13: PMESS Message 228

Table 14: Version Parameter 229

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Table 15: Session ID2 Parameter **230**

Table 16: SLC Session ID Parameter **230**

Table 17: SET Session ID Parameter **231**

Table 18: SPC Session ID Parameter **231**

Table 19: Positioning Method Parameter **232**

Table 20: SLP Mode Parameter **233**

Table 21: Location ID Parameter **233**

Table 22: GSM Cell Info Parameter **234**

Table 23: WCDMA/TD-SCDMA Cell Info Parameter **236**

Table 24: LTE Cell Info **237**

Table 25: CDMA Cell Info **237**

Table 26: HRPD Cell Info **238**

Table 27: UMB Cell Info **238**

Table 28: WLAN AP Info **239**

Table 29: WiMAX BS Info **240**

Table 30: Position Parameter **241**

Table 31: Trigger Parameter **242**

Table 32: SPC_SET_Key Parameter **242**

Table 33: SPC-TID Parameter **242**

Table 34: SPC_SET_Key_lifetime Parameter **243**

Table 35: QoP Parameter **243**

Table 36: Status Code Parameter **243**

Table 37: Number of Fix Parameter **243**

Table 38: SET Capabilities Parameter **246**

Table 39: Requested Assistance Data Parameter **252**

Table 40: Positioning Payload Parameter **252**

Table 41: Multiple Location ID Parameter **253**

Table 42: Velocity Parameter **254**

Table 43: UTRAN GPS Reference Time Result **254**

Table 44: UTRAN GANSS Reference Time Result **255**

Table 45: UTRAN GPS Reference Time Assistance **256**

Table 46: UTRAN GANSS Reference Time Assistance **258**

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Table 47: GNSS Positioning Technology 258

Table 48: Approved Positioning Methods 260

Table 49: Supported Positioning Methods....261

Table 50: Preferred Positioning Method 262

Table 51: Status Code Parameter....262

Table 52: SLC Timer Values 292

Table 53: SLC Timer Values 292

Table 54: SPC Timer Values....293

Table 55: SET Timer Values....293

Table 56: SET Timer Values....294

Table 57: SLP Timer Values....294

Table 58: SLP Timer Values....295

Table 59 RLP Timer Values 295

Table 60 RLP Timer Values 295

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1. Scope

This document describes the Internal Location Protocol (ILP) for SUPL 2.0. ILP is a protocol-level instantiation of the Llp reference point described in [SUPLAD2]. The protocol is used between the SLC (SUPL Location Center) and a SPC (SUPL Positioning Center). For more details about SUPL Requirements refer to [SUPLRD2]. For more details about SUPL architecture and call-flows, refer to [SUPLAD2] and [SUPL2 ULP TS].

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[SUPL2 ULP TS] "UserPlane Location Protocol", Version 2.0, Open Mobile Alliance™, OMA-TS-ULP-V2,
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URL:http://www.itu.int/ITU-T/studygroups/com17/languages/X694.pdf

[3GPP 25.225] 3GPP TS 25.225 "Physical Layer Measurements (TDD)"
URL:http://www.3gpp.org/

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3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC 2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

Location ID	The Location ID defines the current serving cell, current serving WLAN AP or current serving WiMAX BS information of the SET.
Major Version	Major Versions are likely to contain major feature additions; MAY contain incompatibilities with previous specification revisions; and though unlikely, could change, drop, or replace standard or existing interfaces. Initial releases are “1_0”. [OMAOPS]
Minor Version	Minor versions are likely to contain minor feature additions, be compatible with the preceding Major Version. Minor specification revision include existing interfaces, although it MAY provide evolving interfaces. The initial minor release for any major release is “0”, i.e. 1_0 [OMAOPS]
Multiple Location IDs	The Multiple Location IDs parameter may contain current non-serving cell, current non-serving WLAN AP or current non-sercing WiMAX BS information for the SET and/or historic serving or non-serving cell, WLAN AP or WiMAX BS information for the SET.
Quality of Position	A set of attributes associated with a request for the geographic position of SET. Theattributes include the required horizontal accuracy, vertical accuracy, max location age, and response time of the SET position.
Service Indicator	Service Indicators are intended to be compatible with the Major_Minor release they relate to but add bug fixes. No new functions will be added through the release of Service Indicators. [OMAOPS]
SUPL Roaming	For positioning not associated with an emergency services call, SUPL Roaming occurs when a SET leaves the service area of its H-SLP. See [SUPL2 ULP TS] for a more detailed description.

3.3 Abbreviations

A-GNSS	Assisted GNSS
A-GPS	Assisted GPS
AP	Access Point (WLAN)
BS	Base Station (WiMAX)
CI	Cell Identity (3GPP)
FQDN	Fully Qualified Domain Name
GANSS	Galileo and Additional Navigation Satellite Systems
GLONASS	**GLO**bal'naya **NA**vigatsionnaya **S**putnikovaya **S**istema (Engl.: Global Navigation Satellite System)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
LAC	Location Area Code (3GPP)
Lid	Location ID
LTE	Long Term Evolution
MCC	Mobile Country Code (3GPP)
MNC	Mobile Network Code (3GPP)

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NID	Network ID (C.S0022-A V1.0)
OMA	Open Mobile Alliance
QoP	Quality of Position
QZSS	Quasi-Zenith Satellite System
RNC	Radio Network Controller
SBAS	Satellite Based Augmentation System
SET	SUPL Enabled Terminal
SID	System ID (C.S0022-A V1.0)
SLC	SUPL Location Center
SLP	SUPL Location Platform
SM	Short Message
SMS	Short Message Service
SPC	SUPL Positioning Center
TCP	Transmission Control Protocol
TD-SCDMA	Time Division-Synchronous Code Division Multiple Access
ULP	Userplane Location Protocol
UMB	Ultra Mobile Broadband
WAP	Wireless Application Protocol
WCDMA	Wideband Code Division Multiple Access
WLAN	Wireless Local Area Network

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4. Introduction

This specification describes the ILP protocol, a protocol-level instantiation of the Llp reference point. The Llp reference point has been introduced into SUPL 2.0 to allow operators the use of an open interface (Llp) between the SLC and the SPC. Whether or not Llp is present in a particular implementation is optional. The presence (or absence) of Llp in a particular implementation is transparent to SUPL. The presence of Llp in an implementation does not in itself imply that SLC and SPC are deployed as physically separate network elements.

The target audience for this specification are developers, systems or network engineers developing or deploying SUPL.

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5. Detailed Flows – Immediate Service

The flows in this section are those in which an immediate position is required.

Set up and release of connections:

Before sending any ULP messages the SET SHALL take needed actions such that a TLS connection exists to the SLP/SLC. This can be achieved by establishing a new connection, resume a connection or reuse an existing TLS connection. This includes establishment or utilization of various data connectivity resources that depends on the terminal in which the SET resides and the type of access network. Data connectivity below IP-level is out of scope of this document.

The detailed flows in this section describes when a TLS connection no longer is needed. The TLS connection shall then be released unless another SUPL session is using the TLS connection.

5.1 Network Initiated – Proxy Mode

This section describes Network Initiated Proxy mode scenarios.

The Roaming cases are described with an R-SLC in the flow descriptions but the R-SLC can be omitted in the flow descriptions having the H-SLP interacting directly with SUPL Agent. In the Non-Roaming flow descriptions an R-SLC can be inserted between SUPL Agent and H-SLP.

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5.1.1 Non-Roaming Successful Case

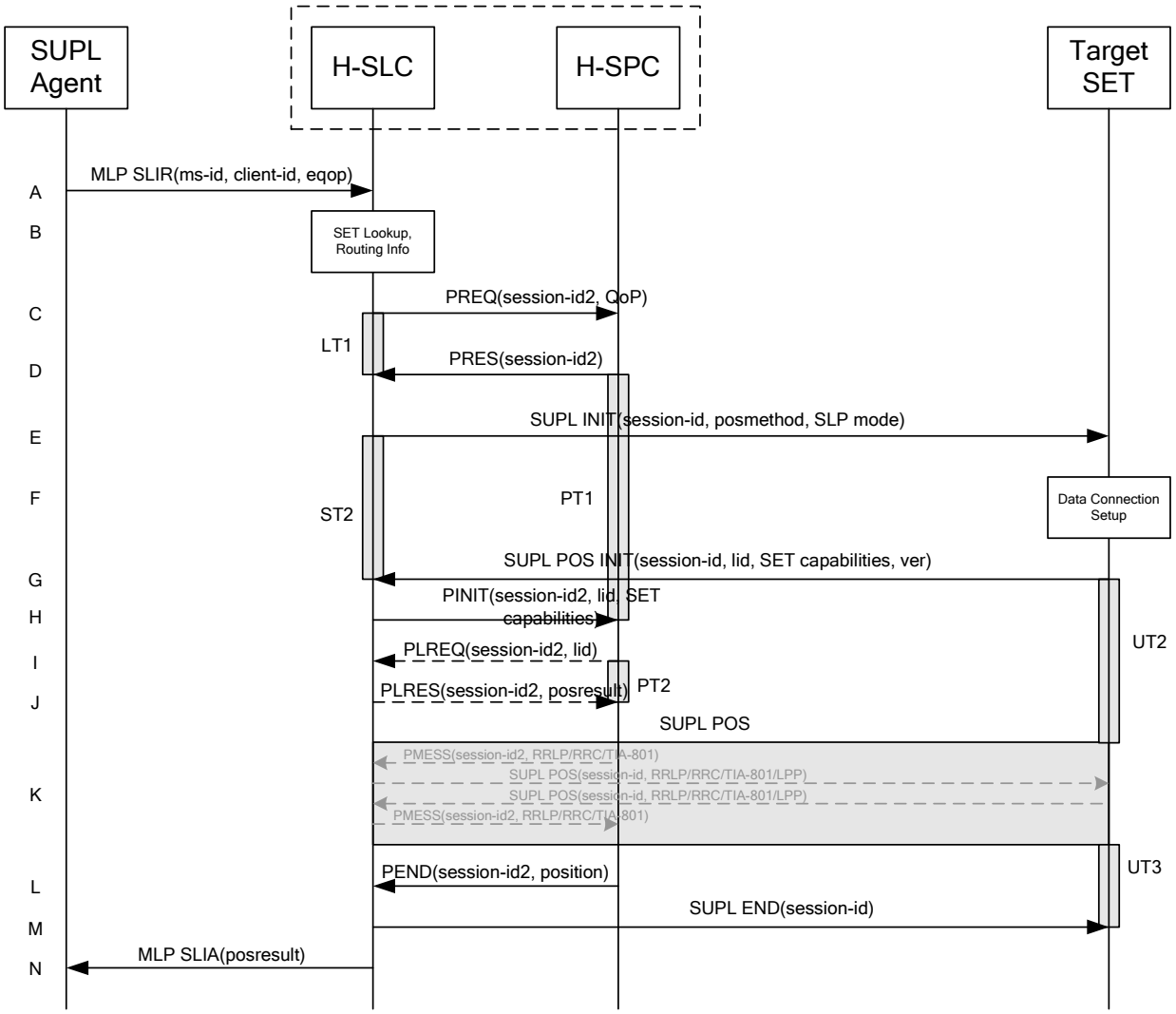

Figure 1: Network Initiated Non-Roaming Successful Case – Proxy Mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id.
If a previously computed position which meets the requested QoP is available at the H-SLC and no notification or verification is required, the H-SLC SHALL directly proceed to step N. If notification and verification or notification only is required, the H-SLC SHALL proceed to step E after having performed the SET Lookup and Routing Info procedures of step B.

B. The H-SLC verifies that the target SET is currently not SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

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C. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

D. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

E. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL set notification mode to notification based on current location and SHALL NOT include the notification element in the SUPL INIT message; otherwise, the H-SLP SHALL set the notification mode indicator to normal notification and if notification or verification to the target subscriber is needed, the H-SLP SHALL also include the notification element in the SUPL INIT message.Before the SUPL INIT message is sent the H-SLC also computes and stores a hash of the message.
If in step A the H-SLC decided to use a previously computed position, the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message carrying the results of the verification process (access granted, or access denied). If no explicit verification is required (notification only) the SET SHALL respond with a SUPL END message. The H-SLC SHALL then directly proceed to step N.

NOTE 4: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step F and use the procedures described in step G to establish a secure connection to the H-SLC.

F. The SET analyses the received SUPL INIT. If found to be non authentic SET takes no further actions. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

G. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using SLP address that has been provisioned by the Home Network to the SET. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SET SHALL send the SUPL POS INIT message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. The H-SLC SHALL check that the hash of SUPL INIT matches the one it has computed for this particular session.

H. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id and SET capabilities. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step D, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL then determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step C. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g. RRLP, RRC, TIA-801 or LPP) from the PINIT message. If a position received from or calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

I. If the H-SPC cannot translate the lid received in step H into a position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into a position itself.

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J. This step is conditional and only occurs if step I was performed. The H-SLC reports the position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the position meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

K. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SLP (SET-Based).

L. Once the position calculation is complete the H-SPC sends a PEND message to the H-SLC.

M. The H-SLC sends a SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. The SET SHALL release the secure connection to the H-SLC and release all resources related to this session.

N. The H-SLC sends the position estimate back to the SUPL Agent in an MLP SLIA message and the H-SLP SHALL release all resources related to this session.

5.1.2 Roaming with V-SLP Positioning Successful Case

SUPL Roaming where the V-SLP is involved in the positioning calculation.

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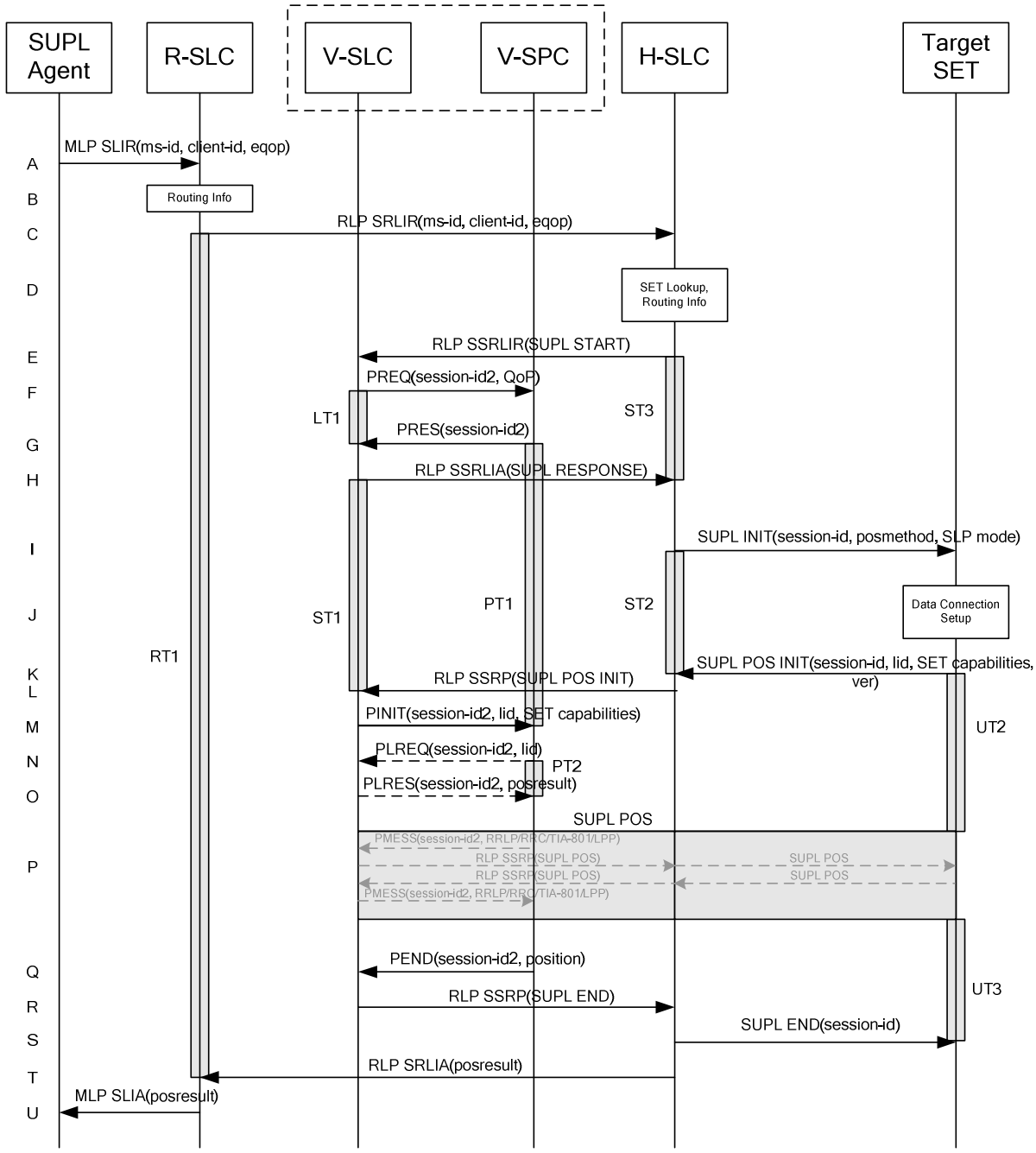

Figure 2: Network Initiated Roaming Successful Case – Proxy mode with V-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the R-SLC, with which SUPL Agent is associated. The R-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received.

B. The R-SLC determines the H-SLC based on the received msid.

NOTE 2: The specifics for determining the H-SLC are considered outside scope of SUPL. However, there are various environment dependent mechanisms.

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C. The R-SLC then forwards the location request to the H-SLC of the target subscriber, using RLP protocol. Based on the received ms-id the H-SLC SHALL apply subscriber privacy against the client-id. If a previously computed position which meets the requested QoP is available at the H-SLC and no notification or verification is required, the H-SLC SHALL directly proceed to step U. If notification and verification or notification only is required, the H-SLC SHALL proceed to step I after having performed step D.

D. The H-SLC verifies that the target SET is currently SUPL Roaming. In addition the H-SLC MAY also verify that the target SET supports SUPL.

NOTE 3: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope

E. The H-SLC sends an RLP SSRLIR to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. Mandatory parameters in SUPL START that are not known to the H-SLC (lid and SET capabilities) shall be populated with arbitrary values by the H-SLC and be ignored by V-SLC. The SET part of the session-id will not be included in this message by the H-SLC to distinguish this scenario from a SET Initiated scenario.

F. The V-SLC requests service from the V-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

G. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

H. The V-SLC acknowledges that it is ready to initiate a SUPL positioning procedure with an RLP SSRLIA back to the H-SLC.

I. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step C indicates that notification or verification to the target subscriber is needed, the H-SLC SHALL also include the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent the H-SLC also computes and stores a hash of the message.
If in step C the H-SLC decided to use a previously computed position the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message to the H-SLC carrying the results of the verification process (access granted, or access denied). If no verification is required (notification only) the SET SHALL respond with a SUPL END message to the H-SLC. The H-SLP SHALL then directly proceed to step U.

NOTE 5: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step J and use the procedures described in step K to establish a secure connection to the H-SLC.

J. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection..

K. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using the H-SLP address that has been provisioned by the Home Network to the SET. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLC. The SET SHALL send the SUPL POS INIT message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally

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provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.

L. The H-SLC SHALL check that the hash of SUPL INIT matches the one it has computed for this particular session. The H-SLC then tunnels the SUPL POS INIT message to the V-SLC using RLP.

M. The V-SLC sends a PINIT message to the V-SPC including session-id2, location id and SET capabilities. The V-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the V-SPC in step G, or a different posmethod of the V-SLC's choosing, as long as it is one supported by the V-SPC. Based on the PINIT message including the SET capabilities, the V-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the V-SLC, the V-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the V-SPC shall choose any posmethod in line with the SET capabilities which was approved by the V-SLC in step F. If required for the posmethod the V-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the PINIT message. If an initial position calculated based on information received in the PINIT message is available that meets the required QoP, the V-SPC MAY directly proceed to step Q and not engage in a SUPL POS session.

N. If the V-SPC cannot translate the lid received in step M into an initial position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into an initial position itself.

O. This step is conditional and only occurs if step N was performed. The V-SLC reports an initial position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the initial position meets the required QoP, the V-SPC MAY directly proceed to step Q and not engage in a SUPL POS session.

P. The SET and the V-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SPC and the V-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SLC and the H-SLC using SUPL POS over RLP tunnel messages. The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages. The flow sequence PMESS – RLP SSRP(SUPL POS) – SUPL POS – SUPL POS – RLP SSRP(SUPL POS) – PMESS is conceptually shown in dotted lines.
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

Q. Once the position calculation is complete, the V-SPC sends a PEND message to the V-SLC.

R. The V-SLC sends a SUPL END message to the H-SLC over RLP.

S. The H-SLC sends the SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. The SET SHALL release the secure connection to the H-SLC and release all resources related to this session.

T. The H-SLC sends the position estimate back to the R-SLC using an RLP SRLIA message. The H-SLC SHALL release all resources related to this session.

U. The R-SLC sends the position estimate back to the SUPL Agent using an MLP SLIA message.

5.1.3 Roaming with H-SLP Positioning Successful Case

SUPL Roaming where the H-SLP is involved in the positioning calculation.

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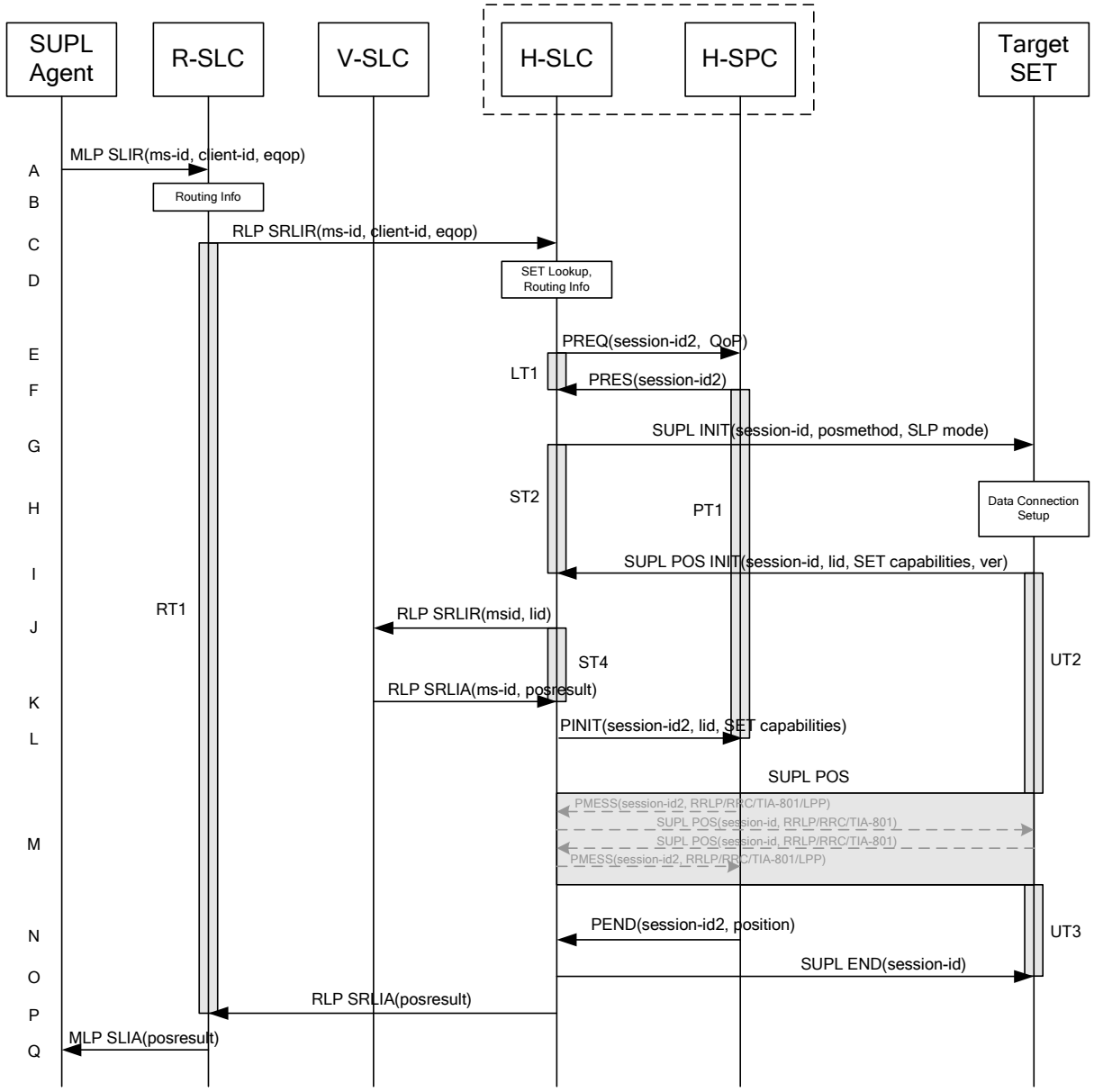

Figure 3: Network Initiated Roaming Successful case – Proxy mode with H-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the R-SLC, with which the SUPL Agent is associated. The R-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received.

B. The R-SLC determines the H-SLC based on the received msid.

NOTE 2: The specifics for determining the H-SLC are considered outside scope of SUPL. However, there are various environment dependent mechanisms.

C. The R-SLC then forwards the location request to the H-SLC of the target subscriber, using RLP protocol. Based on the received ms-id the H-SLC SHALL apply subscriber privacy against the client-id. If a previously computed position which meets the requested QoP is available at the H-SLC and no notification or verification is required, the

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H-SLC SHALL directly proceed to step Q. If notification and verification or notification only is required, the H-SLP SHALL proceed to step G after having performed step D.

D. The H-SLC verifies that the target SET is currently SUPL Roaming. In addition the H-SLC MAY also verify that the target SET supports SUPL.

NOTE 3: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 4: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 5: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

E. The H-SLC requests service from the H-SPC for the SUPL session by sending a PREQ message containing the session-id2 and the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

F. The H-SPC confirms its readiness for a SUPL session with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

G. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step indicates that notification or verification to the target subscriber is needed, the H-SLC SHALL also include the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent the H-SLC also computes and stores a hash of the message.
If in step C the H-SLC decided to use a previously computed position the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message to the H-SLC carrying the results of the verification process (access granted, or access denied). If no verification is required (notification only) the SET SHALL respond with a SUPL END message to the H-SLC. The H-SLC SHALL then directly proceed to step Q.

NOTE 6: Before sending the SUPL END message the SET shall follow the data connection setup procedure of step H and use the procedures described in step I to establish a secure connection to the H-SLC.

H. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

I. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using the H-SLP address that has been provisioned by the Home Network to the SET. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SET SHALL send the SUPL POS INIT message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid) and a hash of the received SUPL INIT message (ver). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.

J. The H-SLC SHALL check that the hash of SUPL INIT matches the one it has computed for this particular session. If an initial position calculated based on information received in the SUPL POS INIT message is available which meets the requested QoP, the H-SLC MAY directly proceed to step O and send a PEND message to the H-SPC. The Otherwise the H-SLC decides that the H-SPC will provide assistance/position calculation and the H-SLC sends an RLP SRLIR request to the V-SLC to determine an initial position for further exchange of SUPL POS messages between SET and H-SPC. The RLP request contains at least the msid and the Location ID (lid). Optionally the H-SLC MAY forward NMR provided by the SET to the V-SLC.

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K. The V-SLC returns a RLP SRLIA message. The RLP SRLIA message contains at least the position result (e.g., initial position for A-GPS positioning).

L. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id, SET capabilities and position estimate (i.e. initial position received from the V-SLC in the previous step). The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step F, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. If the computed position meets the requested QoP, the H-SPC MAY directly move to step N and not engage in a SUPL POS session.

M. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step E. If required for the posmethod, the H-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the PINIT message.
The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET based).

N. Once the position calculation is complete the H-SPC sends a PEND message to the H-SLC.

O. The H-SLC sends a SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. The SET SHALL release the secure connection to the H-SLC and release all resources related to this session.

P. The H-SLC forwards the location estimate to the R-SLC if the position estimate is allowed by the privacy settings of the target subscriber. The H-SLC SHALL release all resources related to this session.

Q. The R-SLC sends the position estimate back to the SUPL Agent using the MLP SLIA message.

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5.1.4 Non-Roaming Successful Case, Notification/Verification based on current location

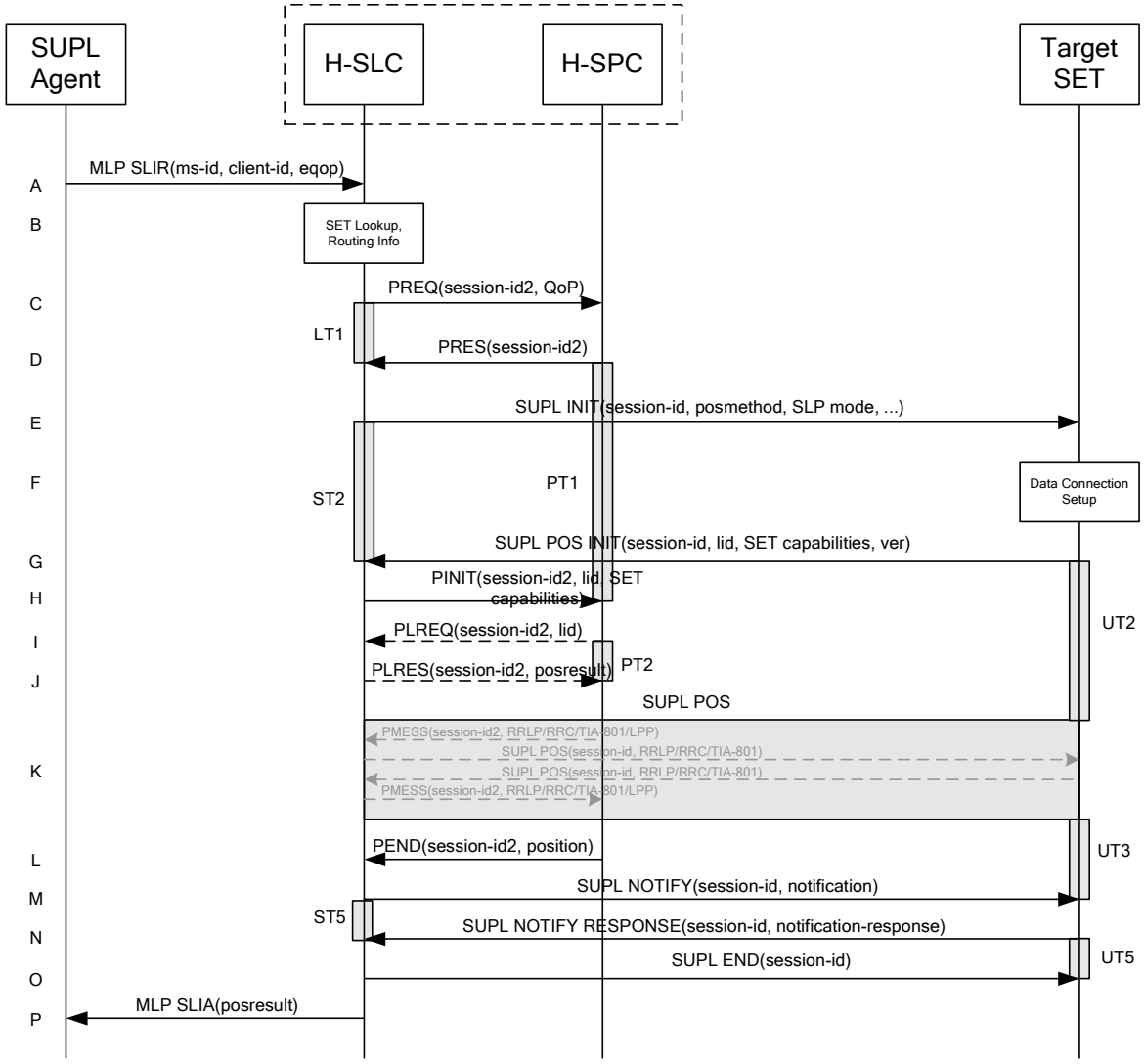

Figure 4: Notification/Verification based on current location, Network Initiated Non-Roaming Successful Case – Proxy Mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id.
If a previously computed position which meets the requested QoP is available at the H-SLC and, based on that position, no notification or verification is required, the H-SLC SHALL directly proceed to step P. If, based on that position, notification and verification or notification only is required, the H-SLC SHALL proceed to step B.

B. The H-SLC verifies that the target terminal is currently not SUPL Roaming. The H-SLC may also verify that the target terminal supports SUPL.

NOTE 2: The specifics for determining if the SET is roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

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C. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

D. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

E. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, proxy/non-proxy mode indicator and the intended positioning method. As in this case the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL include the Notification Mode element in the SUPL INIT to indicate notification based on current location and SHALL NOT include the notification element in the SUPL INIT message. Before the SUPL INIT message is sent the H-SLC also computes and stores a hash of the message.
If in step A the H-SLC decided to use a previously computed position, the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message carrying the results of the verification process (access granted, or access denied). If no explicit verification is required (notification only) the SET SHALL respond with a SUPL END message. The H-SLC SHALL then directly proceed to step P.

NOTE 3: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step F.

F. The SET analyses the received SUPL INIT. If found to be non authentic, the SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

G. The SET will evaluate the Notification rules and follow the appropriate actions. The SET checks the notification mode indicator and determines that in this case the notification is performed based on the location of the SET. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using H-SLP address that has been provisioned by the Home Network to the SET. If no H-SLP address is provided in the SUPL INIT message the SET SHALL use the default H-SLP address, provisioned by the Home Network, when establishing the secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, IS-801). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if it is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. The H-SLC SHALL check that the hash of SUPL INIT matches the one it has computed for this particular session

H. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id and SET capabilities. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step D, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL then determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step C. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the PINIT message. If a position received from or calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

I. If the H-SPC cannot translate the lid received in step H into a position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into a position itself.

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J. This step is conditional and only occurs if step I was performed. The H-SLC reports the position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the position meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

K. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SLP (SET-Based).

L. Once the position calculation is complete, the H-SPC sends a PEND message to the H-SLC

M. The H-SLP applies subscriber privacy against the SET position estimate determined in Step K. If, based on this position, notification and verification or notification only is required, the H-SLP SHALL send a SUPL NOTIFY message to the SET. The SUPL NOTIFY message contains the notification element. If, based on this position, no notification or verification is required, the H-SLP SHALL directly proceed to Step O.

N. The SET SHALL send a SUPL NOTIFY RESPONSE message to the H-SLC. If notification and verification was required in step M then this will contain the containing the notification response from the user.

O. Once the position calculation is complete the H-SLC sends the SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. The SET SHALL release the secure connection to the H-SLC and release all resources related to this session.

P. The H-SLC sends the position estimate back to the SUPL Agent in an MLP SLIA message and the H-SLP SHALL release all resources related to this session.

5.1.5 Roaming with V-SLP Positioning Successful Case, Notification/Verification based on current location

SUPL Roaming where the V-SLP is involved in the positioning calculation.

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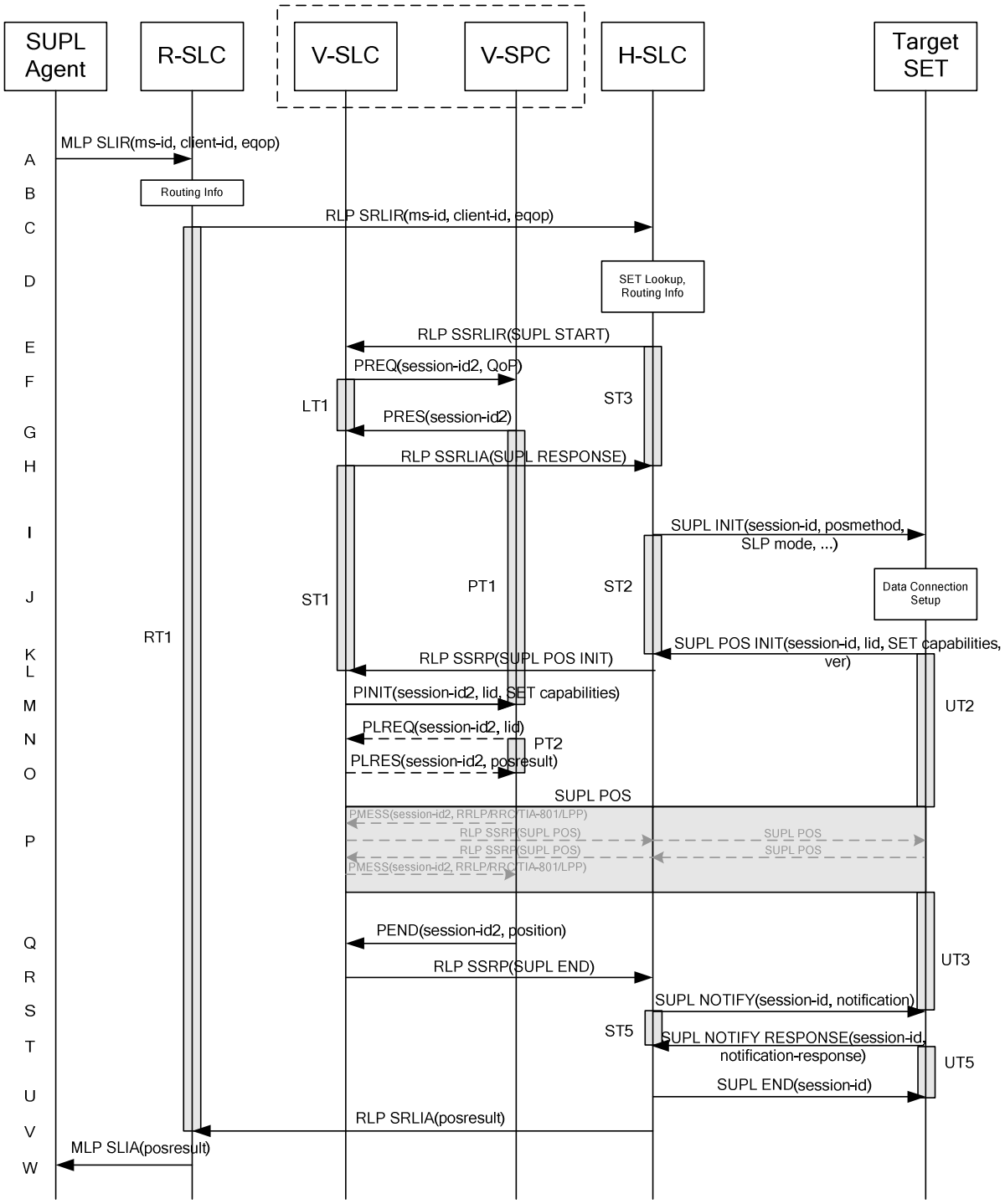

Figure 5: Notification/Verification based on current location, Network Initiated Roaming Successful Case – Proxy mode with V-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the R-SLC, with which SUPL Agent is associated. The R-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requested, based on the client-id received.

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B. The R-SLC determines the H-SLC based on the received msid. If the R-SLC determines that the SUPL Agent is not authorized for this request, Step W will be returned with the applicable MLP return code.

NOTE 2: The specifics for determining the H-SLP are considered outside scope of SUPL. However, there are various environment dependent mechanisms.

C. The R-SLC then forwards the location request to the H-SLC of the target subscriber, using RLP protocol. If a previously computed position which meets the requested QoP is available at the H-SLC and, based on that position, no notification or verification is required, the H-SLC SHALL directly proceed to step V. If, based on that position, notification and verification or notification only is required, the H-SLC SHALL proceed to step I after having performed the SET Lookup and Routing Info procedures of step D.

D. Based on the received ms-id the H-SLC SHALL apply subscriber privacy against the client-id. The H-SLC verifies that the target SET is currently SUPL Roaming. In addition the H-SLC MAY also verify that the target SET supports SUPL.

NOTE 3: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

E. The H-SLC sends an RLP SSRLIR to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. Mandatory parameters in SUPL START that are not known to H-SLC (lid and SET capabilities) shall be populated with arbitrary values by H-SLC and be ignored by V-SLC.

F. The V-SLC requests service from the V-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

G. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

H. The V-SLC acknowledges that it is ready to initiate a SUPL positioning procedure with an RLP SSRLIA back to the H-SLC.

I. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, proxy/non-proxy mode indicator and the intended positioning method. As in this case the result of the privacy check in Step D indicates that subscriber privacy check based on current location is required, the H-SLC SHALL include the Notification Mode element in the SUPL INIT message to indicate notification based on current location and SHALL NOT include the notification element in the SUPL INIT message..This step MAY be performed immediately after step D. Before the SUPL INIT message is sent the H-SLC also computes and stores a hash of the message.
If in step C the H-SLC decided to use a previously computed position the SUPL INIT message SHALL indicate this in a ‘no position’ posmethod parameter value and the SET SHALL respond with a SUPL END message to the H-SLC carrying the results of the verification process (access granted, or access denied). If no verification is required (notification only) the SET SHALL respond with a SUPL END message to the H-SLC. The H-SLC SHALL then directly proceed to step V.

NOTE 4: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step J.

Step I MAY be performed immediately after step D, however, the H-SLC SHALL not proceed with step L before step H has returned.

J. The SET analyses the received SUPL INIT. If found to be non authentic, the SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

K. The SET will evaluate the Notification rules and follow the appropriate actions. The SET checks the notification mode indicator and determines that in this case the notification is performed based on the location of the SET. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In

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this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using the H- SLP address that has been provisioned by the Home Network to the SET. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY optionally provide its position or network timing information, if these are available and supported by both SET and H-SLP. The SET MAY optionally set the Requested Assistance Data element in the SUPL POS INIT.

L. The H-SLC SHALL check that the hash of SUPL INIT matches the one it has computed for this particular session. The H-SLC then tunnels the SUPL POS INIT message over RLP to the V-SLC.

M. The V-SLC sends a PINIT message to the V-SPC including session-id2, location id and SET capabilities. The V-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the V-SPC in step G, or a different posmethod of the V-SLC's choosing, as long as it is one supported by the V-SPC. Based on the PINIT message including the SET capabilities, the V-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the V-SLC, the V-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the V-SPC shall choose any posmethod in line with the SET capabilities which was approved by the V-SLC in step F. If required for the posmethod the V-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the PINIT message. If an initial position calculated based on information received in the PINIT message is available that meets the required QoP, the V-SPC MAY directly proceed to step Q and not engage in a SUPL POS session.

N. If the V-SPC cannot translate the lid received in step M into an initial position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into an initial position itself.

O. This step is conditional and only occurs if step N was performed. The V-SLC reports an initial position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the initial position meets the required QoP, the V-SPC MAY directly proceed to step Q and not engage in a SUPL POS session.

P. The SET and the V-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SPC and the V-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SLC and the H-SLC using SUPL POS over RLP tunnel messages. The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages. The flow sequence PMESS – RLP SSRP(SUPL POS) – SUPL POS – SUPL POS – RLP SSRP(SUPL POS) – PMESS is conceptually shown in dotted lines..
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

Q. Once the position calculation is complete, the V-SPC sends a PEND message to the V-SLC.

R. Once the position calculation is complete the V-SLC sends the SUPL END message tunnelled over RLP to the H-SLC. The V-SLP SHALL release all resources related to this session.

S. The H-SLC applies subscriber privacy against the SET position estimate obtained in Step L. If, based on this position, notification and verification or notification only is required, the H-SLP SHALL send a SUPL NOTIFY message to the SET. The SUPL NOTIFY message contains notification element. If, based on this position, no notification and verification is required, the H-SLP SHALL directly proceed to Step U

T. The SET SHALL send a SUPL NOTIFY RESPONSE message to the H-SLC. If notification and verification was required in step S then this will contain the notification response from the user.

U. The H-SLC sends the SUPL END to the SET informing it that no further positioning procedure will be started and that the location session is finished. The SET SHALL release the secure connection to the H-SLC and release all resources related to this session.

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V. The H-SLC sends the position estimate back to the R-SLP in an RLP SRLIA message. The H-SLP SHALL release all resources related to this session.

W. The R-SLC sends the position estimate back to the SUPL Agent in an MLP SLIA message.

5.1.6 Roaming with H-SLP Positioning Successful Case, Notification/Verification based on current location

SUPL Roaming where the H-SLP is involved in the positioning calculation.

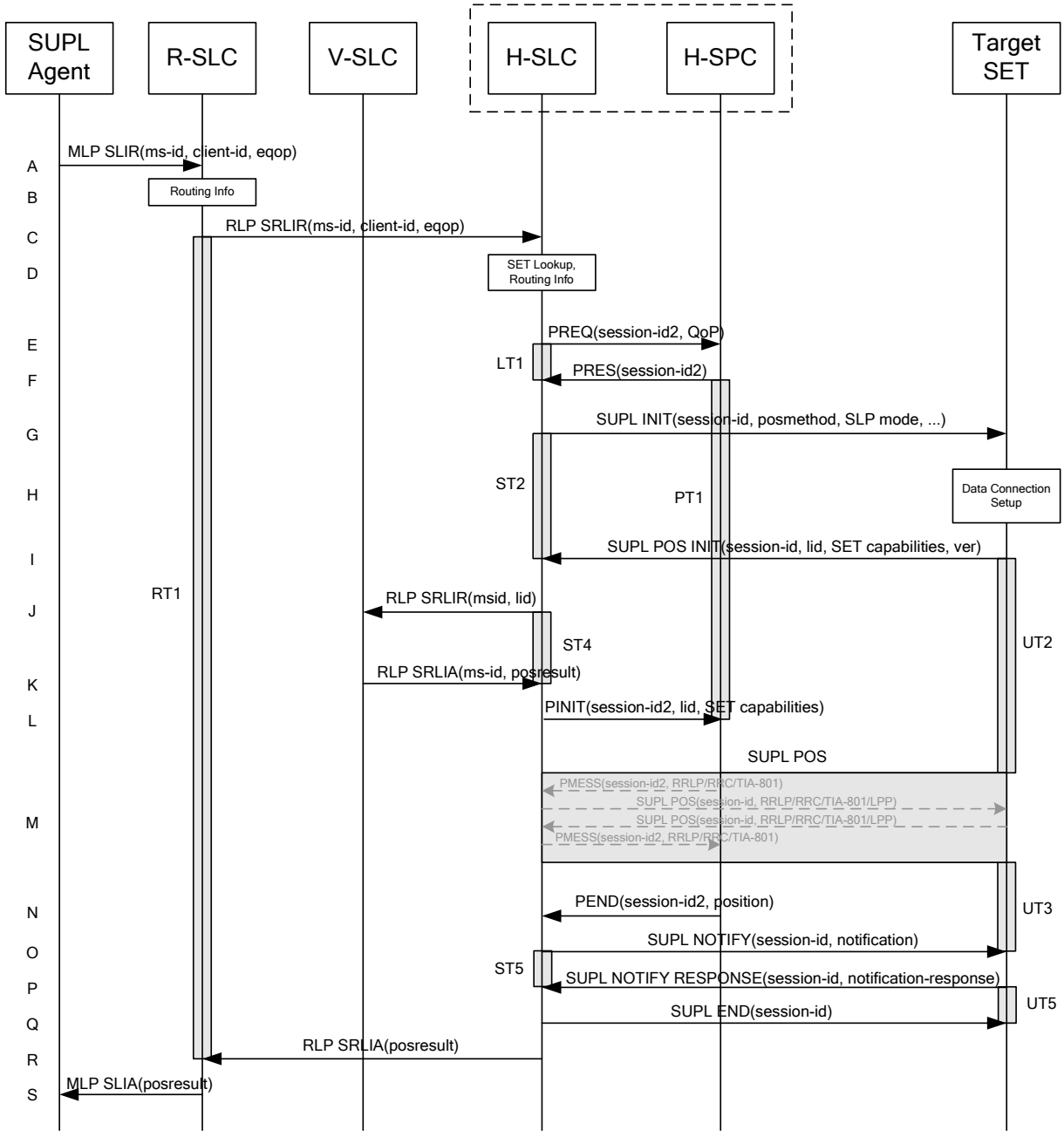

Figure 6: Notification/Verification based on current location, Network Initiated Roaming Successful case – Proxy mode with H-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

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A. The SUPL Agent issues an MLP SLIR message to the R-SLC, with which the SUPL Agent is associated. The R-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requested, based on the client-id received.

B. The R-SLC determines the H-SLC based on the received msid. If the R-SLC determines that the SUPL Agent is not authorized for this request, Step S will be returned with the applicable MLP return code.

NOTE 2: The specifics for determining the H-SLC are considered outside scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

C. The R-SLC then forwards the location request to the H-SLC of the target subscriber, using RLP protocol. If a previously computed position which meets the requested QoP is available at the H-SLC and, based on that position, no notification or verification is required, the H-SLC SHALL directly proceed to step R. If, based on that position, notification and verification or notification only is required, the H-SLC SHALL proceed to step G after having performed the SET Lookup and Routing Info procedures of step D.

D. Based on the received ms-id the H-SLC SHALL apply subscriber privacy against the client-id. The H-SLC verifies that the target SET is currently SUPL Roaming. In addition the H-SLC MAY also verify that the target SET supports SUPL.

NOTE 3: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

E. The H-SLC requests service from the H-SPC for the SUPL session by sending a PREQ message containing the session-id2 and the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

F. The H-SPC confirms its readiness for a SUPL session with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

G. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, proxy/non-proxy mode indicator and the intended positioning method. As in this case the result of the privacy check in Step D indicates that subscriber privacy check based on current location is required, the H-SLC SHALL include the Notification Mode element in the SUPL INIT message to indicate notification based on current location and SHALL NOT include the notification element in the SUPL INIT message. Before the SUPL INIT message is sent the H-SLC also computes and stores a hash of the message.
If in step C the H-SLC decided to use a previously computed position the SUPL INIT message SHALL indicate this in a ‘no position’ posmethod parameter value and the SET SHALL respond with a SUPL END message to the H-SLC carrying the results of the verification process (access granted, or access denied). If no verification is required (notification only) the SET SHALL respond with a SUPL END message to the H-SLC. The H-SLC SHALL then directly proceed to step R.

NOTE 4: Before sending the SUPL END message the SET shall follow the data connection setup procedure of step H.

H. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

I. The SET will evaluate the Notification rules and follow the appropriate actions. The SET checks the notification mode indicator and determines that in this case the notification is performed based on the location of the SET. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLC uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using the H-SLP address that has been provisioned by the Home Network to the SET. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SUPL POS INIT MAY contain a hash of the received SUPL INIT message (ver). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-

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Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if these are available and supported by both SET and H-SLP. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.

J. The H-SLC SHALL check that the hash of SUPL INIT matches the one it has computed for this particular session. If an initial position calculated based on information received in the SUPL POS INIT message is available which meets the requested QoP, the H-SLC MAY directly proceed to step O and send a PEND message to the H-SPC. Otherwise the H-SLC decides that the H-SPC will provide assistance/position calculation and the H-SLC sends a RLP SRLIR request to the V-SLC to determine an initial position. The RLP request contains at least the msid and the Location ID (lid). Optionally the H-SLC MAY forward NMR provided by the SET to the V-SLC.

K. The V-SLC returns a RLP SRLIA message. The RLP SRLIA message contains the position result. If the computed position meets the requested QoP, the H-SLC MAY proceed directly to step O and send a PEND message to the H-SPC.

L. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id, SET capabilities and position estimate (i.e. initial position received from the V-SLC in the previous step). The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step F, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. If the computed position meets the requested QoP, the H-SPC MAY directly move to step N and not engage in a SUPL POS session.

M. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step E. If required for the posmethod, the H-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the PINIT message.
The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET based).

N. Once the position calculation is complete the H-SPC sends a PEND message to the H-SLC.

O. The H-SLC applies subscriber privacy against the SET position estimate determined in Step M. If, based on this position, notification and verification or notification only is required, the H-SLC SHALL send a SUPL NOTIFY message to the SET. The SUPL NOTIFY message contains notification element. If, based on this position, no notification and verification is required, the H-SLC SHALL directly proceed to Step Q.

P. The SET SHALL send a SUPL NOTIFY RESPONSE message to the H-SLC. If notification and verification was required in step O then this will contain the notification response from the user.

Q. Once the position calculation is complete the H-SLC sends the SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. The SET SHALL release the secure connection to the H-SLC and release all resources related to this session.

R. The H-SLC forwards the location estimate to R-SLC if the position estimate is allowed by the privacy settings of the target subscriber. The H-SLP SHALL release all resources related to this session.

S. The R-SLC sends the position estimate back to the SUPL Agent in an MLP SLIA message.

5.2 Network Initiated – Non-Proxy Mode

This section describes Network Initiated Non-Proxy mode scenarios.

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5.2.1 Non-Roaming Successful Case

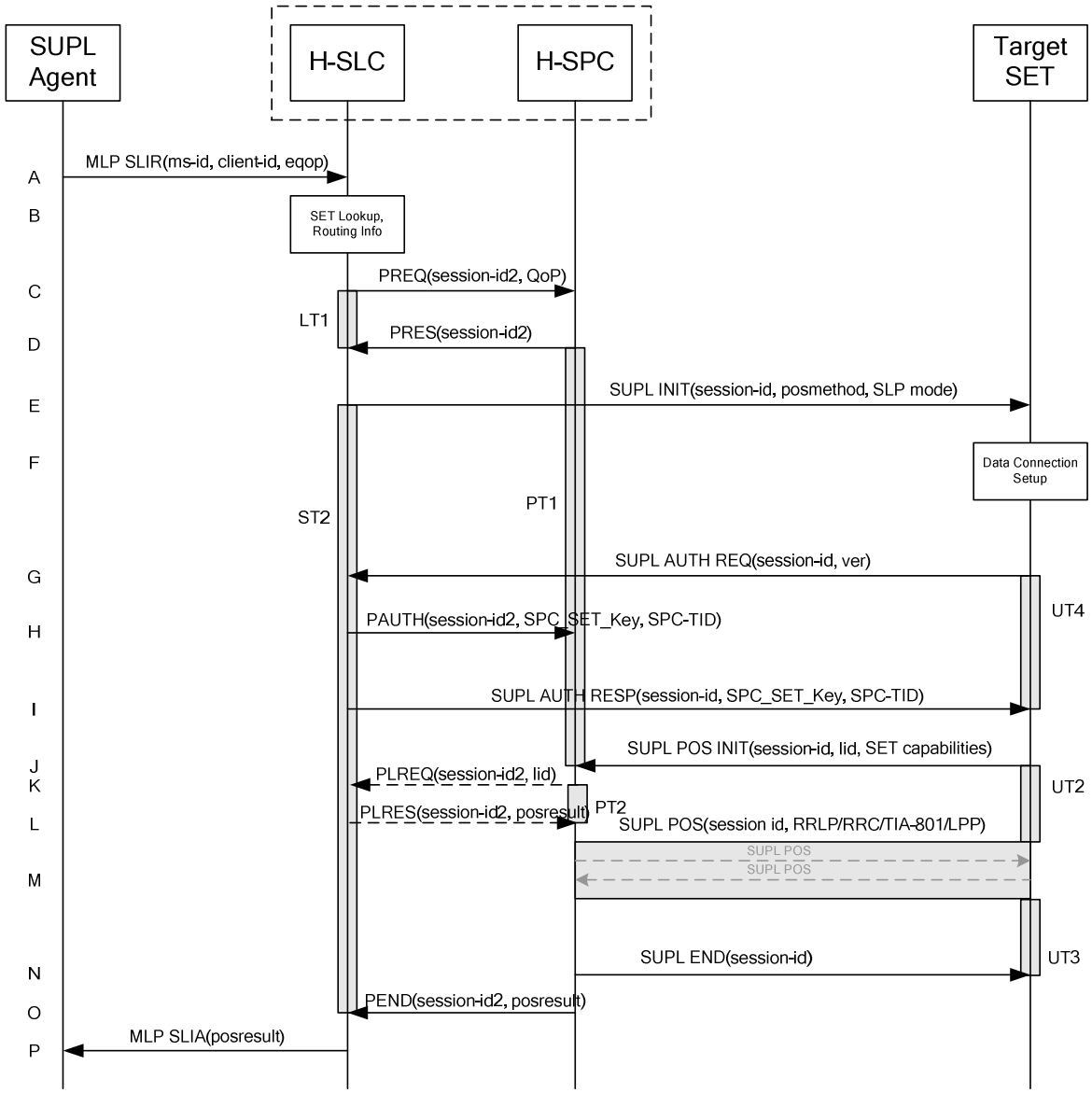

Figure 7: Network Initiated Non-Roaming Successful Case – Non-Proxy mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id.
If a previously computed position which meets the requested QoP is available at the H-SLC and no notification or verification is required, the H-SLC SHALL directly proceed to step P. If notification and verification or notification only is required, the H-SLC SHALL proceed to step E after having performed the SET Lookup and Routing Info procedures of step B.

B. The H-SLC verifies that the target SET is currently not SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

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NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

D. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

E. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, address of the H-SPC, proxy/non-proxy mode indicator and the intended positioning method. The protection level indicates the level of protection for the SUPL INIT message. If the result of the privacy check in Step A indicates that notification or verification to the target subscriber is needed, the H-SLC shall also include Notification element in the SUPL INIT message.
If in step A the H-SLC decided to use a previously computed position, the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message carrying the results of the verification process (access granted, or access denied). If no explicit verification is required (notification only) the SET SHALL respond with a SUPL END message. The H-SLC SHALL then directly proceed to step P. Note: before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step F to establish a secure connection to the H-SLC.

F. The SET analyses the received SUPL INIT. If found to be non authentic SET takes no further actions. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

G. The SET uses the address provisioned by the Home Network to establish a secure connection to the H-SLC. The SET then checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case non-proxy mode is used and the SET SHALL send a SUPL AUTH REQ message to the H-SLC. The SUPL AUTH REQ message SHALL contain session-id and a hash of the received SUPL INIT message (ver).

H. The H-SLC creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. The H-SLC forwards SPC_SET_Key and SPC-TID to the H-SPC using a PAUTH message which also includes the session id.

I. The H-SLC returns a SUPL AUTH RESP message to the SET. The SUPL AUTH RESP message SHALL contain the session-id, SPC_SET_Key and SPC-TID.

J. The SET will evaluate the Notification rules and follow the appropriate actions. The SET establishes a secure connection to the H-SPC according to the address received in step E. The SET and H-SPC perform mutual authentication and the SET sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SET SHALL send the SUPL POS INIT message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. The SET SHALL also release the connection to the H-SLC . If an initial position calculated based on information received in the SUPL POS INIT message is available which meets the requested QoP, the H-SPC MAY directly proceed to step N and no SUPL POS positioning session takes place.

K. If the H-SPC cannot translate the lid received in step J into an initial position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the location ID.

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This step is optional and not required if the H-SPC can perform the translation from lid into an initial position itself.

L. This step is conditional and only occurs if step K was performed. The H-SLC reports the initial position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the initial position meets the required QoP, the H-SPC MAY directly proceed to step N and not engage in a SUPL POS session.

M. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step C, the H-SPC SHALL only choose an approved method. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL POS INIT message.
The SET and the H-SPC exchange several successive positioning procedure messages (a SUPL POS message exchange is shown conceptually in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

N. Once the position calculation is complete, the H-SPC sends the SUPL END message to the SET informing it that no further positioning procedure will be started and that the SUPL session is finished. The SET SHALL release the secure connection to the H-SPC and release all resources related to this session.

O. The H-SPC sends the position estimate to the H-SLC using a PEND message. This also indicates the end of the SUPL session. The H-SPC SHALL release all resources related to this session.

P. The H-SLC sends the position estimate back to the SUPL Agent in an MLP SLIA message. The H-SLC SHALL release all resources related to this session.

5.2.2 Roaming with V-SPC Positioning Successful Case

SET Roaming where the V-SPC is involved in the positioning calculation

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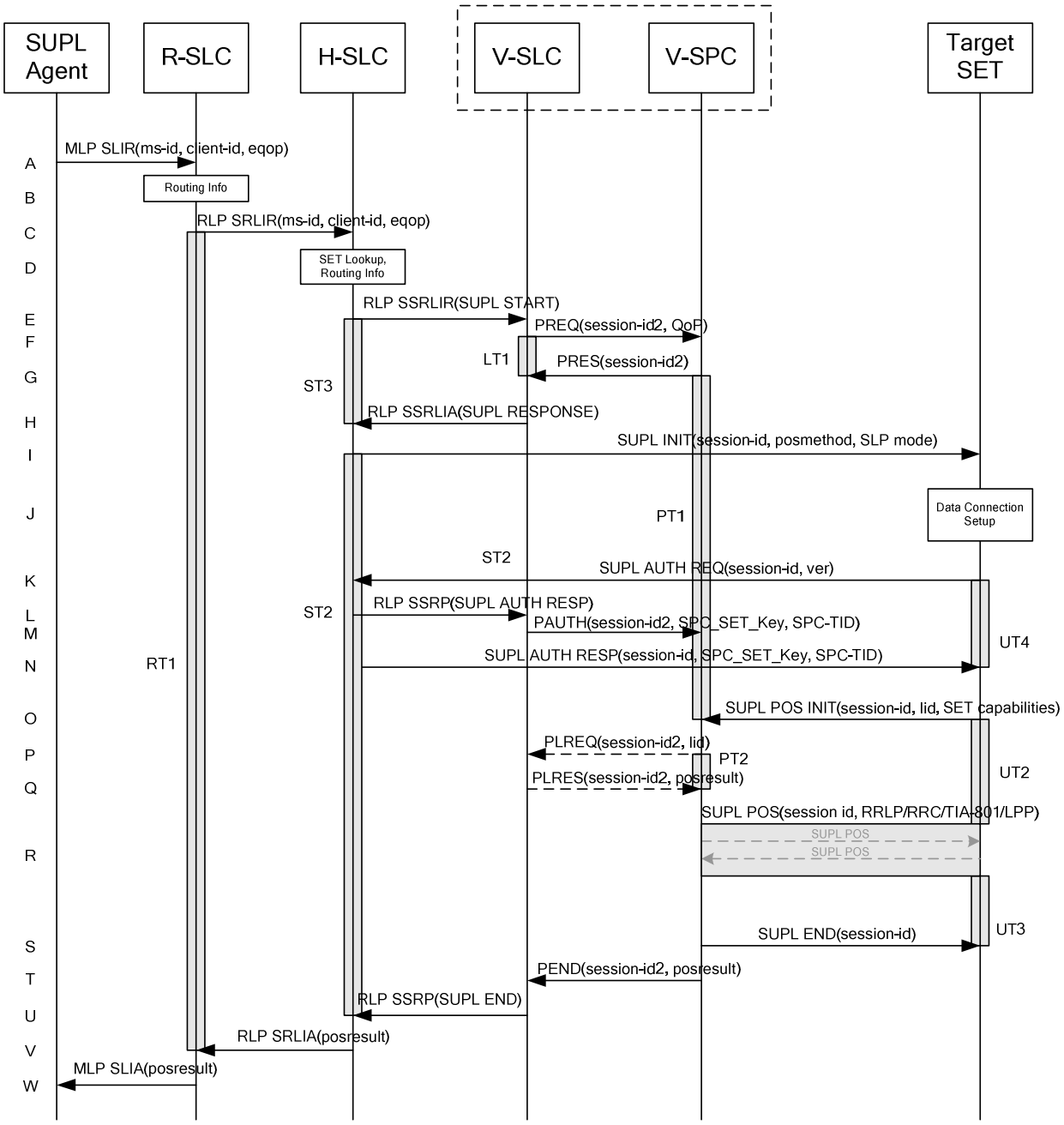

Figure 8: Network Initiated Roaming Successful Case – Non-Proxy-mode with V-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the R-SLC, with which SUPL Agent is associated. The R-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received.

B. The R-SLC determines the H-SLC based on the received msid. If the R-SLC determines that the SUPL Agent is not authorized for this request, Step W will be returned with the applicable MLP return code.

NOTE 2: The specifics for determining the H-SLC are considered outside scope of SUPL. However, there are various environment dependent mechanisms.

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C. The R-SLC then forwards the location request to the H-SLC of the target subscriber, using RLP protocol. Based on the received ms-id the H-SLC SHALL apply subscriber privacy against the client-id. If a previously computed position which meets the requested QoP is available at the H-SLC and no notification or verification is required, the H-SLC SHALL directly proceed to step V. If notification and verification or notification only is required, the H-SLC SHALL proceed to step I after having performed step D.

D. The H-SLC verifies that the target SET is currently SUPL Roaming. In addition the H-SLC MAY also verify that the target SET supports SUPL.

NOTE 3: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

E. The H-SLC allocates a session-id for the SUPL session and decides that the V-SPC will provide assistance data or perform the position calculation. The H-SLC sends an RLP SSRLIR to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. Mandatory parameters in SUPL START that are not known to the H-SLC (lid and SET capabilities) shall be populated with arbitrary values by the H-SLC and be ignored by the V-SLC. The SET part of the session-id will not be included in this message by the H-SLC to distinguish this scenario from a SET Initiated scenario.

F. The V-SLC requests service from the V-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

G. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

H. The V-SLC acknowledges that V-SPC is ready to initiate a SUPL positioning procedure with an RLP SSRLIA back to the H-SLC. The message includes at least session-id, posmethod and the address of the V-SPC.

I. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, address of the V-SPC, proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step C indicates that notification or verification to the target subscriber is needed, the H-SLC SHALL also include the Notification element in the SUPL INIT message.
If in step C the H-SLP decided to use a previously computed position, the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message to the H-SLC carrying the results of the verification process (access granted, or access denied). If no verification is required (notification only) the SET SHALL respond with a SUPL END message to the H-SLC. The H-SLC SHALL then directly proceed to step V.

NOTE 5: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step J to establish a secure connection to the H-SLC.

J. The SET analyses the received SUPL INIT. If found to be non authentic SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

K. The SET uses the address provisioned by the Home Network to establish a connection to the H-SLC. The SET then checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case non-proxy mode is used and the SET SHALL send a SUPL AUTH REQ message to the H-SLC. The SUPL AUTH REQ message SHALL contain session-id and a hash of the received SUPL INIT message (ver).

L. The H-SLP creates SPC_SET_Key and SPC-TID to be used for mutual V-SPC/SET authentication. The H-SLC forwards SPC_SET_KEY and SPC_TID to the V-SLC through an RLP SSRP message.

M. The V-SLC forwards SPC_SET_Key and SPC-TID to the V-SPC using the PAUTH message.

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N. The H-SLC returns a SUPL AUTH RESP to the SET. The SUPL AUTH RESP message SHALL contain the session-id, SPC_SET_Key and SPC-TID.

O. The SET will evaluate the Notification rules and follow the appropriate actions. The SET establishes a secure connection to the V-SPC according to the address received in step I. The SET and V-SPC perform mutual authentication and the SET sends a SUPL POS INIT message to start a SUPL positioning session with the V-SPC. The SET SHALL send the SUPL POS INIT message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. The SET SHALL also release the connection to the H-SLC. If an initial position calculated based on information received in the SUPL POS INIT message is available which meets the requested QoP, the V-SPC MAY directly proceed to step S and no SUPL POS positioning session takes place..

P. If the V-SPC cannot translate the lid received in step O into an initial position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into an initial position itself.

Q. This step is conditional and only occurs if step P was performed. The V-SLC reports the initial position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the initial position meets the required QoP, the V-SPC MAY directly proceed to step S and not engage in a SUPL POS session.

R. Based on the SUPL POS INIT message including posmethod(s) supported by the SET, the V-SPC SHALL determine the posmethod. If the V-SLC included its approved positioning methods in step F, the V-SPC SHALL only choose an approved method. If required for the posmethod, the V-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL POS INIT message.
The SET and the V-SPC exchange several successive positioning procedure messages (a SUPL POS message exchange is shown conceptually in dotted lines).
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

S. Once the position calculation is complete the V-SPC sends a SUPL END message to the SET informing it that no further positioning procedure will be started and that the positioning session is finished. The SET SHALL release all resources related to this session.

T. The V-SPC informs the V-SLC using a PEND message that the positioning procedure is completed and returns the position result. The V-SPC SHALL release all resources related to this session.

U. The V-SLC sends a RLP SSRP to the H-SLC carrying the position result. The V-SLC SHALL release all resources related to this session.

V. The H-SLC sends the position estimate back to the R-SLC using the RLP SRLIA message. The H-SLC SHALL release all resources related to this session.

W. The R-SLC sends the position estimate back to the SUPL Agent using the MLP SLIA message.

5.2.3 Roaming with H-SPC Positioning Successful Case

SUPL Roaming where the H-SPC is involved in the positioning calculation.

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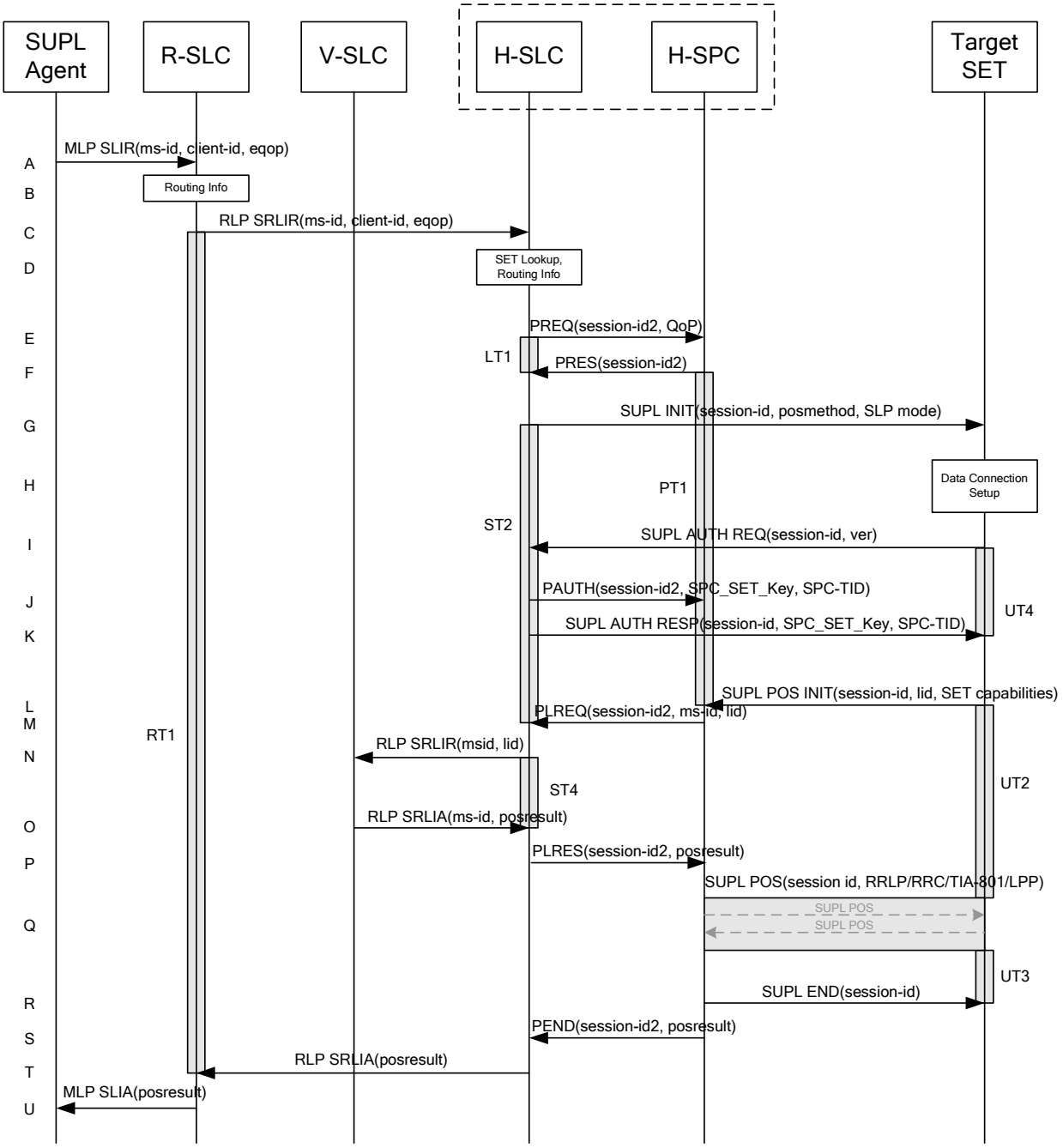

Figure 9: Network Initiated Roaming Successful Case – Non-Proxy-mode with H-SPC

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the R-SLC, with which the SUPL Agent is associated. The R-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received.

B. The R-SLC determines the H-SLC based on the received msid. If the R-SLC determines that the SUPL Agent is not authorized for this request, Step U will be returned with the applicable MLP return code.

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NOTE 2: The specifics for determining the H-SLC are considered outside scope of SUPL. However, there are various environment dependent mechanisms.

C. The R-SLC then forwards the location request to the H-SLC of the target subscriber, using RLP protocol. Based on the received ms-id the H-SLC SHALL apply subscriber privacy against the client-id. If a previously computed position which meets the requested QoP is available at the H-SLC and no notification or verification is required, the H-SLC SHALL directly proceed to step T. If notification and verification or notification only is required, the H-SLC SHALL proceed to step G after having performed step D.

D. The H-SLC verifies that the target SET is currently SUPL Roaming. In addition the H-SLC MAY also verify that the target SET supports SUPL.

NOTE 3: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 4: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 5: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

E. The H-SLC requests service from the H-SPC for the SUPL session by sending a PREQ message containing the session-id2 and the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

F. The H-SPC confirms its readiness for a SUPL session with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

G. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, address of the H-SPC, proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step C indicates that notification or verification to the target subscriber is needed, the H-SLC SHALL also include the Notification element in the SUPL INIT message.
If in step C the H-SLC decided to use a previously computed position the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message to the H-SLC carrying the results of the verification process (access granted, or access denied). If no verification is required (notification only) the SET SHALL respond with a SUPL END message to the H-SLC. The H-SLC SHALL then directly proceed to step T.

NOTE 6: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step H to establish a secure connection to the H-SLC.

H. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

I. The SET uses the address provisioned by the Home Network to establish a secure connection to the H-SLC. The SET then checks the proxy/non-proxy mode indicator to determine if the H-SLC uses proxy or non-proxy mode. In this case non-proxy mode is used and the SET SHALL send a SUPL AUTH REQ message to the H-SLC. The SUPL AUTH REQ message SHALL contain session-id and a hash of the received SUPL INIT message (ver).

J. The H-SLC creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. The H-SLC forwards SPC_SET_Key and SPC-TID to the H-SPC using a PAUTH message.

K. The H-SLC sends a SUPL AUTH RESP message to the SET. The SUPL AUTH RESP message SHALL contain the session-id, SPC_SET_Key and SPC-TID.

L. The SET will evaluate the Notification rules and follow the appropriate actions. The SET establishes a secure connection to the H-SPC according to the address received in step G. The SET and H-SPC perform mutual authentication and the SET then sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SET SHALL send the SUPL POS INIT message even if the SET supported positioning technologies do not

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include the intended positioning method indicated in the SUPL INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific data for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. If an initial position calculated based on information received in the SUPL POS INIT message is available which meets the requested QoP, the H-SPC MAY directly proceed to step R. The SET SHALL also release the connection to the H-SLC.

M. The H-SPC sends a PLREQ message to the H-SLC informing it that that the target SET has established the session and including the lid and optionally the NMR specific data for the radio technology being used (e.g., for GSM: TA, RXLEV).

N. The H-SLC sends an RLP SRLIR request to the V-SLC to determine an initial position for further exchange of SUPL POS messages between SET and H-SPC. The RLP request contains at least the msid and the Location ID (lid). Optionally the H-SLC MAY forward NMR provided by the SET to the V-SLC.

O. The V-SLC returns a RLP SRLIA message to the H-SLC. The RLP SRLIA message contains at least the position result.

P. The H-SLC informs the H-SPC of the initial position in a PLRES message. If the computed position meets the requested QoP, the H-SPC MAY directly move to step R and not engage in a SUPL POS session.

Q. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step E, the H-SPC SHALL only choose an approved method. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL POS INIT message.
The SET and the H-SPC exchange several successive positioning procedure messages (a SUPL POS message exchange is shown conceptually in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

R. Once the position calculation is complete the H-SPC sends SUPL END message to the SET informing it that no further positioning procedure will be started and that the positioning session is finished. The SET SHALL release all resources related to this session.

S. The H-SPC informs the H-SLC in a PEND message that the positioning procedure is completed and includes the position estimate result. The H-SPC SHALL release all resources related to this session.

T. The H-SLC sends the position estimate back to the R-SLC using the RLP SRLIA message. The H-SLC SHALL release all resources related to this session.

U. The R-SLC sends the position estimate back to the SUPL Agent using the MLP SLIA message.

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5.2.4 Non-Roaming Successful Case, Notification/Verification based on current location

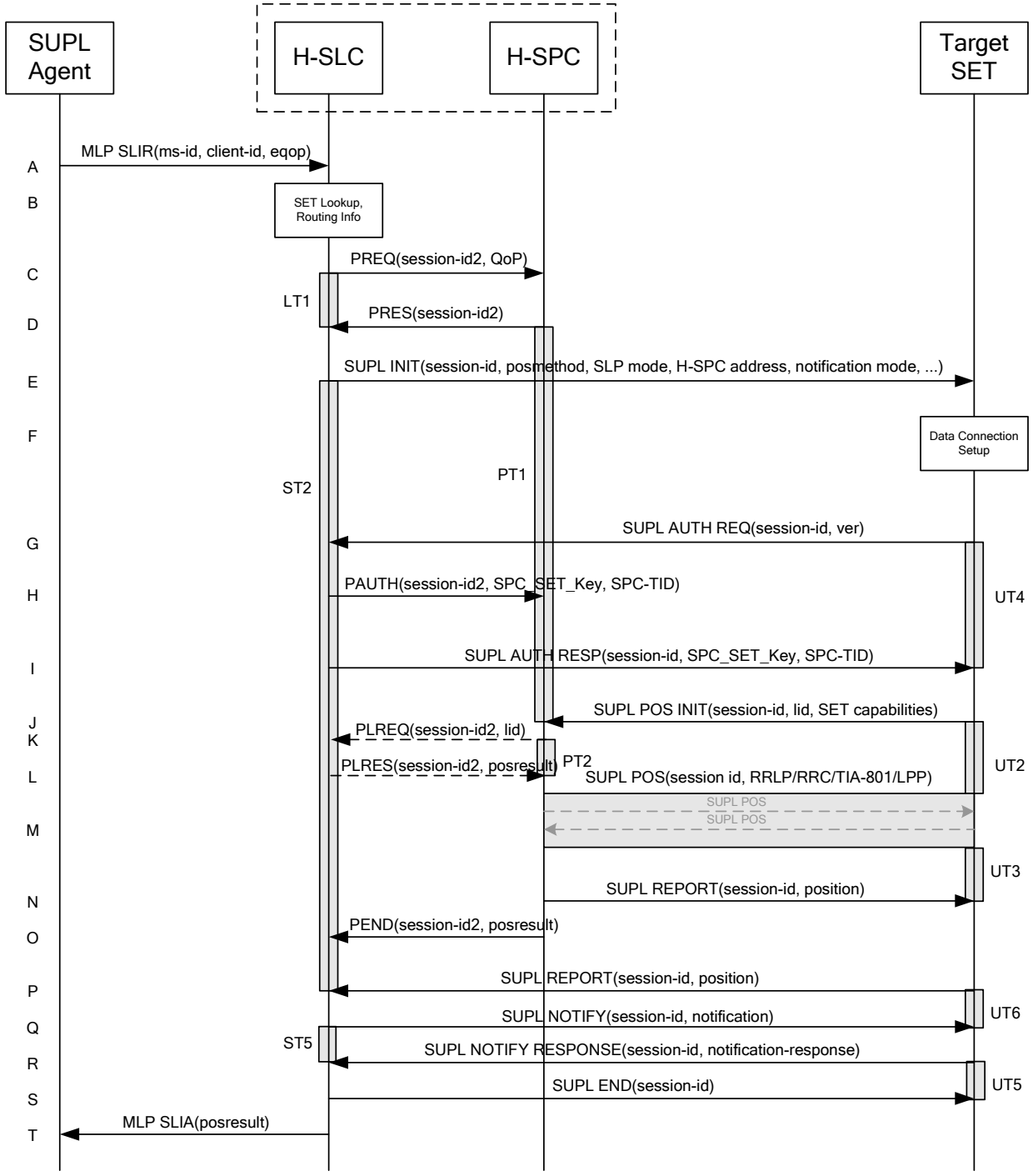

Figure 10: Notification/Verification based on current location, Network Initiated Non-Roaming Successful Case – Non-Proxy mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on

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the client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id.
If a previously computed position which meets the requested QoP is available at the H-SLC and, based on that position, no notification or verification is required, the H-SLC SHALL directly proceed to step T. If, based on that position, notification and verification or notification only is required, the H-SLC SHALL proceed to step B.

B. The H-SLC verifies that the target SET is currently not SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

C. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. If notification or verification based on current location is required, the H-SLC SHALL include the notification mode parameter. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

D. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

E. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, address of the H-SPC, proxy/non-proxy mode indicator and the intended positioning method. As in this case the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLC SHALL include the Notification Mode element in the SUPL INIT message to indicate notification based on current location and SHALL NOT include the notification element in the SUPL INIT message. If in step A, the H-SLC decided to use a previously computer position, the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message carrying the results of the verification process (access granted or access denied). If no explicit verification is required (notification only) the SET SHALL respond with a SUPL END message. The H-SLC SHALL then directly proceed to step T.

NOTE 3: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step F.

F. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

G. The SET uses the address provisioned by the Home Network to establish a secure connection to the H-SLC. The SET then checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case non-proxy mode is used and the SET SHALL send a SUPL AUTH REQ message to the H-SLC. The SUPL AUTH REQ message SHALL contain session-id and a hash of the received SUPL INIT message (ver).

H. The H-SLC creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. The H-SLC forwards SPC_SET_Key and SPC-TID to the H-SPC using a PAUTH message which also includes the session id.

I. The H-SLC returns a SUPL AUTH RESP message to the SET. The SUPL AUTH RESP message SHALL contain the session-id, SPC_SET_Key and SPC-TID.

J. The SET will evaluate the Notification rules and follow the appropriate actions. The SET checks the notification mode indicator and determines that in this case the notification is performed based on the location of the SET. The SET establishes a secure connection to the H-SPC according to the address received in step E. The SET and H-SPC perform mutual authentication and the SET sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if these are available and supported by both SET and H-SPC. The SET MAY set the Requested Assistance Data element in the

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SUPL POS INIT. The SET SHALL also release the IP connection to the H-SLC and release all resources related to this session. If an initial position calculated based on information received in the SUPL POS INIT message is available which meets the requested QoP, the H-SPC MAY directly proceed to step N and no SUPL POS positioning session takes place.

K. If the H-SPC cannot translate the lid received in step J into an initial position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into an initial position itself.

L. This step is conditional and only occurs if step K was performed. The H-SLC reports the initial position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the initial position meets the required QoP, the H-SPC MAY directly proceed to step N and not engage in a SUPL POS session.

M. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step C, the H-SPC SHALL only choose an approved method. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL POS INIT message
The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

N. As in this case in step C the H-SLC indicated that notification or verification is required based on the position of the SET, the H-SPC sends the calculated position to the SET in a SUPL REPORT message.

O. The H-SPC sends a PEND message to the H-SLC indicating the end of the SUPL session. The H-SPC SHALL release all resources related to this session

P. As in this case in step E the H-SLC indicated that notification or verification is based on the position of the SET, the SET sends the calculated position to the H-SLC in a SUPL REPORT message.

Q. The H-SLC applies subscriber privacy against the SET position estimate. If, based on this position, notification and verification or notification only is required, the H-SLP SHALL send a SUPL NOTIFY message to the SET. The SUPL NOTIFY message contains the notification element. If, based on this position, no notification and verification is required, the H-SLP SHALL directly proceed to Step S.

R. The SET SHALL then send an SUPL NOTIFY RESPONSE message to the H-SLC. If notification and verification was required in Step Q then this will contain the notification response from the user.

S. Once the position calculation is complete the H-SLC sends the SUPL END message to the SET informing it that no further positioning procedure will be started and that the SUPL session is finished. The SET SHALL release the secure connection to the H-SLC and release all resources related to this session.

T. The H-SLC sends the position estimate back to the SUPL Agent in an MLP SLIA message and H-SLC can release all resources related to this session. The H-SLC SHALL release all resources related to this session.

5.2.5 Roaming with V-SPC Positioning Successful Case, Notification/Verification based on current location

SET Roaming where the V-SPC is involved in the positioning calculation.

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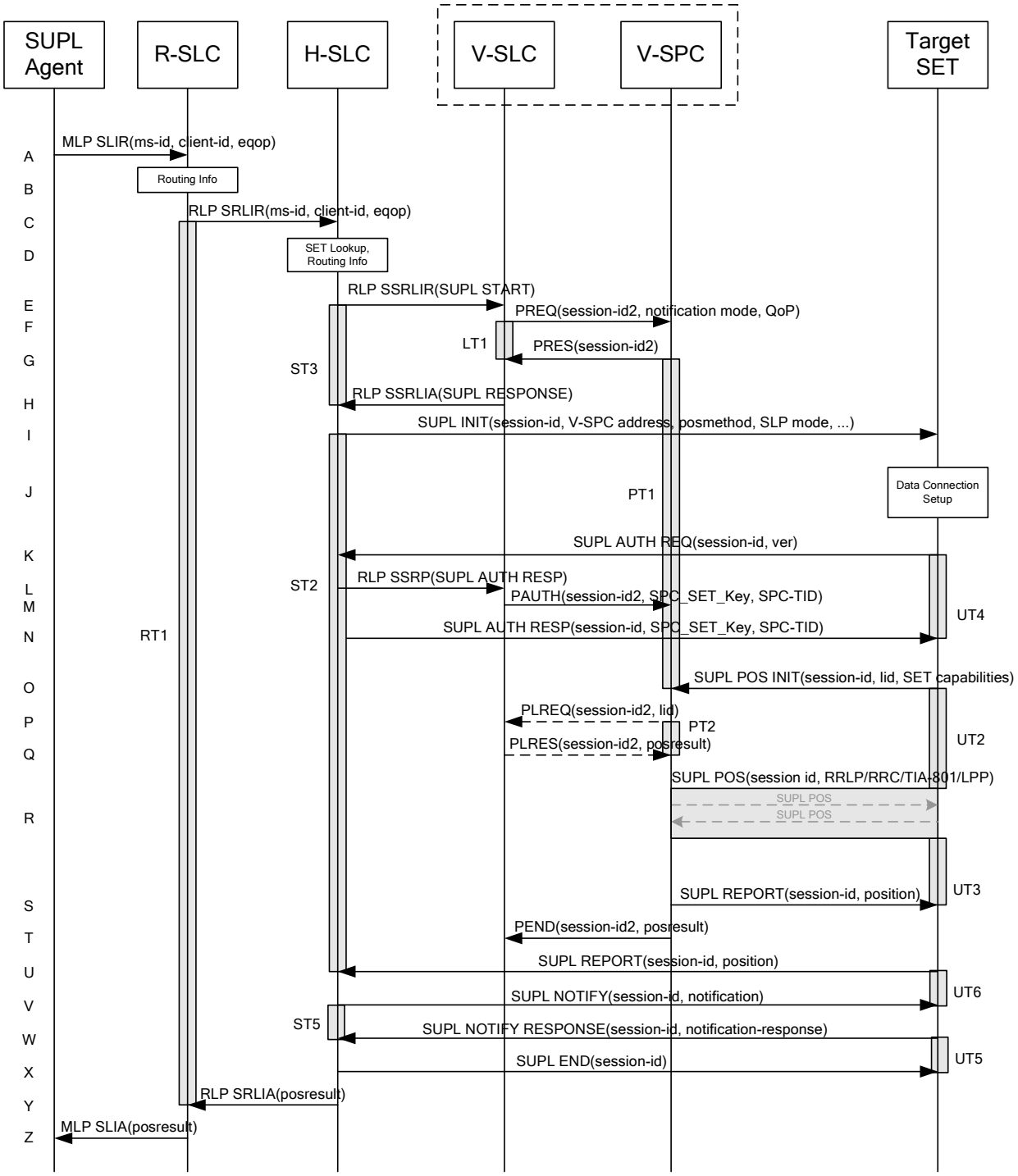

Figure 11: Notification/Verification based on current location, Network Initiated Roaming Successful Case – Non-Proxy-mode with V-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the R-SLC, with which SUPL Agent is associated. The R-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received.

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B. The R-SLC determines the H-SLC based on the received msid. If the R-SLC determines that the SUPL Agent is not authorized for this request, Step Z will be returned with the applicable MLP return code.

NOTE 2: The specifics for determining the H-SLC are considered outside scope of SUPL. However, there are various environment dependent mechanisms.

C. The R-SLC then forwards the location request to the H-SLC of the target subscriber, using RLP protocol. If a previously computed position which meets the requested QoP is available at the H-SLC and, based on that position, no notification or verification is required, the H-SLC SHALL directly proceed to step Y. If, based on that position, notification and verification or notification only is required, the H-SLP SHALL proceed to step I after having performed the SET Lookup and Routing Info procedures of step D. Based on the received ms-id the H-SLC SHALL apply subscriber privacy against the client-id.

D. The H-SLC verifies that the target SET is currently SUPL Roaming. In addition the H-SLP MAY also verify that the target SET supports SUPL.

NOTE 3: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

E. The H-SLC allocates a session-id for the SUPL session and decides that the V-SLP will provide assistance data or perform the position calculation. The H-SLC sends an RLP SSRLIR to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. Mandatory parameters in SUPL START that are not known to H-SLP (lid and SET capabilities) shall be populated with arbitrary values by H-SLC and be ignored by V-SLC. If the result of the privacy check in Step C indicates that notification and verification is required based on the actual location of the target SET user, the H-SLC will inform the V-SLC accordingly.

F. The V-SLC requests service from the V-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. As in this case, notification or verification based on current location is required, the H-SLC SHALL include the notification mode parameter. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

G. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

H. The V-SLC acknowledges that V-SPC is ready to engage in a SUPL positioning procedure with an RLP SSRLIA back to the H-SLC. The message includes the address of the V-SPC.

I. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, address of the V-SPC, proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step D indicates that subscriber privacy check based on current location is required, the H-SLP SHALL include the Notification Mode element in the SUPL INIT message to indicate notification based on current location and SHALL NOT include the notification element in the SUPL INIT message.

   If in step C the H-SLP decided to use a previously computed position the SUPL INIT message SHALL indicate this in a ‘no position’ posmethod parameter value and the SET SHALL respond with a SUPL END message to the H-SLP carrying the results of the verification process (access granted, or access denied). If no verification is required (notification only) the SET SHALL respond with a SUPL END message to the H-SLC. The H-SLC SHALL then directly proceed to step Y.

NOTE 4: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step J.

J. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

K. The SET uses the address provisioned by the Home Network to establish a connection to the H-SLC. The SET then checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case

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non-proxy mode is used and the SET SHALL send a SUPL AUTH REQ message to the H-SLC. The SUPL AUTH REQ message SHALL contain session-id and a hash of the received SUPL INIT message (ver).

L. The H-SLC creates SPC_SET_Key and SPC-TID to be used for mutual V-SPC/SET authentication. The H-SLC forwards SPC_SET_Key and SPC-TID to the V-SLC through an RLP SSRP message.

M. The V-SLC forwards SPC_SET_Key and SPC-TID to the V-SPC using the PAUTH message.

N. The H-SLC returns a SUPL AUTH RESP to the SET. The SUPL AUTH RESP message SHALL contain the session-id, SPC_SET_Key and SPC-TID.

O. The SET will evaluate the Notification rules and follow the appropriate actions. The SET checks the notification mode indicator and determines that in this case the notification is performed based on the location of the SET. The SET establishes a secure connection to the V-SPC according to the address received in step I. The SET and V-SPC perform mutual authentication and the SET sends a SUPL POS INIT message to start a SUPL positioning session with the V-SPC. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if these are available and supported by both SET and V-SPC. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. The SET SHALL also release the connection to the H-SLC. If an initial position calculated based on information received in the SUPL POS INIT message is available which meets the requested QoP, the V-SPC MAY directly proceed to step S and no SUPL POS positioning session takes place.

P. If the V-SPC cannot translate the lid received in step O into an initial position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into an initial position itself.

Q. This step is conditional and only occurs if step P was performed. The V-SLC reports the initial position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the initial position meets the required QoP, the V-SPC MAY directly proceed to step S and not engage in a SUPL POS session.

R. Based on the SUPL POS INIT message including posmethod(s) supported by the SET, the V-SPC SHALL determine the posmethod. If the V-SLC included its approved positioning methods in step F, the V-SPC SHALL only choose an approved method. If required for the posmethod, the V-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL POS INIT message.
The SET and the V-SPC exchange several successive positioning procedure messages. The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

S. As in this case in step F the V-SLC indicated that notification or verification is required based on the position of the SET, the V-SPC sends the calculated position to the SET in a SUPL REPORT message.

T. The V-SPC informs the V-SLC using a PEND message that the positioning procedure is completed and returns the position result. The V-SPC SHALL release all resources related to this session.

U. As in this case in step I the H-SLC indicated that notification or verification is based on the position of the SET, the SET sends the calculated position to the H-SLC in a SUPL REPORT message.

V. The H-SLC applies subscriber privacy against the SET position estimate. If, based on this position, notification and verification or notification only is required, the H-SLP SHALL send a SUPL NOTIFY message to the SET. The SUPL NOTIFY message contains notification element. If, based on this position, no notification and verification is required, the H-SLC SHALL directly proceed to Step X.

W. The SET SHALL then send an SUPL NOTIFY RESPONSE message to the H-SLP. If notification and verification was required in Step V then this will contain the notification response from the user.

X. Once the position calculation is complete the H-SLC sends a SUPL END message to the SET informing it that no further positioning procedure will be started and that the positioning session is finished. The SET SHALL release all resources related to this session.

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Y. The H-SLC sends the position estimate back to the R-SLC in an RLP SRLIA message. The H-SLP SHALL release all resources related to this session.

Z. The R-SLC sends the position estimate back to the SUPL Agent in an MLP SLIA message.

5.2.6 Roaming with H-SPC Positioning Successful Case, Notification/Verification based on current location

SUPL Roaming where the H-SPC is involved in the positioning calculation.

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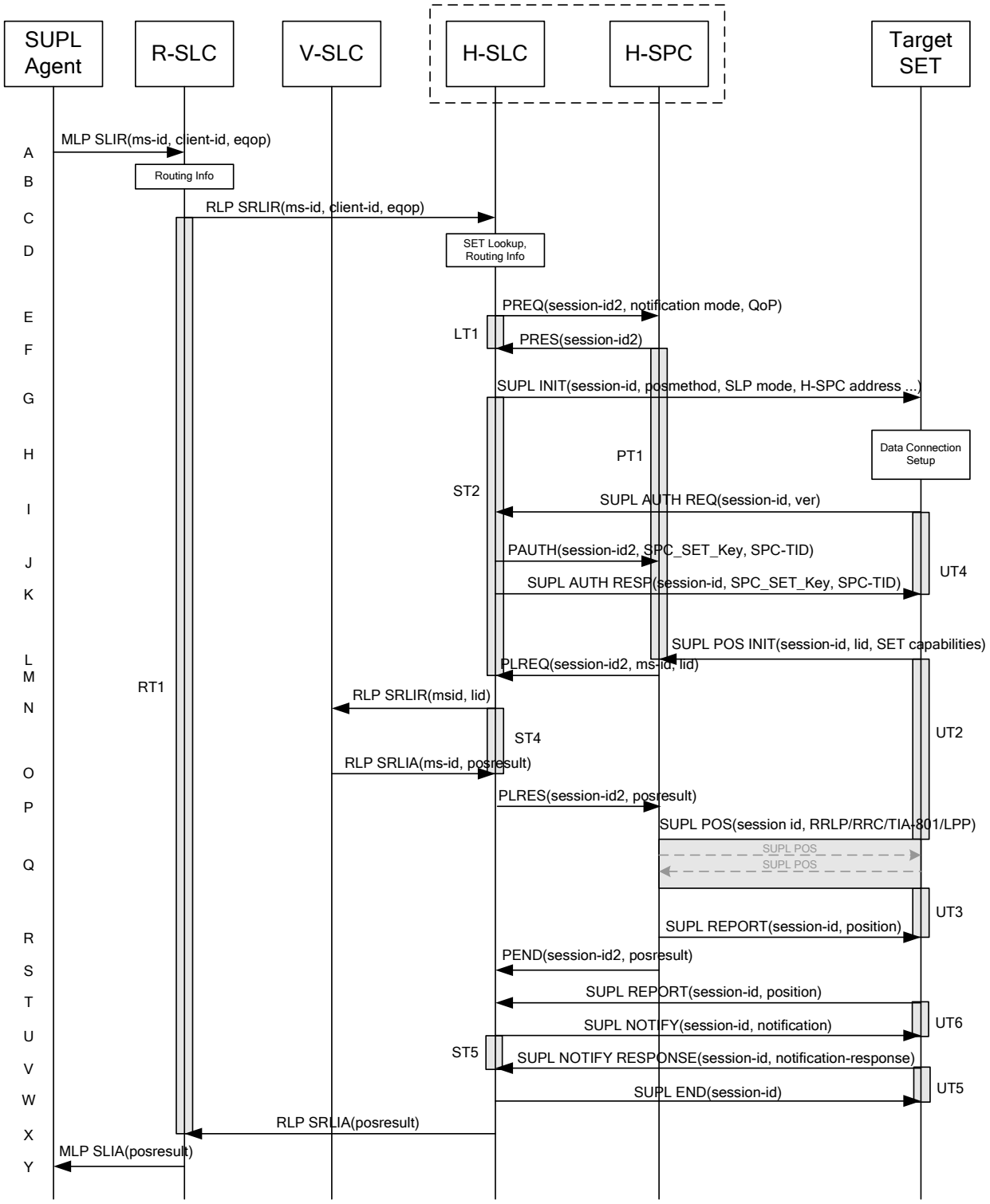

Figure 12: Notification/Verification based on current location, Network Initiated Roaming Successful Case – Non-Proxy-mode with H-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

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A. The SUPL Agent issues an MLP SLIR message to the R-SLC, with which SUPL Agent is associated. The R-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received.

B. The R-SLC determines the H-SLC based on the received msid. If the R-SLC determines that the SUPL Agent is not authorized for this request, Step Y will be returned with the applicable MLP return code.

NOTE 2: The specifics for determining the H-SLC are considered outside scope of SUPL. However, there are various environment dependent mechanisms.

C. The R-SLC then forwards the location request to the H-SLC of the target subscriber, using RLP protocol. If a previously computed position which meets the requested QoP is available at the H-SLC and, based on that position, no notification or verification is required, the H-SLC SHALL directly proceed to step X. If, based on that position, notification and verification or notification only is required, the H-SLC SHALL proceed to step G after having performed the SET Lookup and Routing Info procedures of step D.

D. Based on the received ms-id the H-SLC SHALL apply subscriber privacy against the client-id. The H-SLC verifies that the target SET is currently SUPL Roaming. In addition the H-SLC MAY also verify that the target SET supports SUPL.

NOTE 3: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 4: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

E. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. If notification or verification based on current location is required, the H-SLC SHALL include the notification mode parameter. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

F. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

G. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, address of the H-SPC, proxy/non-proxy mode indicator and the intended positioning method. As in this case the result of the privacy check in Step D indicates that subscriber privacy check based on current location is required, the H-SLC SHALL include the Notification Mode element in the SUPL INIT message to indicate notification based on current location and SHALL NOT include the notification element in the SUPL INIT message .
If in step C the H-SLC decided to use a previously computed position the SUPL INIT message SHALL indicate this in a ‘no position’ posmethod parameter value and the SET SHALL respond with a SUPL END message to the H-SLC carrying the results of the verification process (access granted, or access denied). If no verification is required (notification only) the SET SHALL respond with a SUPL END message to the H-SLC. The H-SLC SHALL then directly proceed to step X.

NOTE 5: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step H.

H. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

I. The SET uses the address provisioned by the Home Network to establish a secure connection to the H-SLC. The SET then checks the proxy/non-proxy mode indicator to determine if the H-SLC uses proxy or non-proxy mode. In this case non-proxy mode is used and the SET SHALL send a SUPL AUTH REQ message to the H-SLC. The SUPL AUTH REQ message SHALL contain session-id and a hash of the received SUPL INIT message (ver).

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J. The H-SLC creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. The H-SLC forwards SPC_SET_Key and SPC-TID to the H-SPC using a PAUTH message.

K. The H-SLC returns a SUPL AUTH RESP message to the SET. The SUPL AUTH RESP message SHALL contain the session-id, SPC_SET_Key and SPC-TID.

L. The SET will evaluate the Notification rules and follow the appropriate actions. The SET checks the notification mode indicator and determines that in this case the notification is performed based on the location of the SET. The SET establishes a secure connection to the H-SPC according to the address received in step G. The SET and H-SPC perform mutual authentication and the SET then sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific data for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if these are available and supported by both SET and H-SPC. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. If an initial position calculated based on information received in the SUPL POS INIT message is available which meets the requested QoP, the H-SPC MAY directly proceed to step R. The SET SHALL also release the connection to the H-SLC.

M. The H-SPC sends a PLREQ message to the H-SLC informing it that that the target SET has established the session and including the lid and optionally the NMR specific data for the radio technology being used (e.g., for GSM: TA, RXLEV).

N. The H-SLC sends a RLP SRLIR request to the V-SLC to determine an initial position for further exchange of SUPL POS messages between SET and H-SPC. The RLP request contains at least the msid and the Location ID (lid). Optionally the H-SLC MAY forward NMR provided by the SET to the V-SLC.

O. The V-SLP returns a RLP SRLIA message. The RLP SRLIA message contains the position result.

P. The H-SLC informs the H-SPC of the initial position in a PLRES message. If the computed position meets the requested QoP, the H-SPC MAY directly move to step R and not engage in a SUPL POS session.

Q. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step E, the H-SPC SHALL only choose an approved method. If required for the posmethod the H-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL POS INIT message.
The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

R. As in this case in step E the H-SLC indicated that notification or verification is required based on the position of the SET, the H-SPC sends the calculated position to the SET in a SUPL REPORT message.

S. The H-SPC informs the H-SLC in a PEND message that the positioning procedure is completed and includes the position estimate result. The H-SPC SHALL release all resources related to this session.

T. As in this case in step G the H-SLC indicated that notification or verification is based on the position of the SET, the SET sends the calculated position to the H-SLC in a SUPL REPORT message.

U. The H-SLC applies subscriber privacy against the SET position estimate. If, based on this position, notification and verification or notification only is required, the H-SLC SHALL send a SUPL NOTIFY message to the SET. The SUPL NOTIFY message contains notification element. If, based on this position, no notification and verification is required, the H-SLC SHALL directly proceed to Step W.

V. The SET SHALL then send an SUPL NOTIFY RESPONSE message to the H-SLC. If notification and verification was required in step U then this will contain the notification response from the user.

W. Once the position calculation is complete the H-SLC sends SUPL END message to the SET informing it that no further positioning procedure will be started and that the positioning session is finished. The SET SHALL release all resources related to this session.

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X. The H-SLC sends the position estimate back to the R-SLP in an RLP SRLIA message. The H-SLC SHALL release all resources related to this session.

Y. The R-SLP sends the position estimate back to the SUPL Agent in an MLP SLIA message.

5.3 Exception Procedures

This section describes the exception procedures for Network Initiated Immediate scenarios.

5.3.1 SET Does Not Allow Positioning for Non Roaming

After receiving a SUPL INIT message the SET executes the notification/verification procedure. In this scenario, the subscriber rejects the location request. The flow shown in Figure 13 applies to both proxy and non-proxy mode.

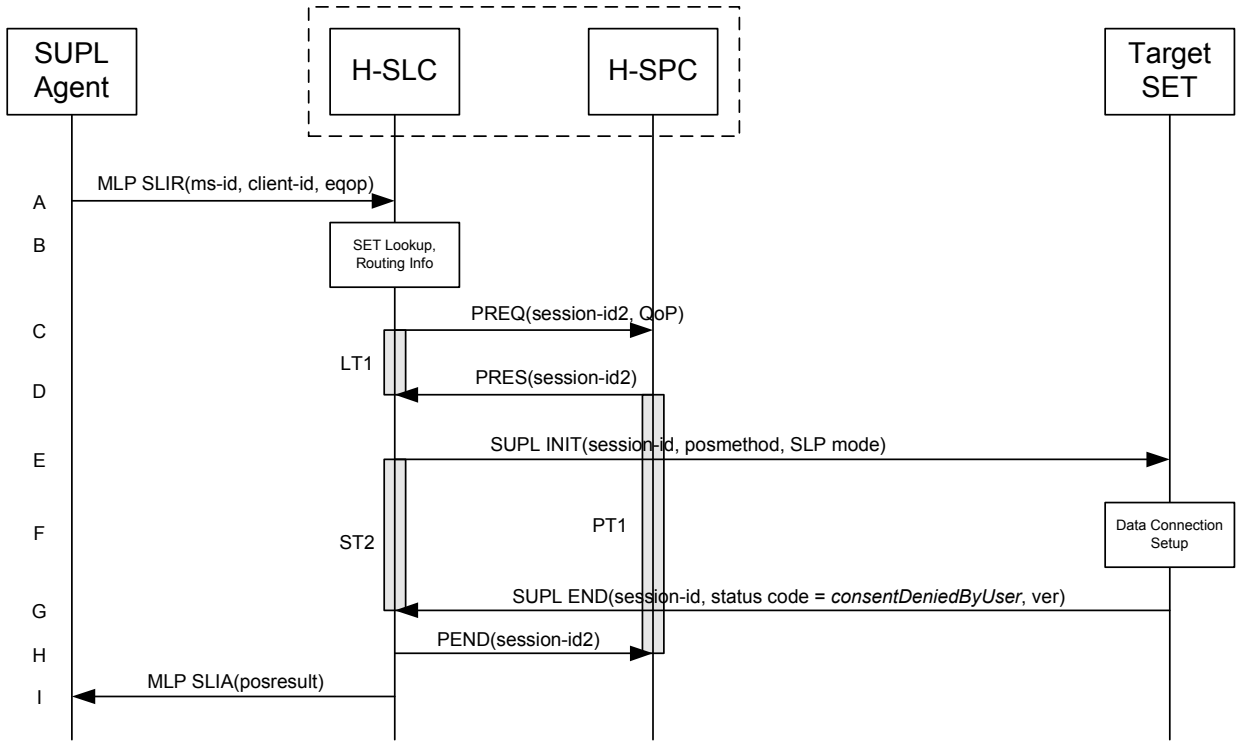

Figure 13: Network Initiated SET User Rejects Positioning for Non-Roaming.

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP SLIR message to the H-SLP, with which the SUPL Agent is associated. The H-SLP SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLP SHALL apply subscriber privacy against the client-id.

B. The H-SLP verifies that the target SET is currently not SUPL Roaming. The H-SLP may also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or if the SET supports SUPL is considered out of scope for SUPL (there are various environment dependent mechanisms).

C. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

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D. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

E. The H-SLP initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, proxy/non-proxy mode indicator and the intended positioning method. The SUPL INIT MAY contain the protection level, the desired QoP and the address of the H-SLP. The protection level indicates the level of protection for the SUPL INIT message. In this case the result of the privacy check in Step A indicated that notification or verification to the target subscriber is required, and the H-SLP therefore includes the Notification element in the SUPL INIT message

F. The SET analyses the received SUPL INIT. If found to be non authentic, the SET takes no further action. Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

G. The SET evaluates the notification rules and alerts the subscriber of the position request. In this case the user rejects the location request, either by explicit action or implicitly by not responding to the notification. The SET returns a SUPL END message to the H-SLC containing the session-id, a hash of the received SUPL INIT message (ver) and the status code *consentDeniedByUser*.

H. The H-SLC sends a PEND message to the H-SPC to terminate the SUPL session.

I. The H-SLC sends the position response, containing the ms-id, client-id, and the appropriate error-code back to the SUPL Agent using an MLP SLIA message.

5.3.2 SET Does Not Allow Positioning for Roaming with V-SLP

After receiving a SUPL INIT message the SET executes the notification/verification procedure. In this scenario, the subscriber rejects the location request. The flow shown in Figure 14 applies to both proxy and non-proxy mode for roaming with V-SLP.

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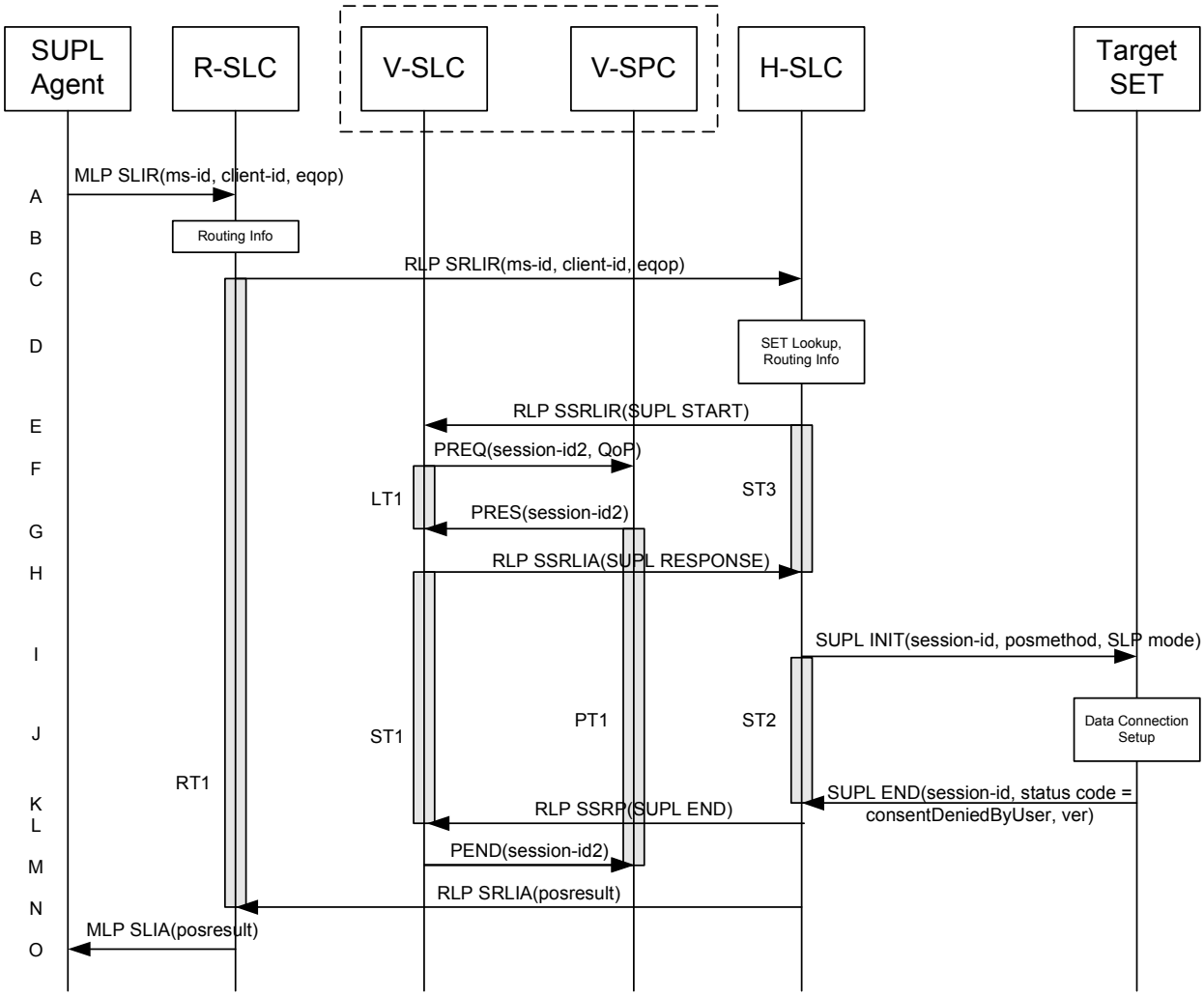

Figure 14: Network Initiated SET User Denies Positioning for Roaming with V-SLP

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP SLIR message to the R-SLC, with which SUPL Agent is associated. The R-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received.

B. The R-SLC determines the H-SLC based on the received msid. If the R-SLP determines that the SUPL Agent is not authorized for this request, Step L will be returned with the applicable MLP return code.

NOTE 2: The specifics for determining the H-SLC are considered outside scope of SUPL (there are various environment dependent mechanisms).

C. The R-SLC forwards the location request to the H-SLC of the target subscriber, using the RLP protocol. Based on the received ms-id the H-SLC SHALL apply subscriber privacy against the client-id. If a previously computed position which meets the requested QoP is available at the H-SLC, the H-SLC SHALL proceed to step I after having performed the step D.

D. The H-SLC verifies that the target SET is currently SUPL Roaming. In addition the H-SLC MAY also verify that the target SET supports SUPL.

NOTE 3: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

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NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope

E. The H-SLC sends an RLP SSRLIR to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. Mandatory parameters in SUPL START that are not known to the H-SLC (lid and SET capabilities) shall be populated with arbitrary values by the H-SLC and be ignored by V-SLC. The SET part of the session-id will not be included in this message by the H-SLC to distinguish this scenario from a SET Initiated scenario.

F. The V-SLC requests service from the V-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

G. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

H. The V-SLC acknowledges that it is ready to initiate a SUPL positioning procedure with an RLP SSRLIA back to the H-SLC.

I. The H-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, proxy/non-proxy mode indicator and the intended positioning method. In this case the result of the privacy check in Step D indicated that notification or verification to the target subscriber is needed and the H-SLC therefore includes the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent the H-SLC also computes and stores a hash of the message.
If in step C the H-SLC decided to use a previously computed position the SUPL INIT message SHALL indicate this in a ‘no position’ posmethod parameter value.

J. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

K. The SET evaluates the notification rules and alerts the subscriber of the position request. In this case the user rejects the location request, either by explicit action or implicitly by not responding to the notification, and the SET returns a SUPL END message to the H-SLC containing the session-id, a hash of the received SUPL INIT message (ver) and the status code *consentDeniedByUser*

L. The H-SLC SHALL check that the hash of SUPL INIT matches the one it has computed for this particular session. The H-SLC then tunnels the SUPL END message to the V-SLC using RLP.

M. The V-SLC sends a PEND message to the V-SPC to terminate the SUPL session.

N. The H-SLC sends an RLP SRLIA message to the R-SLC indicating the error condition user rejected location request. The H-SLC SHALL release all resources related to this session.

O. The H-SLC sends the position response, containing the ms-id, client-id, and the appropriate error-code back to the SUPL Agent using an MLP SLIA message.

5.3.3 SET Does Not Allow Positioning for Roaming with H-SLP

This scenario is identical to the non-roaming scenario (see section 5.3.1)

5.3.4 SUPL Protocol Error

When a SUPL protocol error occurs and as a result the SUPL session is terminated, a PEND message is used by the SLC or SPC to notify its counterpart (i.e. SPC or SLC) about the end of the SUPL session.

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5.3.5 Timer expiration

Timer expirations are defined in Appendix C.

5.4 SET Initiated – Proxy mode

This section describes the SET Initiated Proxy mode scenarios.

5.4.1 Non-Roaming Successful Case

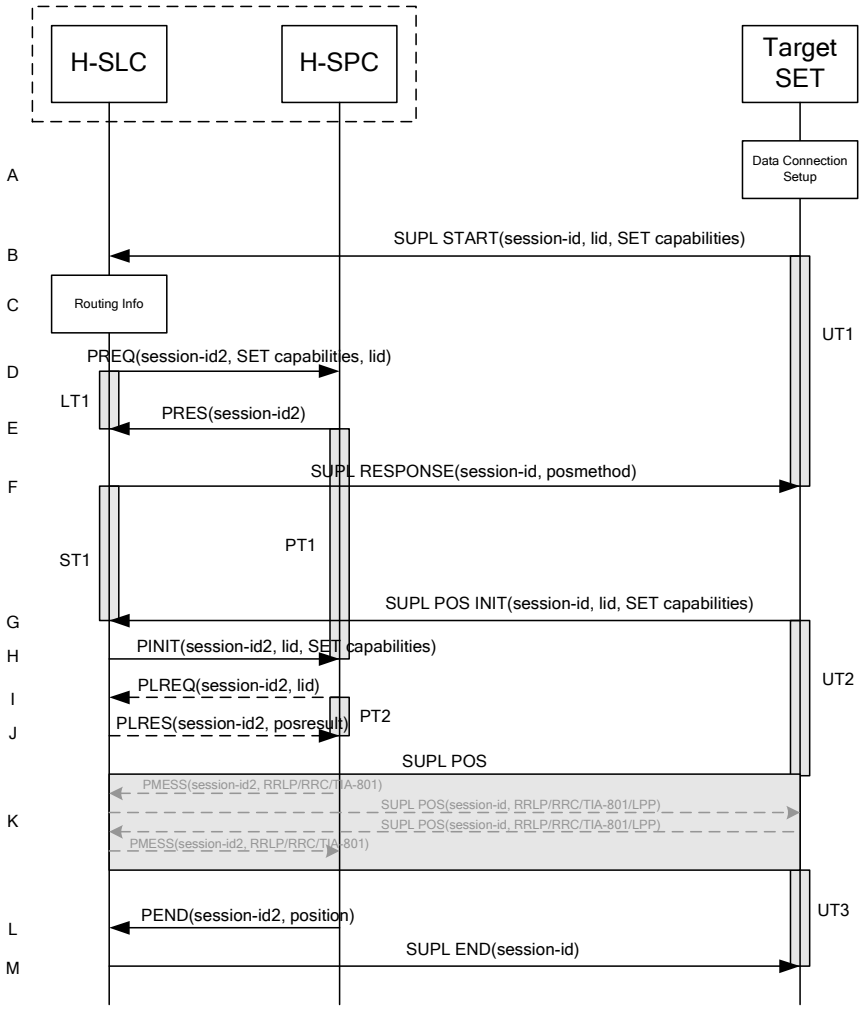

Figure 15: SET-Initiated Non-Roaming Successful Case - Proxy mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for position from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL START message to start a positioning session with the H-SLP. The SUPL START message contains session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). If a previously computed position which meets any requested QoP is available at the H-SLC the H-

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SLC SHALL directly proceed to step M and send the position to the SET in the SUPL END message (step N is not executed in this case)..

C. The H-SLC verifies that the target SET is currently not SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

D. The H-SLC inspects the SUPL START message and determines if the SET is allowed to directly access the H-SPC. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the session-id2, lid, posmethod and optionally the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES. It MAY also contain a position based on information received in the PREQ message. This position does not need to meet the QoP.

F. Consistent with the SUPL START message including posmethod(s) supported by the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL START message. The H-SLC SHALL respond with the SUPL RESPONSE to the SET. The SUPL RESPONSE contains the session-id but no H-SLC address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL RESPONSE also contains the posmethod. The SUPL RESPONSE MAY contain location information, not meeting the QoP, but giving an initial approximation of the position. If a coarse position computed based on information received in the SUPL START message meets the requested QoP, the H-SLC MAY directly proceed to step M and terminate the session with the H-SPC using a PEND message.

G. After the SET receives the SUPL RESPONSE from the H-SLC, the SET sends a SUPL POS INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.

H. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id and SET capabilities. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step E, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including posmethod(s) supported by the SET (as part of the SET capabilities)the SET capabilities, the H-SPC SHALL then determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line withthat meets the SET capabilities andwhich was approved by the H-SLC in step D. If a coarse position calculated based on information received in the PINIT message is available that meets any required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

I. If the H-SPC cannot translate the lid received in step H into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into a coarse position itself.

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J. This step is conditional and only occurs if step I was performed. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

K. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

L. Once the position calculation is complete the H-SPC sends a PEND message to the H-SLC.

M. The H-SLC sends the SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. Depending on positioning method and used positioning protocol the H-SLP MAY add the determined position to the SUPL END message. The SET SHALL release the secure connection to the H-SLC and release all resources related to this session.

5.4.2 Roaming with V-SLP Positioning Successful Case

SET Roaming where the V-SLP is involved in the positioning calculation.

A policy of a single SET to H-SLP SUPL session is maintained by encapsulating the messages between the SET and V-SLP through the use of the RLP protocol.

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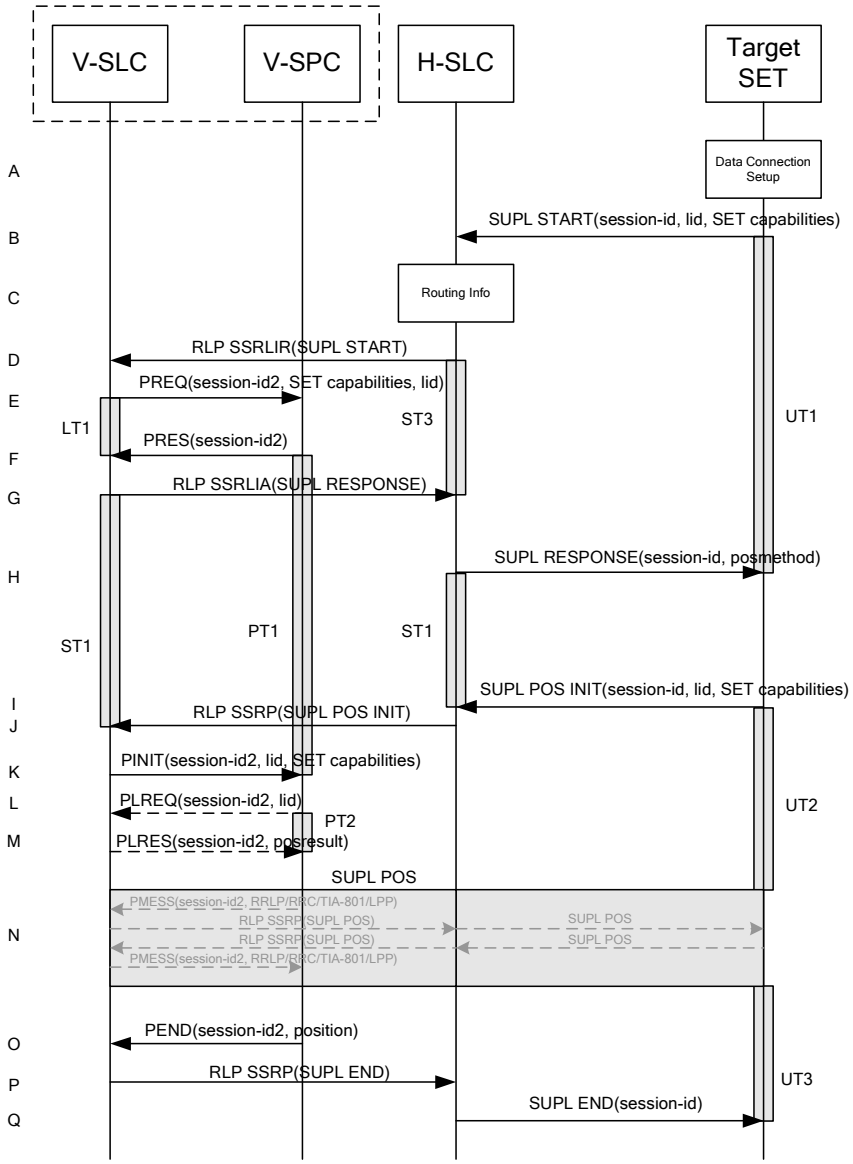

Figure 16: SET-Initiated Roaming Successful Case – Proxy mode with V-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for position from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL START message to start a positioning session with the H-SLC. The SUPL START message contains session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). If a previously computed position which meets any requested QoP is available at the H-SLC the H-SLC SHALL directly proceed to step Q and send the position to the SET in the SUPL END message (step Q of this flow will then not be executed).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

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D. The H-SLC decides that the assistance data/position calculation is done by the V-SLP and sends a RLP SSRLIR tunnelling the SUPL START message to the V-SLC.

E. The V-SLC requests service from the V-SPC for a SUPL session by sending a PREQ message containing the session-id2, lid, the SET capabilities and optionally the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

F. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES. It MAY also contain a position based on information received in the PREQ message. This position does not need to meet the QoP.

G. Consistent with the SUPL START message including posmethod(s) supported by the SET, the V-SLC MAY determine the posmethod. If the V-SPC included a list of supported posmethods in step F, the chosen posmethod SHALL be on this list. If required for the posmethod, the V-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL START message. The V-SLC responds with a SUPL RESPONSE tunnelled over RLP back to the H-SLC that it is capable of supporting this request. The SUPL RESPONSE contains at least the sessionid and posmethod. The SUPL RESPONSE MAY contain location information, not meeting the QoP, but giving an initial approximation of the position. If a coarse position calculated based on information received in the RLP SSRLIR (SUPL START) message meets any requested QoP, the V-SLC SHALL send a RLP SSRLIA (SUPL END) message - as opposed to RLP SSRLIA (SUPL RESPONSE) - including the position estimate to the H-SLC in which case the H-SLC SHALL then proceed to step Q and terminate the session with the H-SPC using a PEND message (step R of this flow will then not be executed).

H. The H-SLC forwards the SUPL RESPONSE to the SET. The SUPL RESPONSE contains the session-id but no H-SLC address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL RESPONSE also contains the posmethod. The SUPL RESPONSE MAY contain location information, not meeting the QoP, but giving an initial approximation of the position.

I. After the SET receives the SUPL RESPONSE from the H-SLC, the SET sends a SUPL POS INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.

J. The H-SLC forwards the SUPL POS INIT to the V-SLC over the RLP tunnel.

K. The V-SLC sends a PINIT message to the V-SPC including session-id2, location id and SET capabilities. The V-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the V-SPC in step F, or a different posmethod of the V-SLC's choosing, as long as it is one supported by the V-SPC. Based on the PINIT message including the SET capabilities, the V-SPC SHALL then determine the posmethod. If a posmethod has been included in the PINIT by the V-SLC, the V-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the V-SPC shall choose any posmethod in line with the SET capabilities which was approved by the V-SLC in step E. If a coarse position calculated based on information received in PINIT message is available that meets the required QoP, the V-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

L. If the V-SPC cannot translate the lid received in step K into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step

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is optional and not required if the V-SPC can perform the translation from lid into a coarse position itself.

M. This step is conditional and only occurs if step L was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the V-SPC MAY directly proceed to step K and not engage in a SUPL POS session.

N. The SET and the V-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SPC and the V-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SLC and the H-SLC using SUPL POS over RLP tunnel messages. The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages. The flow sequence PMESS – RLP SSRP(SUPL POS) – SUPL POS – SUPL POS – RLP SSRP(SUPL POS) – PMESS is conceptually shown in dotted lines.
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC via H-SLC (SET-Based).

O. Once the position calculation is complete the V-SPC sends a PEND message to the V-SLC.

P. The V-SLC then sends a SUPL END message to the SET, which is tunnelled over RLP via the H-SLC. The V-SLC MAY add the determined position to the SUPL END message. The V-SLP SHALL release all resources related to this session.

Q. The H-SLC forwards the SUPL END to the SET informing it that no further positioning procedure will be started and that the location session is finished. The SET SHALL release the secure connection and release all resources related to this session. The H-SLC SHALL release all resources related to this session.

5.4.3 Roaming with H-SLP Positioning Successful Case

SET Roaming where the H-SLP is involved in the positioning calculation.

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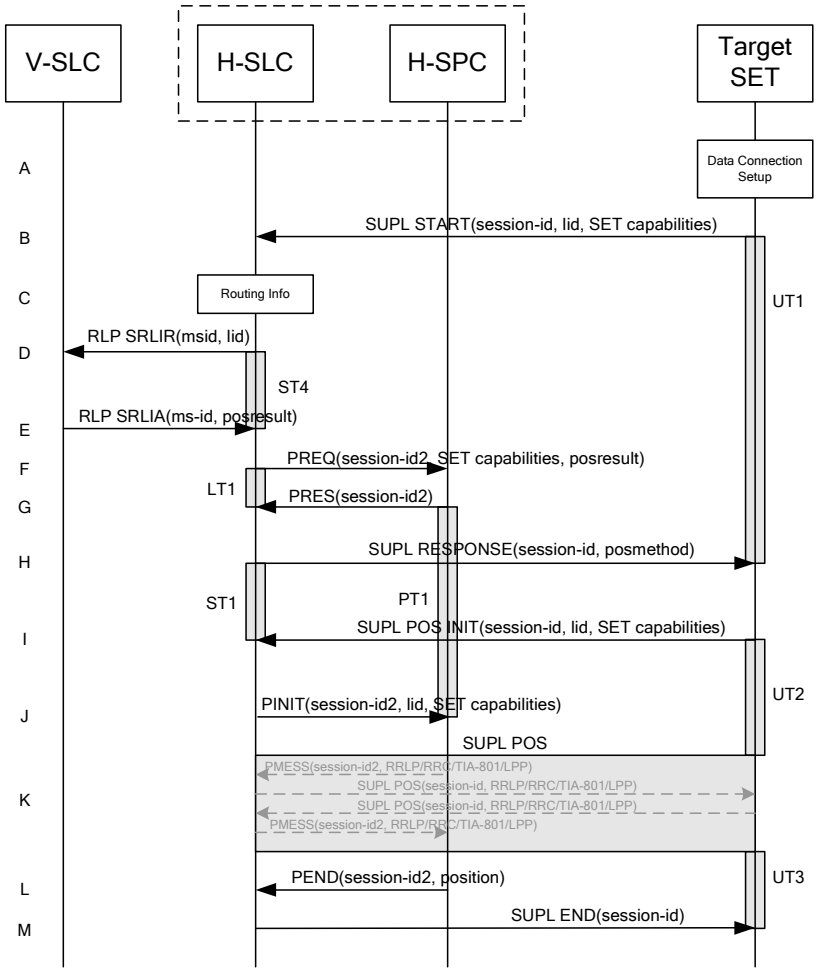

Figure 17: SET-Initiated Roaming Successful Case – Proxy mode with H-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for position from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL START message to start a positioning session with the H-SLC. The SUPL START message contains session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). If a previously computed position which meets any requested QoP is available at the H-SLC the H-SLC SHALL directly proceed to step M and send a SUPL END message including the position to the SET and end the session (step N of this flow will then not be executed).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

D. The H-SLC decides that the H-SLP will provide assistance/position calculation and the H-SLC sends a plain RLP SRLIR request to the V-SLC to determine a coarse position for further exchange of SUPL POS messages between SET and H-SLP. The RLP request contains at least the msid and the Location ID (lid).

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E. The V-SLC returns a RLP SRLIA message. The RLP SRLIA message contains at least the position result (e.g., coarse position for A-GPS positioning). If the computed position meets the requested QoP, the H-SLC MAY directly proceed directly to step M.

F. The H-SLC inspects the SUPL START message and determines if the SET is allowed to directly access the H-SPC. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the session-id2, coarse position estimate, SET capabilities and optionally the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

G. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES. It MAY also contain a position based on information received in the PREQ message. This position does not need to meet the QoP.

H. Consistent with the SUPL START message including posmethod(s) supported by the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step G, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL START message.
The H-SLC responds with the SUPL RESPONSE to the SET. The SUPL RESPONSE contains the session-id but no H-SPC address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL RESPONSE also contains the posmethod. The SUPL RESPONSE MAY contain location information, not meeting the QoP, but giving an initial approximation of the position. If a coarse position computed based on information received in the SUPL START message meets the requested QoP, the H-SLC MAY directly proceed to step M and terminate the session with the H-SPC using a PEND message.

I. After the SET receives the SUPL RESPONSE from H-SLC, the SET sends a SUPL POS INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.

J. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id and SET capabilities. If a position computed based on information received in the PINIT message is available which meets any required QoP, the H-SPC MAY directly proceed to L and not engage in a SUPL POS session. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step G, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL then determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step F.

K. The SET and the H-SCP exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

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L. Once the position calculation is complete the H-SPC sends a PEND message to the H-SLC.

M. The H-SLC sends a SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. Depending on positioning method and used positioning protocol the H-SLP MAY add the determined position to the SUPL END message. The SET SHALL release the secure connection to the H-SLC and release all resources related to this session

5.4.4 SET-Initiated Location Request of another SET

This scenario does not involve ILP.

5.4.5 Location Request of Transfer Location to Third Party

All scenarios to do with transfer of location to a third party are identical to the equivalent scenarios without transfer of location as far as ILP is concerned.

5.5 SET Initiated – Non-Proxy mode

This section describes the SET Initiated Non-Proxy mode scenarios.

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5.5.1 Non-Roaming Successful Case

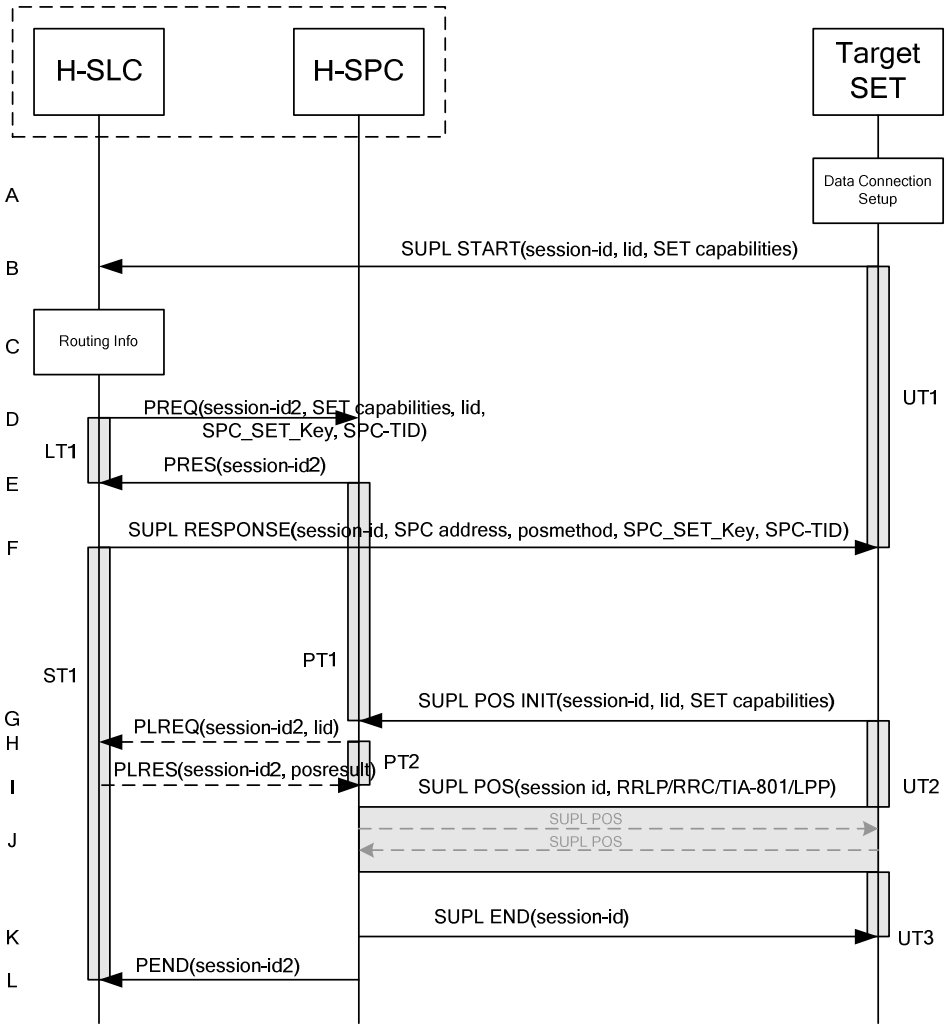

Figure 18: SET-Initiated Non-Roaming Successful Case – Non-Proxy mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for position from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL START message to start a positioning session with the H-SLC. The SUPL START message contains session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). If a previously computed position which meets any requested QoP is available at the H-SLC the H-SLC shall respond with a SUPL END message to the SET containing the position and end the SUPL session.

C. The H-SLC verifies that the target SET is currently not SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

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D. The H-SLC will inspect the SUPL START message and determine if the SET is allowed to directly access the H-SPC. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the session-id2, lid, SET capabilities and optionally the QoP. The H-SLC creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication and forwards them to the H-SPC in the PREQ message. The H-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES. It MAY also contain a position based on information received in the PREQ message. This position does not need to meet the QoP.

F. Consistent with the SUPL START message including posmethod(s) supported by the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL START message.
The H-SLC SHALL respond with a SUPL RESPONSE to the SET. The SUPL RESPONSE contains the session-id, SPC_SET_Key and SPC-TID to be used by the SET for mutual H-SPC/SET authentication, and the address of the H-SPC to indicate to the SET that a new secure connection SHALL be established. The SUPL RESPONSE MAY contain location information, not meeting the QoP, but giving an initial approximation of the position.
If a coarse position computed based on information received in the SUPL START message meets any requested QoP, the H-SLC MAY respond with a SUPL END message (instead of the SUPL RESPONSE) to the SET containing the position to end the SUPL session and terminate the session with the H-SPC using a PEND message.

G. To initiate the actual positioning session the SET opens a new secure connection to the H-SPC using the address indicated in step F. The SET and H-SPC perform mutual authentication through the keys received in step D and step F, and the SET sends a SUPL POS INIT message. Before the new secure connection is established the existing secure connection to the H-SLC is closed. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. If a coarse position calculated based on information received in the SUPL POS INIT message is available that meets any required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.

H. If the H-SPC cannot translate the lid received in step G into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into a coarse position itself.

I. This step is conditional and only occurs if step H was performed. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.

J. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step D, the H-SPC SHALL only choose an approved method. The SET and the SPC exchange several successive positioning procedure messages (a SUPL POS message exchange is shown conceptually in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-

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Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

K. Once the position calculation is complete the H-SPC SHALL send the SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. Depending on positioning method and used positioning protocol the SPC MAY add the determined position to the SUPL END message. When the SUPL END is received the SET SHALL release the secure connection to the H-SPC and release all resources related to this session. The H-SPC informs the H-SLC that the positioning procedure is finished. The H-SPC SHALL release all resources related to this session.

L. The H-SPC sends a PEND message to the H-SLC indicating that all resources related to this session are to be released.

5.5.2 Roaming with V-SPC Positioning Successful Case

SET Roaming where the V-SPC is involved in the positioning calculation.

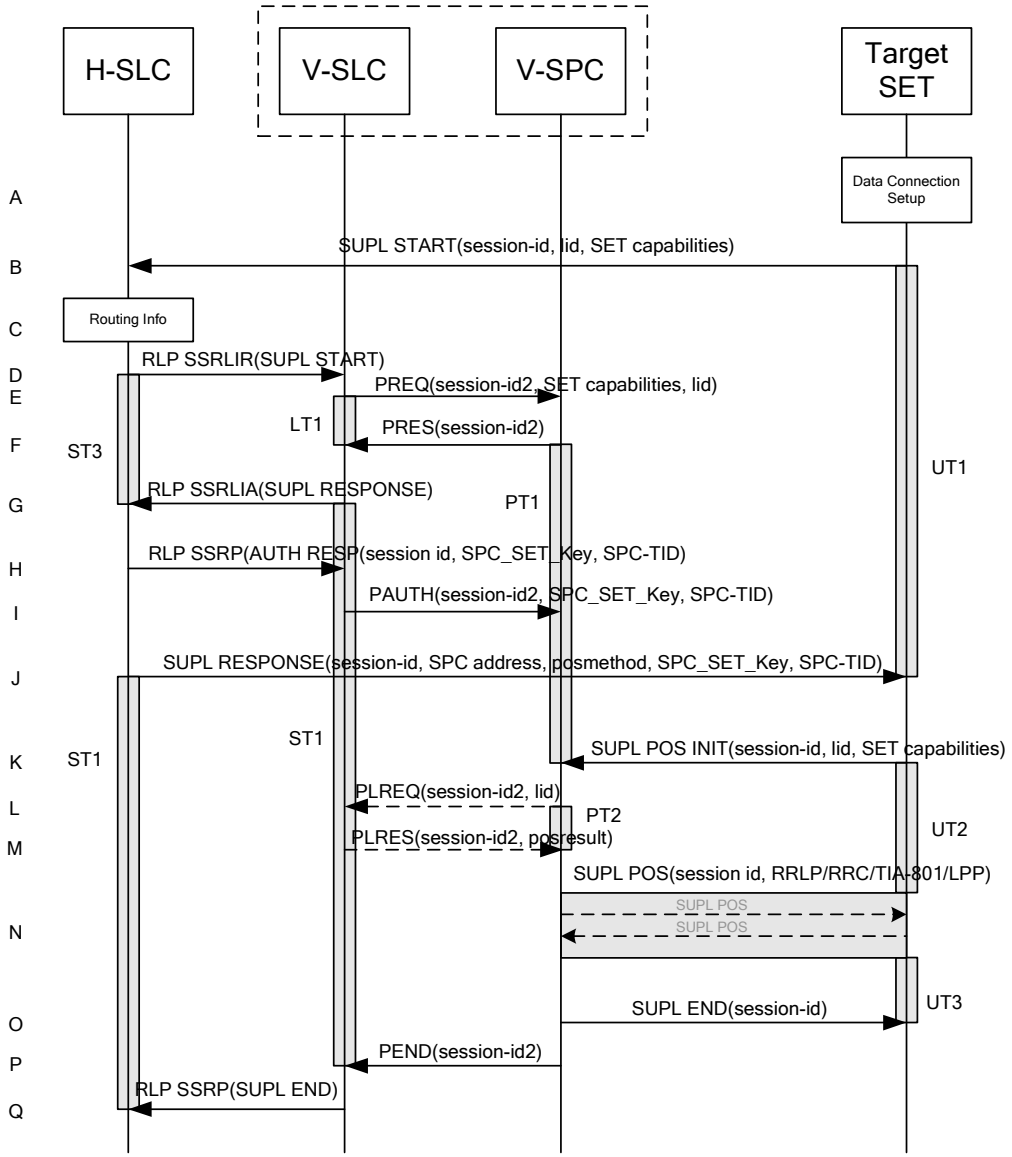

Figure 19: SET-Initiated Roaming Successful Case – Non-Proxy mode with V-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

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A. The SUPL Agent on the SET receives a request for position from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL START message to start a positioning session with the H-SLC. The SUPL START message contains session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).
If a previously computed position which meets any requested QoP is available at the H-SLC the H-SLC SHALL send a SUPL END message including the position to the SET and end the session.

C. The H-SLP verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL. However, there are various environment dependent mechanisms.

D. The H-SLC decides that the assistance data/position calculation is done by the V-SPC, allocates a sessionid and sends an RLP SSRLIR tunnelling the SUPL START message to the V-SLC.

E. The V-SLC requests service from the V-SPC for a SUPL session by sending a PREQ message containing the session-id2, lid, SET capabilities and optionally the QoP. The V-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

F. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES. It MAY also contain a position based on information received in the PREQ message. This position does not need to meet the QoP.

G. Consistent with the SUPL START message including posmethod(s) supported by the SET, the V-SLC MAY determine the posmethod. If the V-SPC included a list of supported posmethods in step F, the chosen posmethod SHALL be on this list. If required for the posmethod, the V-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL START message.
The V-SLC responds with a SUPL RESPONSE tunnelled over RLP back to the H-SLC that it is capable of supporting this request. The SUPL RESPONSE contains at least the sessionid, and the V-SPC address. The SUPL RESPONSE also contains the posmethod. The SUPL RESPONSE MAY contain location information, not meeting the QoP, but giving an initial approximation of the position. If a coarse position calculated based on information received in the RLP SSRLIR (SUPL START) message meets any requested QoP, the V-SLC MAY send a RLP SSRLIA (SUPL END) message - as opposed to RLP SSRLIA (SUPL RESPONSE) - including the position estimate to the H-SLC in which case the H-SLC sends a SUPL END message carrying the session id and including the position estimate to the SET (as opposed to the SUPL RESPONSE message) to terminates the ULP session and terminates the session with the H-SPC using a PEND message.

H. The H-SLC creates SPC_SET_Key and SPC-TID to be used for mutual V-SPC/SET authentication.The H-SLC forwards SPC_SET_Key and SPC-TID to the V-SLC through an RLP SSRP message.

I. The V-SLC forwards SPC_SET_Key and SPC-TID to the V-SPC through a PAUTH message.

J. The H-SLC forwards the SUPL RESPONSE to the SET. The SUPL RESPONSE contains at least session-id, posmethod, SPC_SET_Key and SPC-TID to be used by the SET for mutual V-SPC/SET authentication, and the address of the V-SPC to indicate to the SET that a new secure connection SHALL be established. The SUPL RESPONSE MAY contain location information, not meeting the QoP, but giving an initial approximation of the position.

K. To initiate the actual positioning session the SET opens a new secure connection to the V-SPC using the address indicated in step J. The SET and V-SPC perform mutual authentication through the keys received in step I and step J and the SET sends a SUPL POS INIT message. Before the new secure

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connection is established the existing secure connection to the H-SLC is closed. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. If a coarse position calculated based on information received in the SUPL POS INIT message is available that meets the required QoP, the V-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

L. If the V-SPC cannot translate the lid received in step K into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into a coarse position itself.

M. This step is conditional and only occurs if step L was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets any required QoP, the V-SPC MAY directly proceed to step K and not engage in a SUPL POS session.

N. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the V-SPC SHALL determine the posmethod. If the V-SLC included its approved positioning methods in step E, the V-SPC SHALL only choose an approved method. The SET and the V-SPC exchange several successive positioning procedure messages (a SUPL POS message exchange is shown conceptually in dotted lines).
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

O. Once the position estimate or calculation is complete, the V-SPC sends a SUPL END to the SET and depending on positioning method and positioning protocol optionally includes the position. The SET SHALL release the secure connection and release all resources related to this session.

P. The V-SPC informs the V-SLC of the end of the SUPL positioning session. The V-SPC SHALL release all resources related to this session.

Q. The V-SLC sends a RLP SSRP to the H-SLC to inform about the end of the SUPL session. The H-SLC and V-SLC SHALL release all resources related to this session.

5.5.3 Roaming with H-SPC Positioning Successful Case

SET Roaming where the H-SPC is involved in the positioning calculation.

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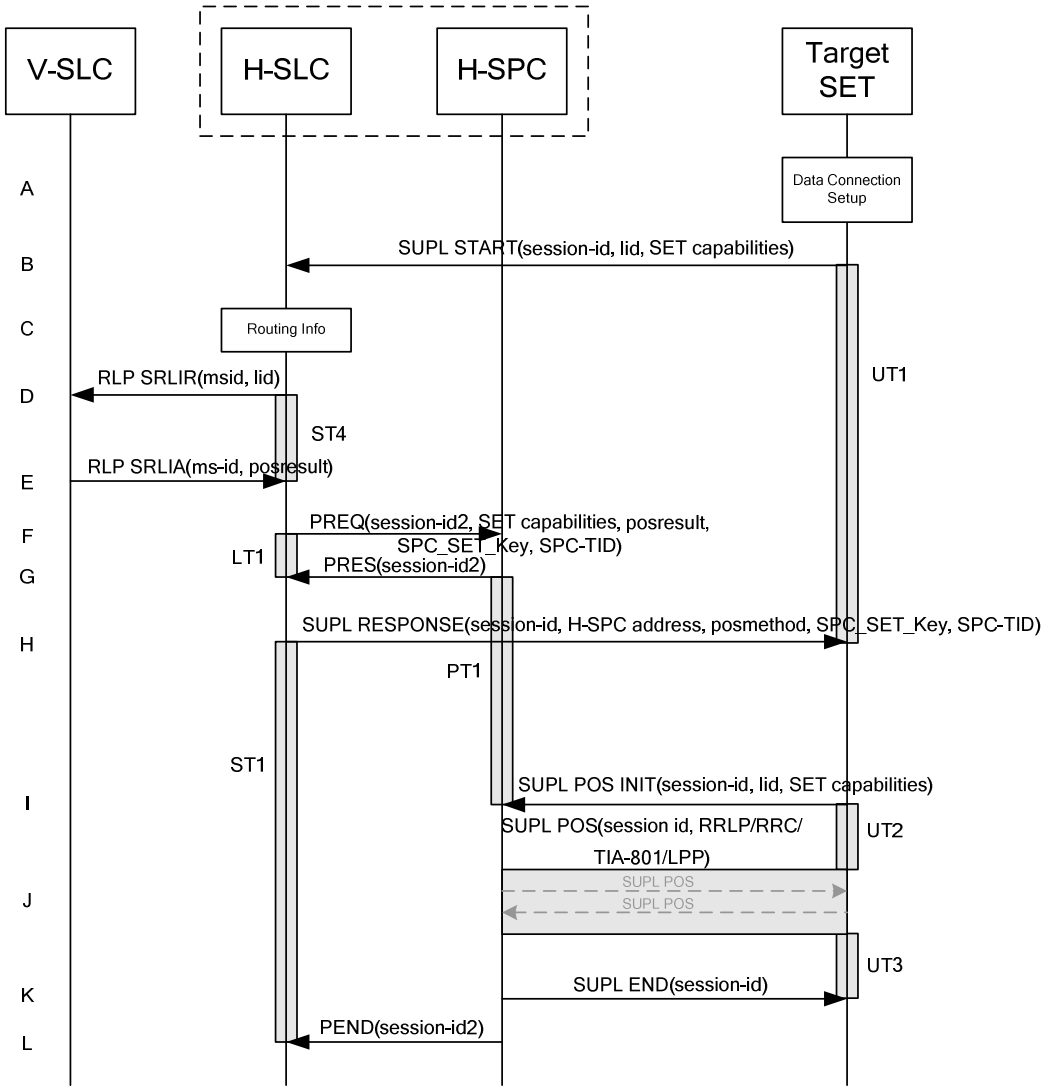

Figure 20: SET-Initiated Roaming Successful Case – Non-Proxy mode with H-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for position from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL START message to the H-SLC to start a SUPL session with the H-SLC and to request authorization to start a SUPL positioning session with the H-SPC. The SUPL START message contains session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).
If a previously computed position which meets any requested QoP is available at the H-SLC the H-SLC SHALL send a SUPL END message including the position to the SET and end the session.

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL.

D. The H-SLC decides that the H-SPC will provide assistance/position calculation and the H-SLC sends a plain RLP SRLIR request to the V-SLC to determine a coarse position for further exchange

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of SUPL POS messages between SET and H-SPC. The RLP request contains at least the msid and the Location ID (lid).

E. The V-SLC returns a RLP SRLIA message. The RLP SRLIA message contains at least the position result (e.g., coarse position for A-GPS positioning). If the coarse position received from the V-SLC meets any requested QoP the H-SLC MAY send a SUPL END to the SET carrying the sessionid and the position result and terminate the SUPL session.

F. The H-SLC will inspect the SUPL START message and determine if the SET is allowed to directly access the H-SPC. The H-SLC requests service from the H-SPC for a SUPL session by sending a PREQ message containing the session-id2, coarse position estimate, SET capabilities and optionally the QoP. The H-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved. The H-SLC also creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. SPC_SET_Key and SPC-TID are forwarded to the H-SPC in the PREQ message.

G. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES. It MAY also contain a position based on information received in the PREQ message. This position does not need to meet the QoP.

H. Consistent with the SUPL START message including posmethod(s) supported by the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step G, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL START message.
The H-SLC responds with the SUPL RESPONSE to the SET. The SUPL RESPONSE contains the session-id, SPC_SET_Key and SPC-TID to be used by the SET for mutual H-SPC/SET authentication, and the H-SPC address. The SUPL RESPONSE also contains the posmethod. The SUPL RESPONSE MAY contain location information, not meeting the QoP, but giving an initial approximation of the position. If a coarse position computed based on information received in the SUPL START message meets any requested QoP, the H-SLC MAY respond with a SUPL END message (instead of the SUPL RESPONSE) to the SET containing the position to end the SUPL session and terminate the session with the H-SPC using a PEND message.

I. To initiate the actual positioning session the SET opens a new secure connection to the H-SPC using the address indicated in step H. The SET and H-SPC perform mutual authentication through the keys received in step F and step H, and the SET sends a SUPL POS INIT message. Before the new secure connection is established the existing secure connection to the H-SLC is closed. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. If a position computed based on information received in the PINIT message is available which meets any required QoP, the H-SPC MAY directly proceed to K and not engage in a SUPL POS session.

J. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step F, the H-SPC SHALL only choose an approved method. The SET and the H-SPC exchange several successive positioning procedure messages (a SUPL POS message exchange is shown conceptually in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

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K. Once the position calculation is complete the H-SPC sends a SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. Depending on the positioning protocol used and positioning method the location estimate is optionally included in the SUPL END message. The SET SHALL release the secure connection and release all resources related to this session. The H-SPC informs the H-SLC that the positioning procedure is finished. The H-SPC SHALL release all resources related to this session.

L. The H-SPC sends a PEND message to the H-SLC indicating that all resources related to this session are to be released.

5.5.4 SET-Initiated Location Request of another SET

This scenario does not involve ILP.

5.5.5 Location Request of Transfer Location to Third Party

All scenarios to do with transfer of location to a third party are identical to the equivalent scenarios without transfer of location as far as ILP is concerned.

5.6 Exception Procedures

This section describes the exception procedures for SET Initiated Immediate scenarios.

5.6.1 SET Authorization Failure

This error case does not impact the Llp interface.

5.6.2 SUPL Protocol Error

When a SUPL protocol error occurs and as a result the SUPL session is terminated, a PEND message is used by the SLC or SPC to notify its counterpart (i.e. SPC or SLC) about the end of the SUPL session.

5.6.3 Timer expiration

Timer expirations are defined in Appendix C.

5.7 Emergency Services Location Request – Proxy Mode

This section describes the handling of Emergency Service Location Requests in Proxy Mode.

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5.7.1 Non-Roaming Successful Case

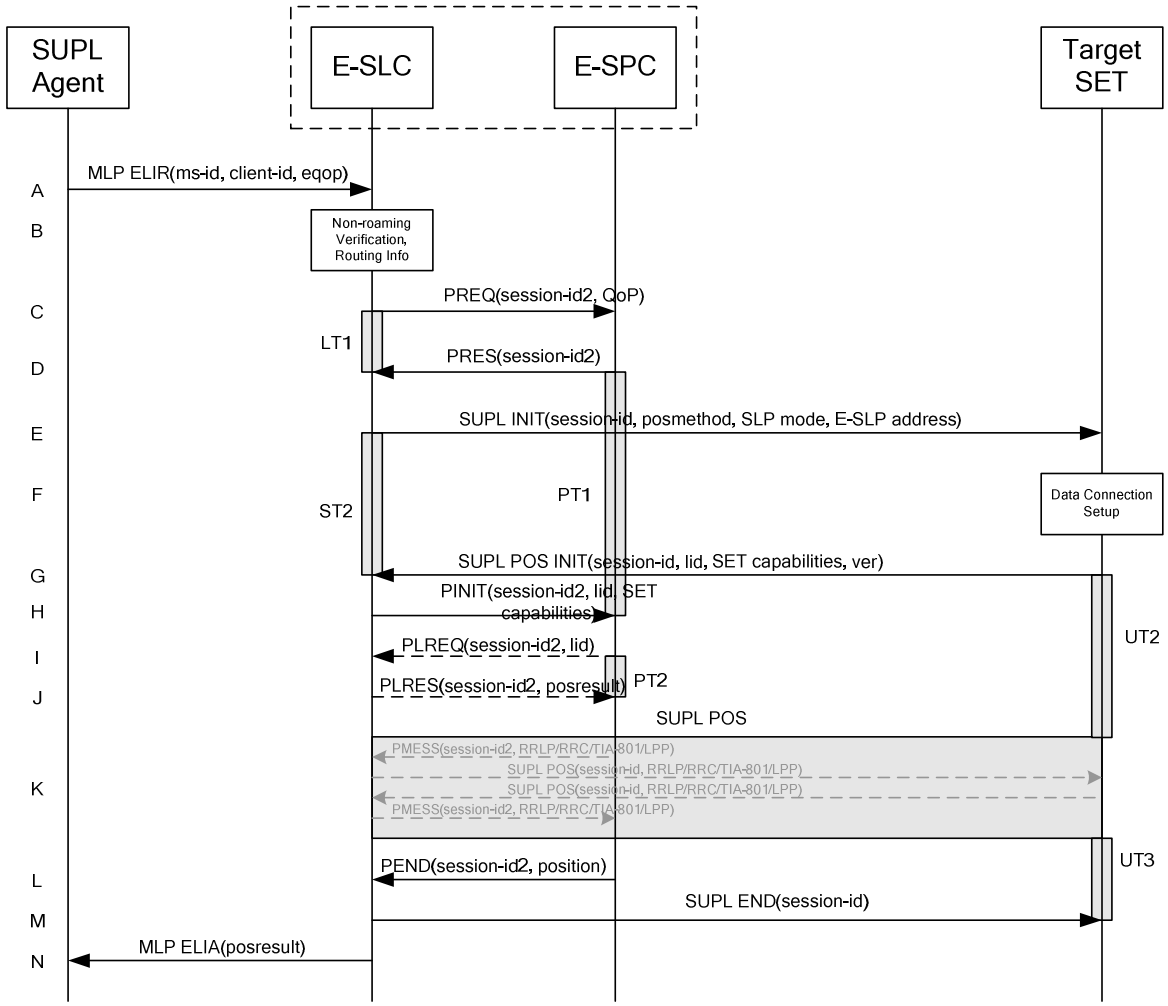

Figure 21: Network Initiated Emergency Services Non-Roaming Successful Case – Proxy Mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP ELIR message to the E-SLC, with which SUPL Agent is associated. The MLP ELIR message may include the SET IP address and location data. The E-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received.
If a previously computed position which meets the requested QoP is available at the E-SLC and no notification or verification is required according to local regulatory requirements, the E-SLC SHALL directly proceed to step N. If notification and verification or notification only is required, the E-SLC SHALL proceed to step B.

B. The E-SLC may use any location data and/or any SET IP address received in step A to verify that the target SET is currently not SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL (there are various environment dependent mechanisms).

C. The E-SLC requests service from the E-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The E-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the E-SPC SHALL assume that all its available positioning methods have been approved.

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D. The E-SPC accepts the service request for a SUPL session from the E-SLC with a PRES message containing the session-id2. The E-SPC MAY include a preferred positioning method in the PRES. The E-SPC MAY include its supported positioning methods in the PRES message.

E. The E-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, proxy/non-proxy mode indicator and the intended positioning method. The SUPL INIT message SHALL contain the E-SLP address if the E-SLP is not the H-SLP for the SET. The SUPL INIT MAY contain the desired QoP. The E-SLP SHALL also include the Notification element in the SUPL INIT message indicating location for emergency services and, according to local regulatory requirements, whether notification or verification to the target SET is or is not required. Before the SUPL INIT message is sent the E-SLC also computes and stores a hash of the message.
If in step A the E-SLC decided to use a previously computed position, the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message carrying the results of the verification process (access granted, or access denied). If no explicit verification is required (notification only) the SET SHALL respond with a SUPL END message. The E-SLC SHALL then directly proceed to step N.

NOTE 3: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step F and use the procedures described in step G to establish a secure connection to the E-SLC.

F. The SET takes needed action preparing for establishment or resumption of a secure connection.

G. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the E-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the E-SLC using either the provisioned H-SLP or defaulted E-SLP address, if no E-SLP address was received in step E, or the E-SLP address received in step E. The SET then sends a SUPL POS INIT message to start a positioning session with the E-SLP. The SET SHALL send the SUPL POS INIT message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.

H. The E-SLC sends a PINIT message to the E-SPC including session-id2, location id and SET capabilities. The E-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the E-SPC in step D, or a different posmethod of the E-SLC's choosing, as long as it is one supported by the E-SPC.
Based on the PINIT message including the SET capabilities, the E-SPC SHALL then determine the posmethod. If a posmethod has been included in the PINIT by the E-SLC, the E-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the E-SPC shall choose any posmethod in line with the SET capabilities which was approved by the E-SLC in step C. If required for the posmethod the E-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the PINIT message. If a position received from or calculated based on information received in the PINIT message is available that meets the required QoP, the E-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

I. If the E-SPC cannot translate the lid received in step H into a position, the E-SPC sends a PLREQ message to the E-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the E-SPC can perform the translation from lid into a position itself.

J. This step is conditional and only occurs if step I was performed. The E-SLC reports the position result back to the E-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the position meets the required QoP, the E-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

K. The SET and the E-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the E-SPC and the E-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the E-SLC and the SET using

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SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The E-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the E-SLP (SET-Based).

L. Once the position calculation is complete the E-SPC sends a PEND message to the E-SLC including the position result.

M. The E-SLC sends a SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. The SET SHALL release the secure connection to the E-SLC and release all resources related to this session.

N. The E-SLC sends the position estimate back to the SUPL Agent using an MLP ELIA message. The E-SLP SHALL release all resources related to this session.

5.7.2 Roaming with V-SLP Positioning Successful Case

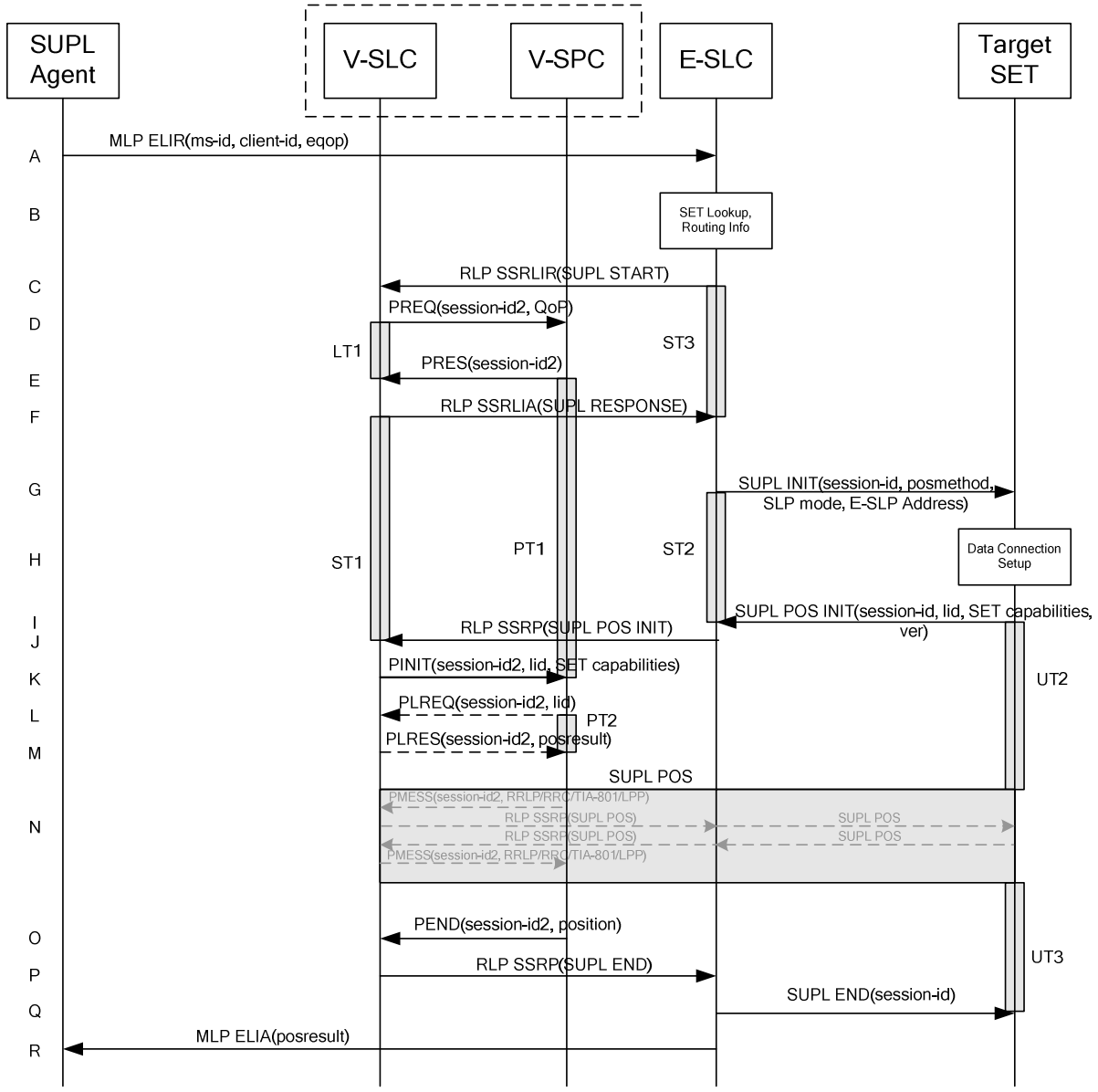

Figure 22: Network Initiated Emergency Services Roaming Successful Case – Proxy Mode with V-SLP positioning

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NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP ELIR message to the E-SLC, with which SUPL Agent is associated. The MLP ELIR message may include the SET IP address and location data. The E-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. If a previously computed position which meets the requested QoP is available at the E-SLC and no notification or verification is required according to local regulatory requirements, the E-SLC SHALL directly proceed to step R. If notification and verification or notification only is required, the E-SLC SHALL proceed to step G after having performed step B.

B. The E-SLC may use any location data and/or any SET IP address received in step A to verify that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL (there are various environment dependent mechanisms).

C. The E-SLC sends an RLP SSRLIR to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. Mandatory parameters in SUPL START that are not known to the E-SLC (lid and SET capabilities) shall be populated with arbitrary values by the E-SLC and be ignored by V-SLC. The SET part of the session-id will not be included in this message by the E-SLC to distinguish this scenario from a SET Initiated scenario.

D. The V-SLC requests service from the V-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

E. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

F. The V-SLC acknowledges that it is ready to initiate a SUPL positioning procedure with an RLP SSRLIA back to the E-SLC.

G. The E-SLC initiates the location session with the SET using the SUPL INIT message.The SUPL INIT message contains at least session-id, proxy/non-proxy mode indicator and the intended positioning method. The SUPL INIT SHALL contain the E-SLP address if the E-SLP is not the H-SLP for the SET. The SUPL INIT MAY contain the desired QoP. The E-SLC SHALL also include the Notification element in the SUPL INIT message indicating location for emergency services and, according to local regulatory requirements, whether notification or verification to the target SET is or is not required. Before the SUPL INIT message is sent the E-SLC also computes and stores a hash of the message.
If in step A the E-SLC decided to use a previously computed position, the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message to the E-SLC carrying the results of the verification process (access granted, or access denied). If no verification is required (notification only) the SET SHALL respond with a SUPL END message to the E-SLC. The E-SLP SHALL then directly proceed to step R.

NOTE 3: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step H and use the procedures described in step I to establish a secure connection to the E-SLC.

H. The SET takes needed action preparing for establishment or resumption of a secure connection.

I. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the E-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the E-SLC using either the H-SLP address, if no E-SLP address was received in step G, or the E-SLP address received in step G. The SET then sends a SUPL POS INIT message to start a positioning session with the E-SLC. The SET SHALL send the SUPL POS INIT message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods

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(e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.

J. The E-SLC SHALL check that the hash of SUPL INIT matches the one it has computed for this particular session. The E-SLC then tunnels the SUPL POS INIT message to the V-SLC using RLP.

K. The V-SLC sends a PINIT message to the V-SPC including session-id2, location id and SET capabilities. The V-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the V-SPC in step E, or a different posmethod of the V-SLC's choosing, as long as it is one supported by the V-SPC. Based on the PINIT message including the SET capabilities, the V-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the V-SLC, the V-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the V-SPC shall choose any posmethod in line with the SET capabilities which was approved by the V-SLC in step D. If required for the posmethod the V-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the PINIT message. If an initial position calculated based on information received in the PINIT message is available that meets the required QoP, the V-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

L. If the V-SPC cannot translate the lid received in step K into an initial position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into an initial position itself.

M. This step is conditional and only occurs if step L was performed. The V-SLC reports an initial position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the initial position meets the required QoP, the V-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

N. The SET and the V-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SPC and the V-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SLC and the E-SLC using SUPL POS over RLP tunnel messages. The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the E-SLC and the SET using SUPL POS messages. The flow sequence PMESS – RLP SSRP (SUPL POS) – SUPL POS – SUPL POS – RLP SSRP(SUPL POS) – PMESS is conceptually shown in dotted lines. The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

O. Once the position calculation is complete, the V-SPC sends a PEND message to the V-SLC including the position result.

P. The V-SLC sends a SUPL END message to the E-SLC over RLP. The SUPL END message SHALL contain the session id and the position result.

Q. The E-SLC sends the SUPL END message to the SET informing it that no further positioning procedure will be started and that the location session is finished. The SET SHALL release the secure connection to the E-SLC and release all resources related to this session.

R. The E-SLC sends the position estimate back to the SUPL Agent using an MLP ELIA message.

5.8 Emergency Services Location Request – Non-Proxy Mode

This section describes the handling of an Emergency Services Location Request in Non-Proxy Mode.

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5.8.1 Non-Roaming Successful Case

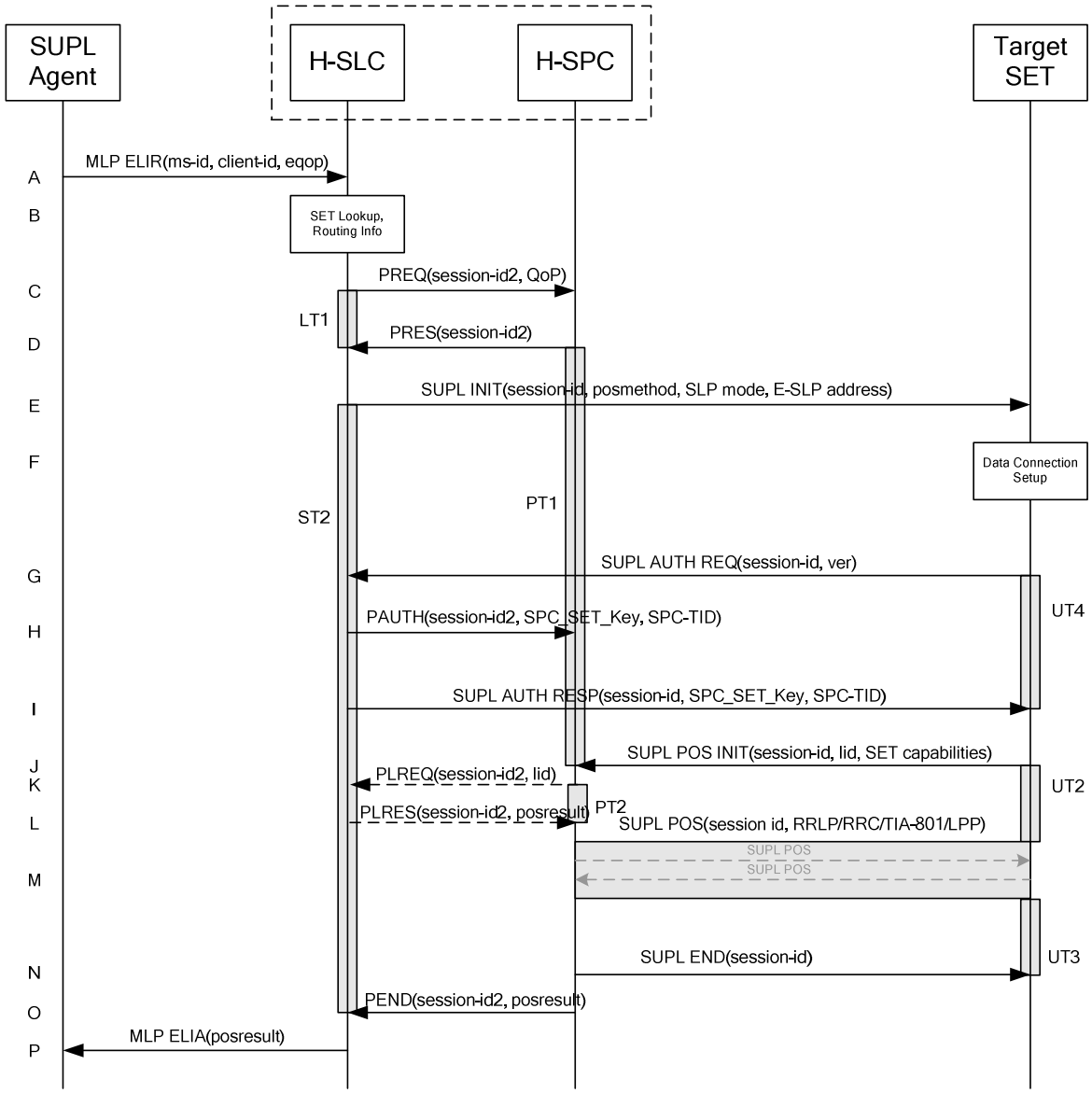

Figure 23: Network Initiated Non-Roaming Successful Case – Non-Proxy mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP ELIR message to the E-SLC, with which SUPL Agent is associated. The MLP ELIR message may include the SET IP address and location data. The E-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received.
If a previously computed position which meets the requested QoP is available at the E-SLC and no notification or verification is required according to local regulatory requirements, the E-SLC SHALL directly proceed to step P. If notification and verification or notification only is required, the E-SLC SHALL proceed to step E after having performed the SET Lookup and Routing Info procedures of step B.

B. The E-SLC may use any location data and/or any SET IP address received in step A to verify that the target SET is currently not SUPL Roaming.

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NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL (there are various environment dependent mechanisms).

C. The E-SLC requests service from the E-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The E-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the E-SPC SHALL assume that all its available positioning methods have been approved.

D. The E-SPC accepts the service request for a SUPL session from the E-SLC with a PRES message containing the session-id2. The E-SPC MAY include a preferred positioning method in the PRES. The E-SPC MAY include its supported positioning methods in the PRES message.

E. The E-SLC initiates the location session with the SET using the SUPL INIT message. The SUPL INIT message SHALL contain session-id, address of the V-SPC, proxy/non-proxy mode indicator and the intended positioning method. The SUPL INIT SHALL also contain the E-SLP address if the E-SLP is not the H-SLP for the SET. The SUPL INIT MAY contain the desired QoP. The E-SLC SHALL also include the Notification element in the SUPL INIT message indicating location for emergency services and, according to local regulatory requirements, whether notification or verification to the target SET is or is not required. Before the SUPL INIT message is sent the E-SLC also computes and stores a hash of the message.
If in step A the E-SLC decided to use a previously computed position, the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message carrying the results of the verification process (access granted, or access denied). If no explicit verification is required (notification only) the SET SHALL respond with a SUPL END message. The H-SLC SHALL then directly proceed to step P. Note: before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step F to establish a secure connection to the E-SLC.

F. The SET takes needed action preparing for establishment or resumption of a secure connection.

G. The SET will evaluate the Notification rules and follow the appropriate actions. The SET SHALL establish a secure connection to the E-SLC using either the provisioned H-SLP or defaulted E-SLP address, if no E-SLP address was received in step E, or the E-SLP address received in step E. The SET also checks the proxy/non-proxy mode indicator to determine if the E-SLP uses proxy or non-proxy mode. In this case, non-proxy mode is used and the SET SHALL send a SUPL AUTH REQ to the E-SLC. The SUPL AUTH REQ SHALL contain the session-id and a hash of the received SUPL INIT message (ver).

H. The E-SLC creates SPC_SET_Key and SPC-TID to be used for mutual E-SPC/SET authentication. The E-SLC forwards SPC_SET_Key and SPC-TID to the E-SPC using a PAUTH message with also includes the session-id.

I. The E-SLC returns a SUPL AUTH RESP message to the SET. The SUPL AUTH RESP message SHALL contain the session-id, SPC_SET_Key and SPC-TID.

J. The SET will evaluate the Notification rules and follow the appropriate actions. The SET establishes a secure connection to the E-SPC according to the address received in step E. The SET and E-SPC perform mutual authentication and the SET sends a SUPL POS INIT message to start a positioning session with the E-SPC. The SET SHALL send the SUPL POS INIT message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. The SET SHALL also release the IP connection to the E-SLC and release all resources related to this session. If an initial position calculated based on information received in the SUPL POS INIT message is available which meets the requested QoP, the E-SPC MAY directly proceed to step N and no SUPL POS positioning session takes place.

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K. If the E-SPC cannot translate the lid received in step J into an initial position, the E-SPC sends a PLREQ message to the E-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the E-SPC can perform the translation from lid into an initial position itself.

L. This step is conditional and only occurs if step K was performed. The E-SLC reports the initial position result back to the E-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the initial position meets the required QoP, the E-SPC MAY directly proceed to step N and not engage in a SUPL POS session.

M. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the E-SPC SHALL determine the posmethod. If the E-SLC included its approved positioning methods in step C, the E-SPC SHALL only choose an approved method. If required for the posmethod the E-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL POS INIT message.
The SET and the E-SPC exchange several successive positioning procedure messages (a SUPL POS message exchange is shown conceptually in dotted lines).
The E-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the E-SPC (SET-Based).

N. Once the position calculation is complete, the E-SPC sends the SUPL END message to the SET informing it that no further positioning procedure will be started and that the SUPL session is finished. The SET SHALL release the secure connection to the E-SPC and release all resources related to this session.

O. The E-SPC sends the position estimate to the E-SLC using a PEND message. This also indicates the end of the SUPL session. The E-SPC SHALL release all resources related to this session.

P. The E-SLC sends the position estimate back to the SUPL Agent using an MLP ELIA message. The E-SLC SHALL release all resources related to this session.

5.8.2 Roaming Successful Case with V-SPC Positioning

SET Roaming where the V-SPC is involved in the positioning calculation

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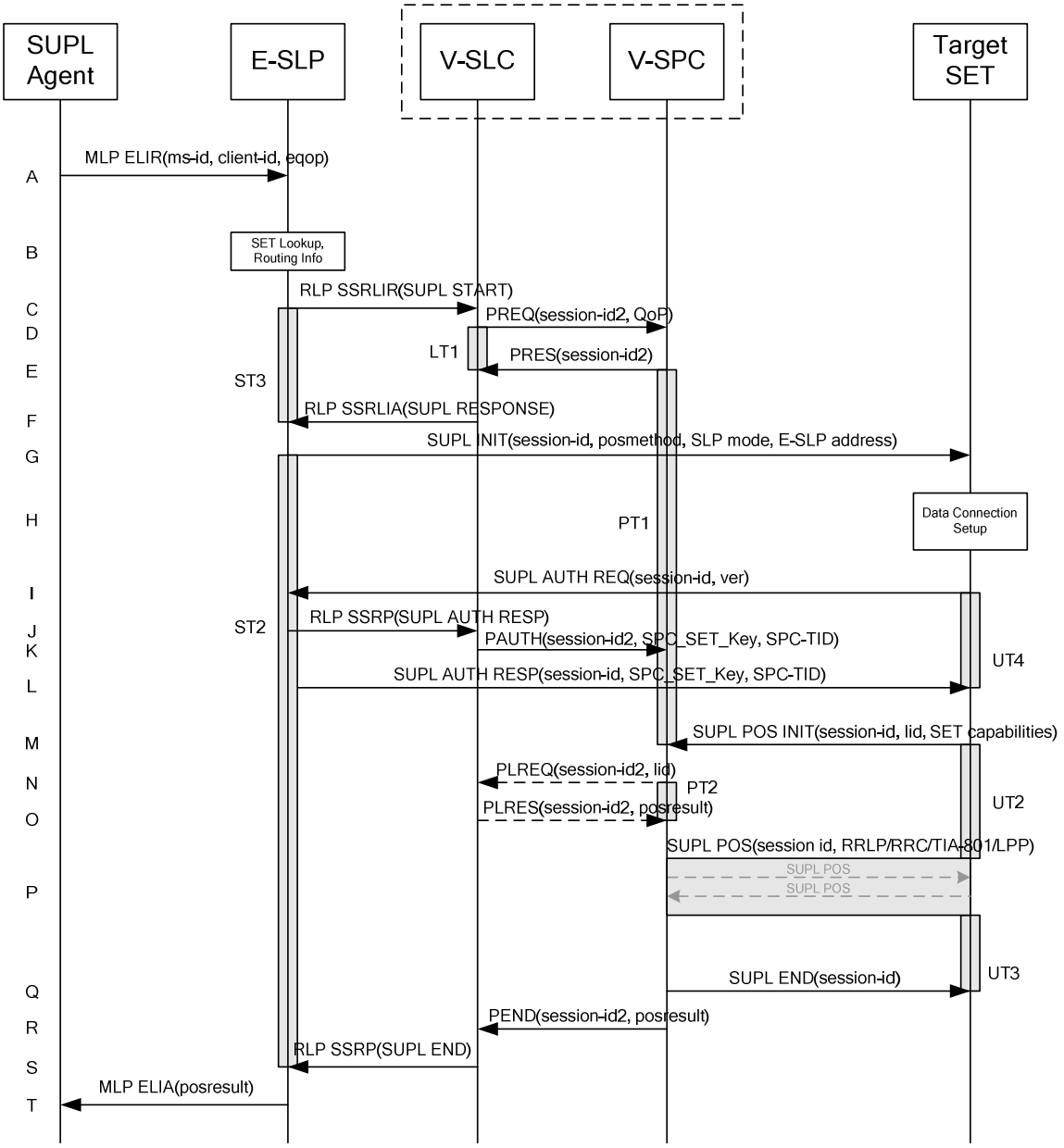

Figure 24: Network Initiated Roaming Successful Case – Non-Proxy-mode with V-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP ELIR message to the E-SLP, with which SUPL Agent is associated. The MLP ELIR message may include the SET IP address and location data. The E-SLP SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. If a previously computed position which meets the requested QoP is available at the E-SLP and no notification or verification is required according to local regulatory requirements, the E-SLP SHALL directly proceed to step T. If notification and verification or notification only is required, the E-SLP SHALL proceed to step G after having performed the Roaming Verification and Routing Info procedures of step B.

B. The E-SLP may use any location data and/or any SET IP address received in step A to verify that the target SET is currently SUPL Roaming.

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NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL (there are various environment dependent mechanisms).

C. The E-SLP allocates a session-id for the SUPL session and decides that the V-SPC will provide assistance data or perform the position calculation. The E-SLP sends an RLP SSRLIR to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. Mandatory parameters in SUPL START that are not known to E-SLP (lid and SET capabilities) shall be populated with arbitrary values by E-SLP and be ignored by V-SLP. The SET part of the session-id will not be included in this message by the E-SLP to distinguish this scenario from a SET Initiated scenario.

D. The V-SLC requests service from the V-SPC for a SUPL session by sending a PREQ message containing the session-id2 and the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

E. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

F. The V-SLC acknowledges that V-SPC is ready to initiate a SUPL positioning procedure with an RLP SSRLIA back to the H-SLC. The message includes at least session-id, posmethod and the address of the V-SPC.

G. The E-SLP initiates the location session with the SET using the SUPL INIT message.The SUPL INIT message SHALL contain session-id, address of the V-SPC, proxy/non-proxy mode indicator and the intended positioning method. The SUPL INIT SHALL also contain the E-SLP address if the E-SLP is not the H-SLP for the SET. The SUPL INIT MAY contain the desired QoP. The E-SLP SHALL also include Notification element in the SUPL INIT message indicating location for emergency services and, according to local regulatory requirements, whether notification or verification to the target SET is or is not required.
If in step A the E-SLP decided to use a previously computed position the SUPL INIT message SHALL indicate this in a 'no position' posmethod parameter value and the SET SHALL respond with a SUPL END message to the E-SLP carrying the results of the verification process (access granted, or access denied). If no verification is required (notification only) the SET SHALL respond with a SUPL END message to the E-SLP. The E-SLP SHALL then directly proceed to step T.

NOTE 3: Before sending the SUPL END message the SET SHALL perform the data connection setup procedure of step H and use the procedures described in step I to establish an IP connection to the E-SLP.

H. The SET takes needed action preparing for establishment or resumption of a secure connection.

I. The SET establishes a secure connection to the E-SLP using either the provisioned H-SLP or defaulted E-SLP address, if no E-SLP address was received in step G, or the E-SLP address provided in step G. The SET then checks the proxy/non-proxy mode indicator to determine if the E-SLP uses proxy or non-proxy mode. In this case non-proxy mode is used and the SET SHALL send a SUPL AUTH REQ message to the E-SLP. The SUPL AUTH REQ message SHALL contain session-id and a hash of the SUPL INIT message (ver).

J. The E-SLP creates SPC_SET_Key and SPC-TID to be used for mutual V-SPC/SET authentication. The E-SLP forwards SPC_SET_Key and SPC-TID to the V-SLC through an RLP SSRP message.

K. The V-SLC forwards SPC_SET_Key and SPC-TID to the V-SPC using the PAUTH message.

L. The H-SLC returns a SUPL AUTH RESP to the SET. The SUPL AUTH RESP message SHALL contain the session-id, SPC_SET_Key and SPC-TID.

M. The SET will evaluate the Notification rules and follow the appropriate actions. The SET establishes an IP connection to the V-SPC according to the address received in step G. The SET and V-SPC may perform mutual authentication and the SET sends a SUPL POS INIT message to start a SUPL positioning session with the V-SPC. The SET SHALL send the SUPL POS INIT message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported

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positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. The SET SHALL also release the IP connection to the E-SLP and release all resources related to this session.

N. If the V-SPC cannot translate the lid received in step M into an initial position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into an initial position itself.

O. This step is conditional and only occurs if step N was performed. The V-SLC reports the initial position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the initial position meets the required QoP, the V-SPC MAY directly proceed to step Q and not engage in a SUPL POS session.

P. Based on the SUPL POS INIT message including posmethod(s) supported by the SET, the V-SPC SHALL determine the posmethod. If the V-SLC included its approved positioning methods in step D, the V-SPC SHALL only choose an approved method. If required for the posmethod, the V-SPC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL POS INIT message. The SET and the V-SPC exchange several successive positioning procedure messages (a SUPL POS message exchange is shown conceptually in dotted lines).
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

Q. Once the position calculation is complete the V-SPC sends a SUPL END message to the SET informing it that no further positioning procedure will be started and that the positioning session is finished. The SET SHALL release all resources related to this session.

R. The V-SPC informs the V-SLC using a PEND message that the positioning procedure is completed and returns the position result. The V-SPC SHALL release all resources related to this session.

S. The V-SLC sends a SUPL END message within an RLP SSRP message to the E-SLP carrying the position result. The V-SLC SHALL release all resources related to this session.

T. The E-SLP sends the position estimate back to the SUPL Agent in an MLP ELIA message.

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6. Detailed Flows - Triggered Services: Periodic Triggers

The flows in this section are those for which periodic triggers are required.

Set up and release of connections:

Before sending any ULP messages the SET SHALL take needed actions such that a TLS connection exists to the SLP/SLC. This can be achieved by establishing a new connection, resume a connection or reuse an existing TLS connection. This includes establishment or utilization of various data connectivity resources that depends on the terminal in which the SET resides and the type of access network. Data connectivity below IP-level is out of scope of this document.

The detailed flows in this section describes when a TLS connection no longer is needed. The TLS connection shall then be released unless another SUPL session is using the TLS connection.

6.1 Network Initiated – Proxy mode

This section describes the Network Initiated Proxy mode scenarios. It is assumed that the trigger resides in the SET (see [SUPL2 ULP TS] for more details).

The concept of the R-SLC applies as with Immediate Service but for the sake of simplicity has been omitted in this section.

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6.1.1 Non-Roaming Successful Case

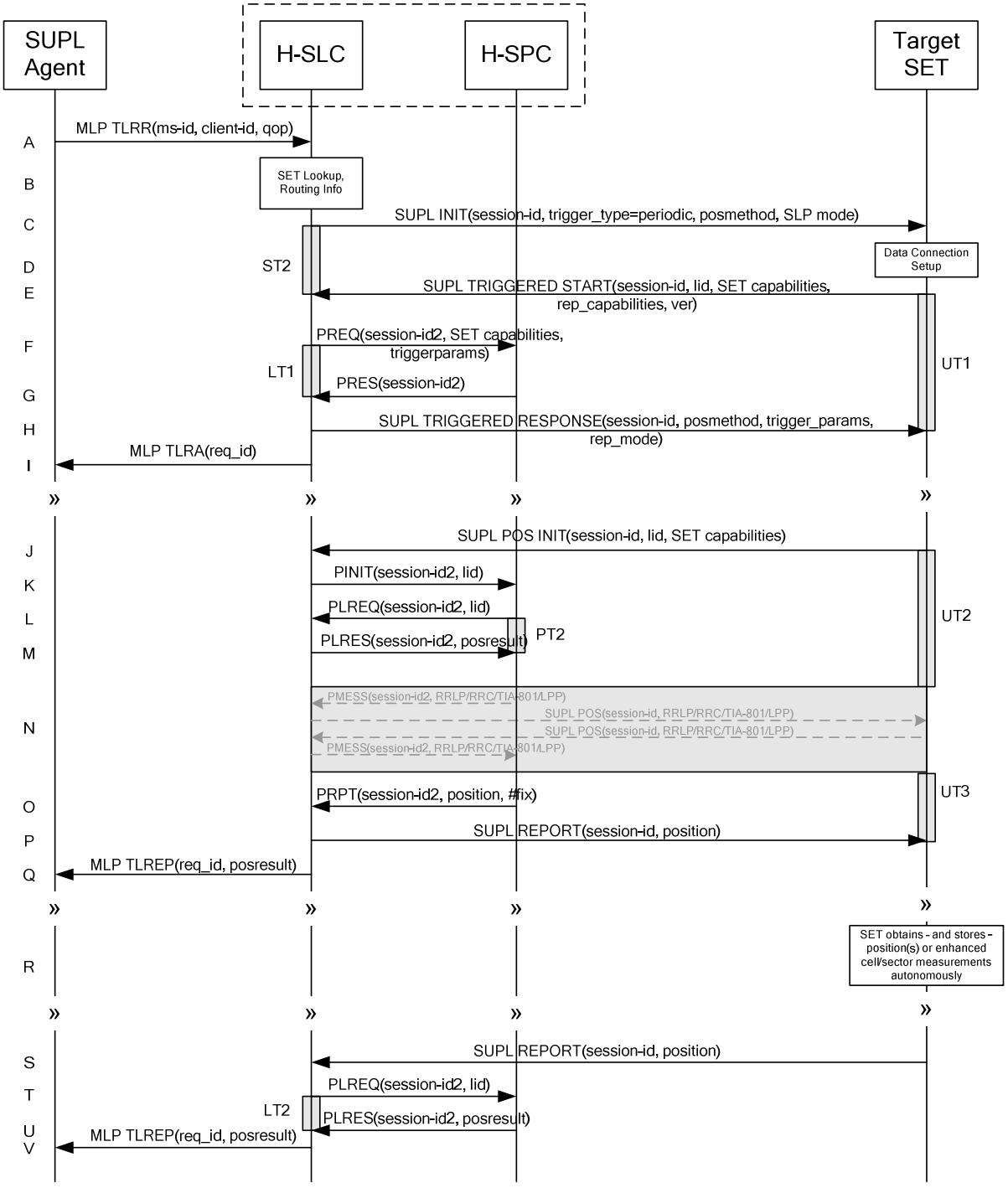

Figure 25: Network Initiated Periodic Trigger Service Non-Roaming Successful Case – Proxy Mode (Part I)

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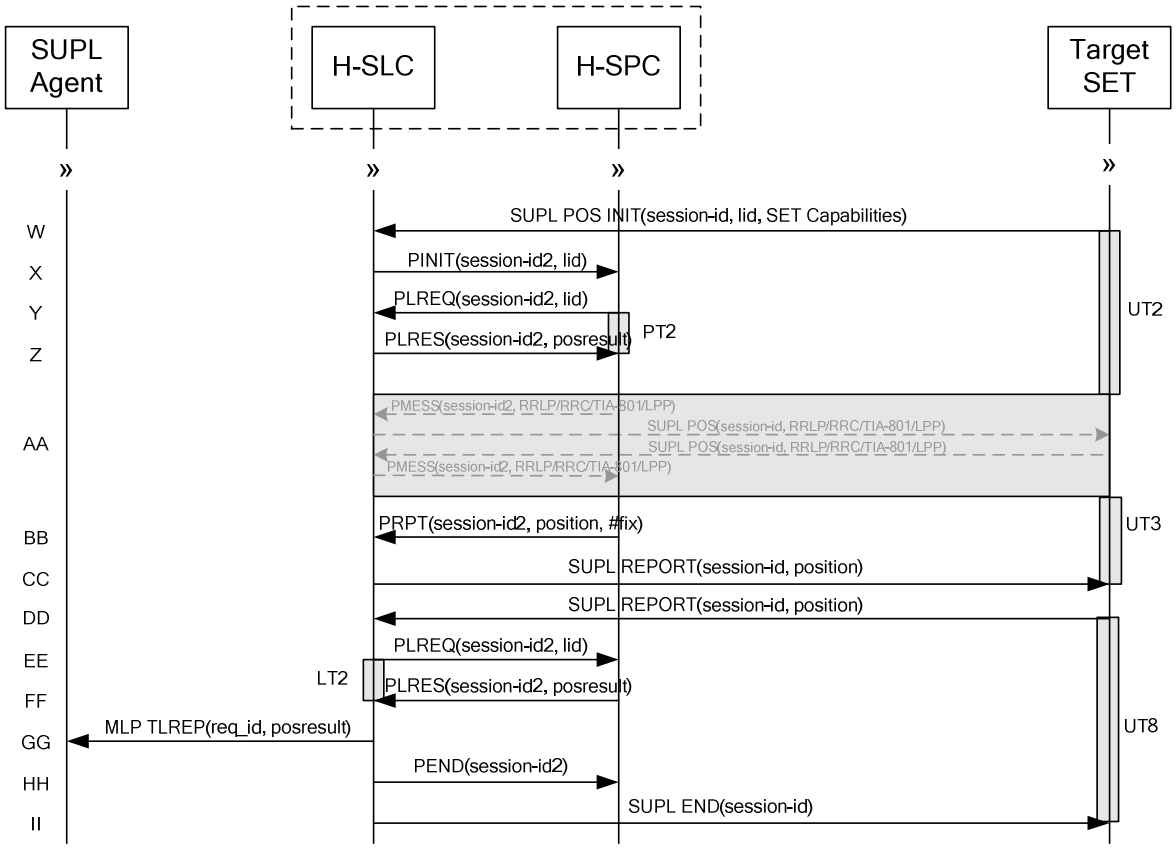

Figure 26: Network Initiated Periodic Trigger Service Non-Roaming Successful Case – Proxy Mode (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLP, with which SUPL Agent is associated. The H-SLP shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLP shall apply subscriber privacy against the client-id. The TKRR message may indicate that batch reporting or quasi-real time reporting is to be used instead if real time reporting. In the case of batch reporting, the TLRR indicates the conditions for sending batch reports to the H-SLP and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates (e.g. QoP, time window).

B. The H-SLP verifies that the target SET is currently not SUPL Roaming.
The H-SLP MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLP initiates the periodic trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case periodic), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that notification or verification to the target subscriber is needed, the H-SLP SHALL also include the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent, the H-SLP also computes and stores a hash of the message.

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D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLP using SLP address that has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start a periodic triggered session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid) and reporting capabilities (rep_capabilities). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The rep_capabilities parameter indicates whether the SET is capable of batch reporting, real time reporting and/or quasi-real time reporting. The H-SLC SHALL check that the hash of SUPL INIT matches the one it has computed for this particular session.

F. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

G. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

H. Consistent with the SET capabilities received in the SUPL TRIGGERED START message the H-SLC selects the intended positioning method to be used for the periodic triggered session. If the H-SPC included a list of supported posmethods in step G, the chosen posmethod SHALL be on this list. The H-SLC responds with a SUPL TRIGGERED RESPONSE message including session-id, posmethod and periodic trigger parameters. Consistent with the rep_capabilities of the SET, the H-SLP also indicates the reporting mode (rep_mode parameter) to be used by the SET: real time reporting, quasi-real time reporting or batch reporting. In the case of batch reporting, the SUPL TRIGGERED RESPONSE message indicates the conditions for sending batch reports to the H-SLP and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates and/or (if allowed) particular stored enhanced cell/sector measurements. In the case of quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates whether the SET is allowed to send enhanced cell/sector measurements in lieu of or in addition to position estimates. If enhanced cell/sector positioning was selected for batch or quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates if the SET is permitted to send stored enhanced cell/sector measurements. In this case, if batch reporting was selected, the SET MAY skip steps J to N.

I. The H-SLP informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the periodic triggered session. The SET and the H-SLP MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

J. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id and the Location ID (lid) and the SET capabilities parameter. The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the H-SLP MAY directly proceed to step P and not engage in a SUPL POS session.

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K. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id and SET capabilities. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step G, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities, which was approved by the H-SLC in step F. If a coarse position calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

L. If the H-SPC cannot translate the lid received in step K into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into coarse position itself.

M. This step is conditional and only occurs if step L was performed. The H-SLC calculates a coarse position based on lid and reports the result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

N. The SET and the H-SLP exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines). The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

O. Once the position calculation is complete the H-SPC sends a PRPT message to the H-SLC. PRPT contains the session-id2, the position result if calculated in H-SPC and the number of the fix.

P. Once the position calculation is complete the H-SLP sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the H-SLP. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the H-SLP and therefore needs to be included in the message for batch reporting mode.

   If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the H-SLP) steps J to P are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLP using a SUPL REPORT message containing the session-id and the position estimate.

Q. This step is optional: Once the position calculation is complete and if real time or quasi-real time reporting is used, the H-SLP sends a MLP TLREP message to the SUPL Agent. The MLP TLREP message includes the req_id and the position result. If the reporting mode is set to batch reporting, this message is not used.

R. This step is optional: If the SET cannot communicate with the H-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported - perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the H-SLP.

S. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the session-id and the position result(s) including date and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT

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message may be chosen according to criteria received in step H. If no criteria are received in step H, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

T. This step is optional: if the SUPL REPORT message in step S contained enhanced cell/sector measurements and the H-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step S.

U. This step is conditional and only used if step T occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

V. The H-SLP forwards the reported and/or calculated position estimate(s) to the SUPL Agent in an MLP TLREP message.

Steps J to V are repeated as applicable. When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps W to CC may be performed (a repeat of steps J to P). Alternatively - and if applicable - step R is repeated.

DD. This step is optional. When real-time reporting is used, it is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due. When batch or quasi real-time reporting is used, step DD is executed if and as soon as the following conditions apply:

i. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.

ii. The SET is able to establish communication with the H-SLP.

iii. In the case of batch reporting, the conditions for sending have arisen or the SET has obtained the last fix according to the number of fixes (in which case an incomplete batch of positions is sent).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step H. If no criteria are received in step H, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

EE. This step is optional: if the SUPL REPORT message in step DD contained enhanced cell/sector measurements and the H-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step DD.

FF. This step is conditional and only used if step EE occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

GG. The H-SLP forwards the reported and/or calculated historical position estimate(s) to the SUPL Agent in an MLP TLREP message. As an option (e.g. if the SUPL Agent is not available), the H-SLP could retain the historic position fixes for later retrieval by the SUPL Agent.

HH. After the last position result has been reported to the SUPL Agent in step GG or following some timeout on not receiving stored position estimates in step DD, the H-SLC informs the H-SPC about the end of the periodic triggered session by sending a PEND message. PEND contains session-id2.

II. The H-SLC ends the periodic triggered session by sending a SUPL END message to the SET.

6.1.2 Roaming with V-SLP Positioning Successful Case

SUPL Roaming where the V-SLP is involved in the position calculation.

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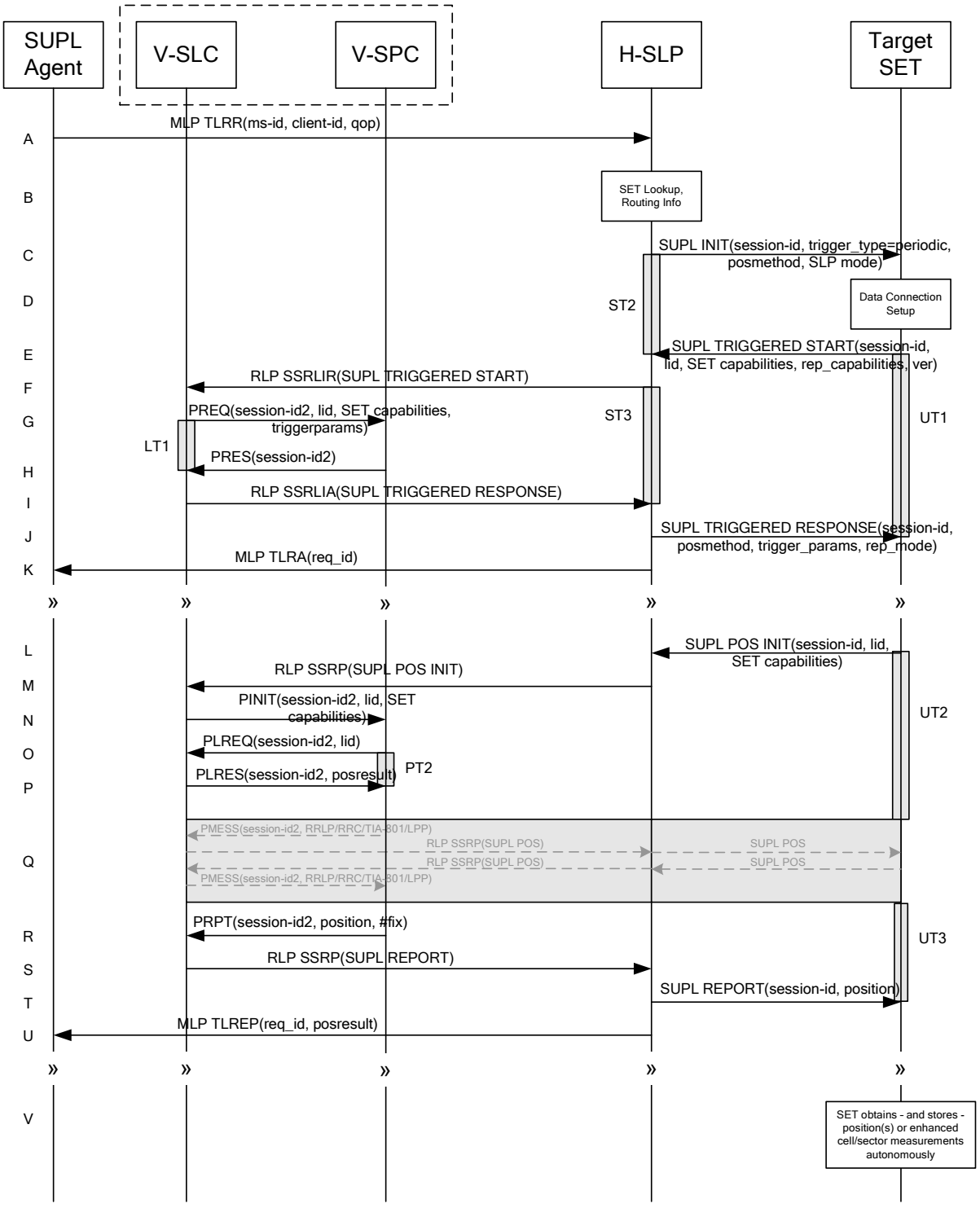

Figure 27: Network Initiated Periodic Trigger Service Roaming Successful Case – Proxy with V-SLP positioning (Part I)

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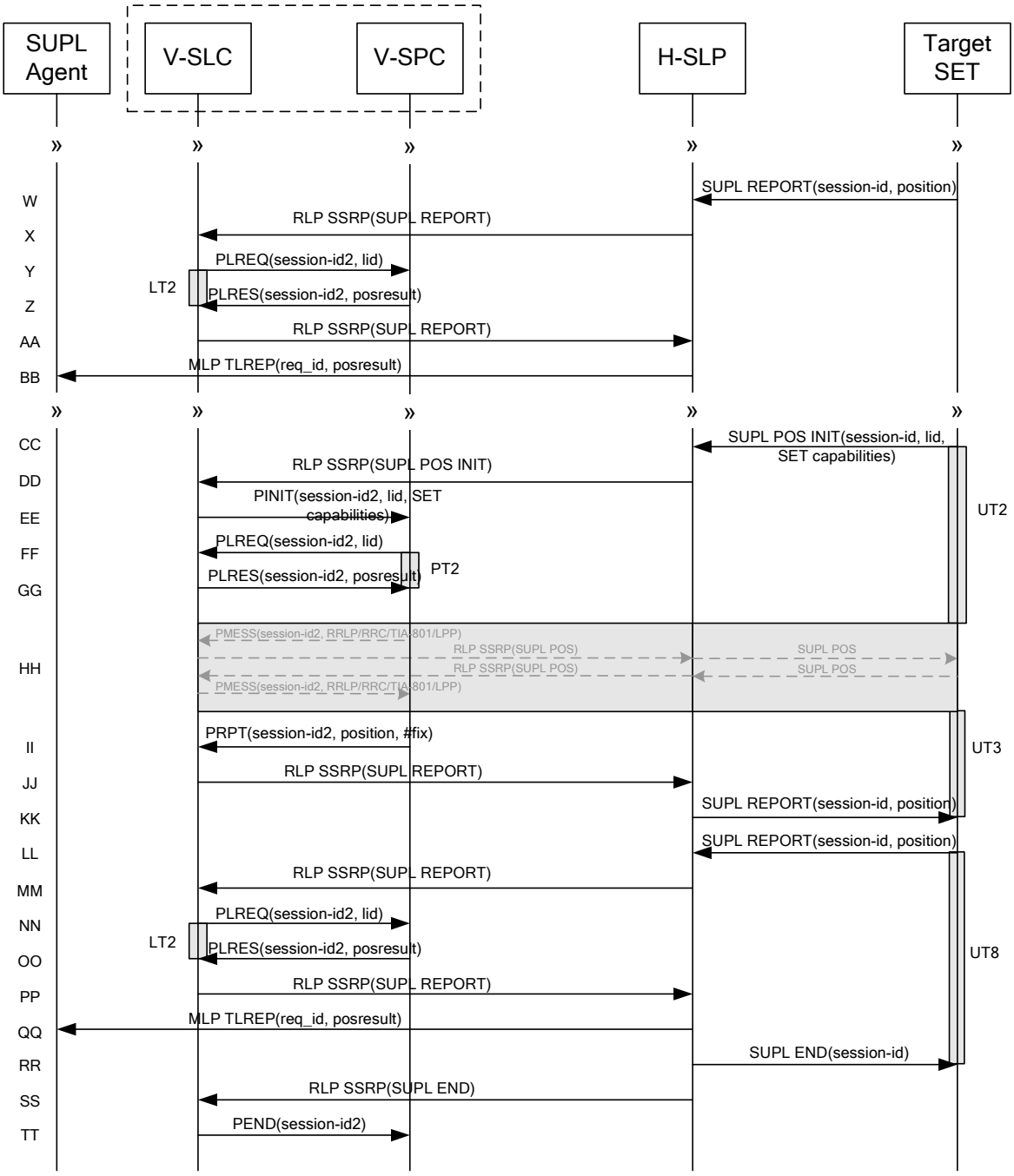

Figure 28: Network Initiated Periodic Trigger Service Roaming Successful Case – Proxy with V-SLP positioning (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLP, with which SUPL Agent is associated. The H-SLP shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLP shall apply subscriber privacy against the client-id. The TLRR message may indicate that batch reporting or quasi-real time reporting is to be used instead of real time reporting.In the case of batch reporting, the TLRR indicates the conditions for sending batch reports to the H-SLP and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates (e.g. QoP, time window).

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B. The H-SLP verifies that the target SET is currently SUPL Roaming.
The H-SLP MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLP initiates the periodic trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case periodic), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that notification or verification to the target subscriber is needed, the H-SLP SHALL also include the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent, the H-SLP also computes and stores a hash of the message.

D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLP using SLP address that has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start a periodic triggered session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver), and Location ID (lid) and reporting capabilities (rep_capabilities). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The rep_capabilities parameter indicates whether the SET is capable of batch reporting, real time reporting and/or quasi-real time reporting.

F. Based on the received lid or other mechanisms, the H-SLP determines the V-SLP and sends an RLP SSRLIR including the SUPL TRIGGERED START message to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure.

G. The V-SLC requests service from the V-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY optionally contain the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

H. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

I. Consistent with the SET capabilities received in step F, the V-SLC determines a posmethod to be used for the periodic triggered session. If the V-SPC included a list of supported posmethods in step H, the chosen posmethod SHALL be on this list. The V-SLC indicates its readiness for a periodic triggered session by sending a SUPL TRIGGERED RESPONSE message back to the H-SLP in a RLP SSRLIA message.

J. The H-SLP forwards the received SUPL TRIGGERED RESPONSE message to the SET including session-id, posmethod and periodic trigger parameters. Consistent with the rep_capabilities of the SET, the H-SLP also indicates the reporting mode (rep_mode parameter) to be used by the SET: real time reporting, quasi-real time reporting or batch reporting. In the case of batch reporting, the SUPL TRIGGERED RESPONSE message indicates the conditions for sending batch reports to the H-SLP and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates and/or (if allowed) particular stored enhanced cell/sector measurements. In the case of quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates whether the SET is allowed to send enhanced cell/sector measurements in lieu of or in addition to position estimates.

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If enhanced cell/sector positioning was selected for batch or quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates if the SET is permitted to send stored enhanced cell/sector measurements. In this case, if batch reporting was selected, the SET MAY skip steps L to Q.

K. The H-SLP informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the periodic triggered session. The SET and the H-SLP MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

L. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the H-SLP to start a positioning session with the V-SLP. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If the SUPL POS INIT message contains a position that meets the required QoP, the H-SLP MAY directly proceed to step T.

M. The H-SLP forwards the SUPL POS INIT message to the V-SLC using a RLP SSRP message.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the V-SLC MAY directly proceed to step S and not engage in a SUPL POS session.

N. The V-SLC sends a PINIT message to the V-SPC including session-id2, location id and SET capabilities. The V-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the V-SPC in step H, or a different posmethod of the V-SLC's choosing, as long as it is one supported by the V-SPC. Based on the PINIT message including the SET capabilities, the V-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the V-SLC, the V-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the V-SPC shall choose any posmethod in line with the SET capabilities, which was approved by the V-SLC in step G. If a coarse position calculated based on information received in the PINIT message is available that meets the required QoP, the V-SPC MAY directly proceed to step R and not engage in a SUPL POS session.

O. If the V-SPC cannot translate the lid received in step N into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into coarse position itself.

P. This step is conditional and only occurs if step O was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the V-SPC MAY directly proceed to step R and not engage in a SUPL POS session.

Q. The SET and the V-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SPC and the V-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SLC and the H-SLC using SUPL POS over RLP tunnel messages. The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages. The flow sequence PMESS – RLP SSRP(SUPL POS) – SUPL POS – SUPL POS – RLP SSRP(SUPL POS) – PMESS is conceptually shown in dotted lines.
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

R. Once the position calculation is complete, the V-SPC sends a PRPT message to the V-SLC. PRPT contains the session-id2, the position result if calculated in V-SPC and the number of the fix.

S. Once the position calculation is complete, the V-SLC sends a SUPL REPORT message including the position to the H-SLP in an RLP tunnel using an SSRP message.

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T. Once the position calculation is complete the H-SLP sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the H-SLP. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the V-SLP and therefore needs to be included in the message for batch reporting mode.

   If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the H-SLP) steps L to T are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLP using a SUPL REPORT message containing the session-id and the position estimate.

U. This step is optional: once the position calculation is complete and if real time or quasi-real time reporting is used, the H-SLP forwards the received position estimate from the V-SLC in an MLP TLREP message to the SUPL Agent. The MLP TLREP message includes the req_id and the position result. If the reporting mode is set to batch reporting, this message is not used.

V. This step is optional: if the SET cannot communicate with the H-SLP (e.g. no radio coverage available) quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported – perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the H-SLP.

W. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLP. The SUPL REPORT message contains the session-id and the position result(s) including data and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step J. If no criteria are received in step J, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

X. This step is optional: if in step W the SET sent enhanced cell/sector measurements, the H-SLP needs to engage the help of the V-SLP to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLP sends the received enhanced cell/sector measurements in a SUPL REPORT message to the V-SLC using an SSRP message over RLP tunnel.

Y. This step is optional: if the SUPL REPORT message in step X contained enhanced cell/sector measurements and the V-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the V-SLC sends a PLREQ message to the V-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step X.

Z. This step is conditional and only used if step Y occurred: the V-SPC returns the calculated position estimates to the V-SLC in a PLRES message. PLRES contains session-id2 and the position results.

AA. This step is optional: if in step X the V-SLC received enhanced cell/sector measurements, the results of the translation into position estimate need to be returned to the H-SLP. To this end a SUPL REPORT message is sent to the H-SLP. The SUPL REPORT message is carried within an SSRP message over RLP tunnel.

BB. The H-SLP forwards the reported and/or calculated position estimate(s) to the SUPL Agent in an MLP TLREP message.

   Steps L to BB are repeated as applicable. When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps CC to KK may be performed (a repeat of steps L to T). Alternatively – and if applicable – step V is repeated.

LL. This step is optional. When real-time reporting is used, it is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due. When batch or quasi real-time reporting is used, step LL is executed if and as soon as the following conditions apply:

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i. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLP.

ii. The SET is able to establish communication with the H-SLP.

iii. In the case of batch reporting, the conditions for sending have arisen or the SET has obtained the last fix according to the number of fixes (in which case an incomplete batch of positions is sent).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLP. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step J. If no criteria are received in step J, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

MM. This step is optional: if in step LL the SET sent enhanced cell/sector measurements, the H-SLP needs to engage the help of the V-SLP to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLP sends the received enhanced cell/sector measurements in a SUPL REPORT message to the V-SLC using an SSRP message over RLP tunnel.

NN. This step is optional: if the SUPL REPORT message in step MM contained enhanced cell/sector measurements and the V-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the V-SLC sends a PLREQ message to the V-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step MM.

OO. This step is conditional and only used if step NN occurred: the V-SPC returns the calculated position estimates to the V-SLC in a PLRES message. PLRES contains session-id2 and the position results.

PP. This step is optional: if in step MM the V-SLC received enhanced cell/sector measurements, the results of the translation into position estimate need to be returned to the H-SLP. To this end a SUPL REPORT message is sent to the H-SLP. The SUPL REPORT message is carried within an SSRP message over RLP tunnel.

QQ. The H-SLP forwards the reported and/or calculated historical position estimate(s) to the SUPL Agent in an MLP TLREP message. As an option (e.g. if the SUPL Agent is not available), the H-SLP could retain the historic position fixes for later retrieval by the SUPL Agent.

RR. After the last position result has been reported to the SUPL Agent in step QQ, or following some timeout on not receiving stored position estimates in step LL, the H-SLP ends the periodic triggered session by sending a SUPL END message to the SET.

SS. The H-SLP informs the V-SLC about the end of the periodic triggered session by sending a SUPL END message using an RLP SSRP tunnel message.

TT. The V-SLC ends the periodic triggered session with the V-SPC by sending a PEND message. PEND contains the session-id2.

6.1.3 Roaming with H-SLP Positioning Successful Case

SUPL Roaming where the H-SLP is involved in the position calculation.

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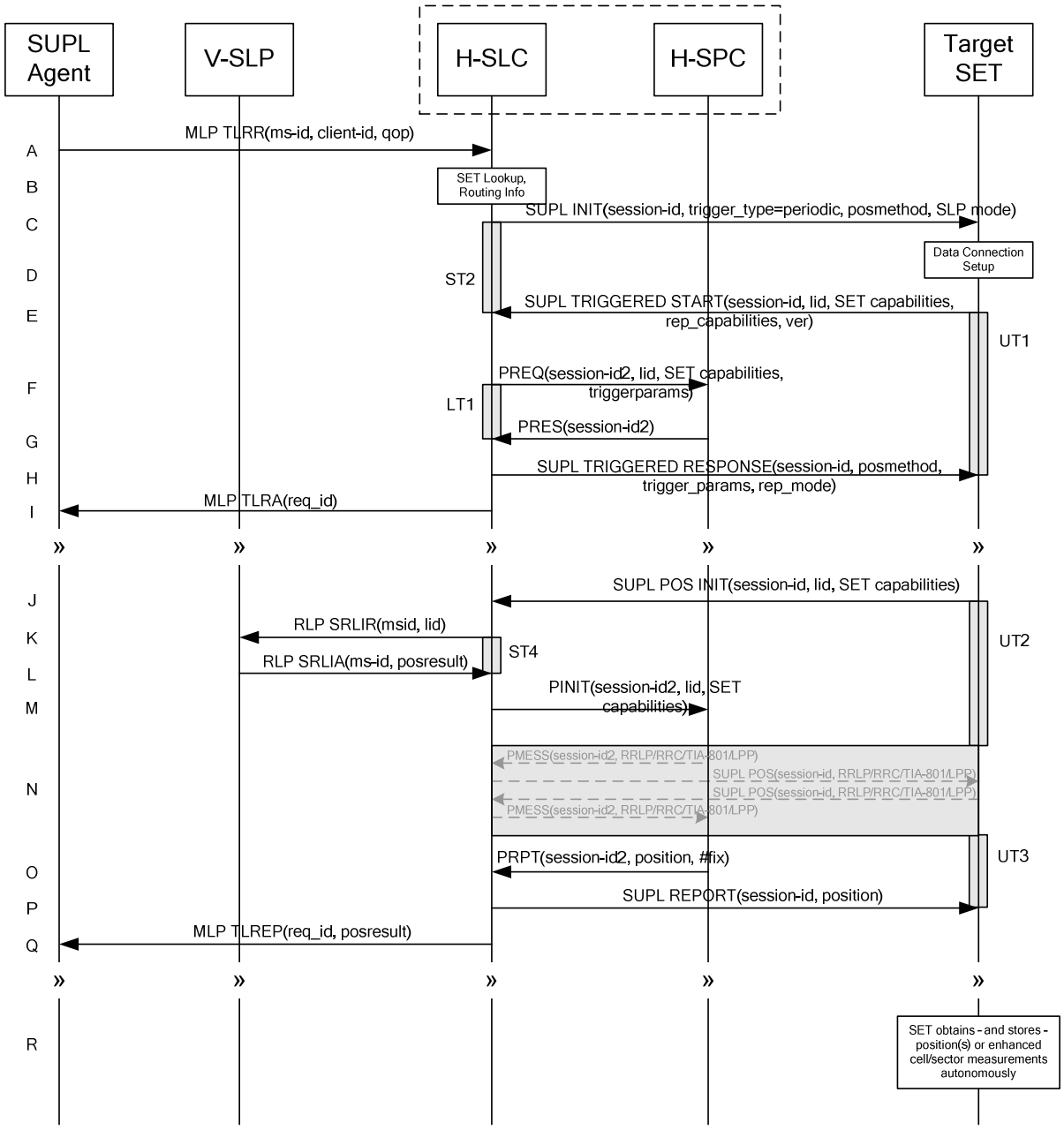

Figure 29: Network Initiated Periodic Trigger Service Roaming Successful Case – Proxy with H-SLP positioning (Part I)

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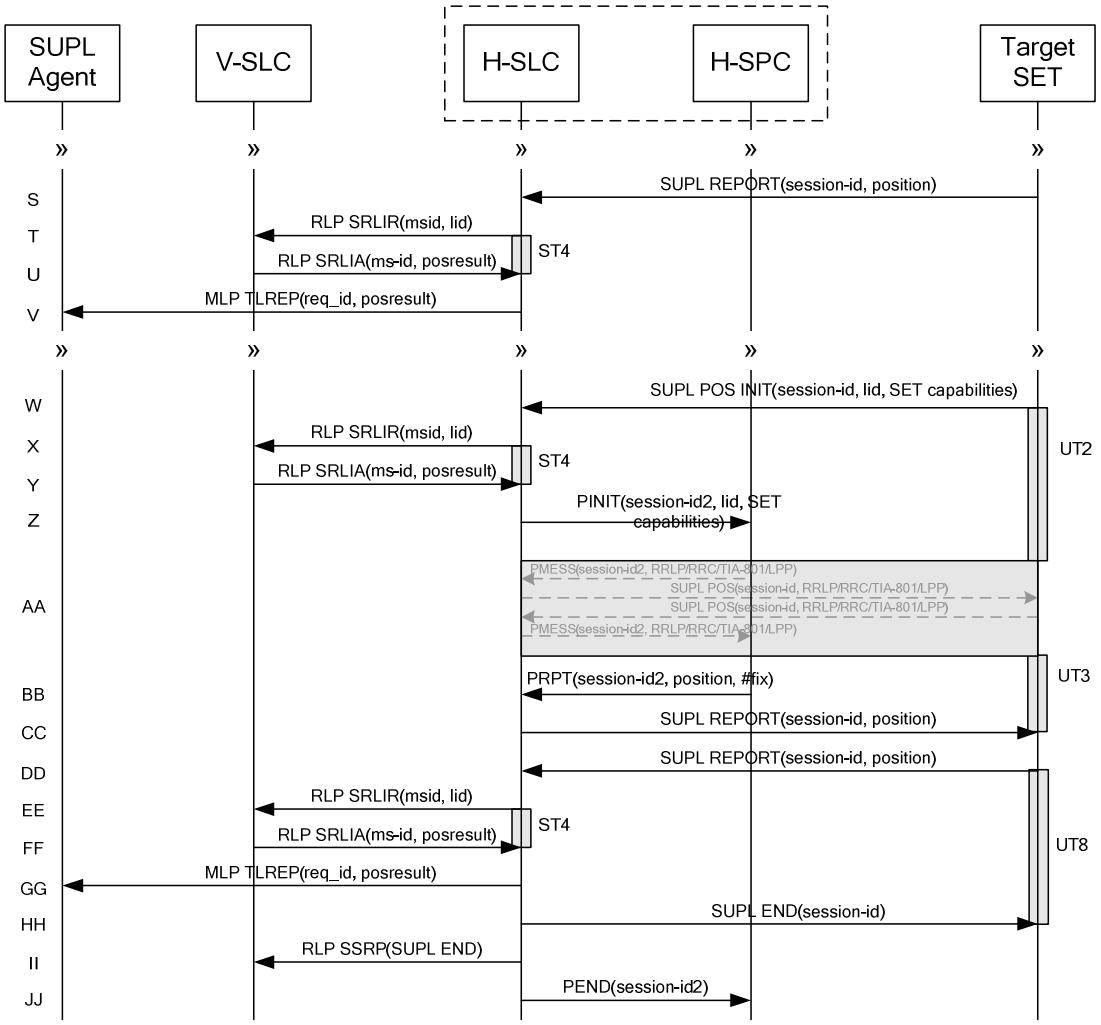

Figure 30: Network Initiated Periodic Trigger Service Roaming Successful Case – Proxy with H-SLP positioning (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLP, with which SUPL Agent is associated. The H-SLP shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLP shall apply subscriber privacy against the client-id. The TLRR message may indicate that batch reporting or quasi-real time reporting is to be used instead of real time reporting.In the case of batch reporting, the TLRR indicates the conditions for sending batch reports to the H-SLP and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates (e.g. QoP, time window).

B. The H-SLP verifies that the target SET is currently SUPL Roaming.
The H-SLP MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

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C. The H-SLP initiates the periodic trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case periodic), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that notification or verification to the target subscriber is needed, the H-SLP SHALL also include the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent, the H-SLP also computes and stores a hash of the message.

D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLP using SLP address that has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start a periodic triggered session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver), and Location ID (lid) and reporting capabilities (rep_capabilities). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The rep_capabilities parameter indicates whether the SET is capable of batch reporting, real-time reporting and/or quasi-real time reporting.

F. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

G. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

H. Consistent with the SET capabilities received in step E. the H-SLC determines a posmethod to be used for the periodic triggered session. If the H-SPC included a list of supported posmethods in step G, the chosen posmethod SHALL be on this list. The H-SLC indicates its readiness for a periodic triggered session by sending a SUPL TRIGGERED RESPONSE message back to the SET. The SUPL TRIGGERED RESPONSE message to the SET includes at a minimum the session-id, posmethod and periodic trigger parameters. Consistent with the rep_capabilities of the SET, the H-SLC also indicates the reporting mode (rep_mode parameter) to be used by the SET: real time reporting, quasi-real time reporting or batch reporting. In the case of batch reporting, the SUPL TRIGGERED RESPONSE message indicates the conditions for sending batch reports to the H-SLC and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates and/or (if allowed) particular stored enhanced cell/sector measurements. In the case of quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates whether the SET is allowed to send enhanced cell/sector measurements in lieu of or in addition to position estimates. If enhanced cell/sector positioning was selected for batch or quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates if the SET is permitted to send stored enhanced cell/sector measurements. In this case, if batch reporting was selected, the SET MAY skip steps J to N.

I. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the periodic triggered session. The SET and the H-SLP MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

J. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the H-SLC to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.

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If the SUPL POS INIT message contains a position that meets the required QoP, the H-SLC MAY directly proceed to step P and not engage in a SUPL POS session.

K. To obtain a coarse position based on lid received in step J, the H-SLC sends an RLP SRLIR message to the V-SLP.

L. The V-SLP translates the received lid into a position estimate and returns the result to the H-SLC in an RLP SRLIA message.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the H-SLC MAY directly proceed to step P and not engage in a SUPL POS session.

M. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id, SET capabilities and position estimate (i.e. coarse position received from the V-SLC in the previous step). The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step G, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities, which was approved by the H-SLC in step F.

N. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

O. Once the position calculation is complete, the H-SPC sends a PRPT message to the H-SLC. PRPT contains the session-id2, the position result if calculated in H-SPC and the number of the fix.

P. Once the position calculation is complete the H-SLP sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the H-SLP. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the H-SLP and therefore needs to be included in the message for batch reporting mode.

If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the H-SLP) steps J to P are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLP using a SUPL REPORT message containing the session-id and the position estimate.

Q. This step is optional: once the position calculation is complete and if real time or quasi-real time reporting is used the H-SLP sends the calculated position estimate to the SUPL Agent in an MLP TLREP message to the SUPL Agent. The MLP TLREP message includes the req_id and the position result. If the reporting mode is set to batch reporting, this message is not used.

R. This step is optional: if the SET cannot communicate with the H-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported – perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the H-SLP.

S. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the session-id and the position result(s) including

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data and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step J. If no criteria are received in step J, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

T. This step is optional: if in step S the SET sent enhanced cell/sector measurements, the H-SLC needs to engage the help of the V-SLP to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLC sends an RLP SRLIR message to the V-SLP.

U. This step is optional and only takes place if step T has occurred: The V-SLP translates the received enhanced cell/sector measurements into position estimates and returns the results to the H-SLC in an RLP SRLIA message.

V. The H-SLC forwards the reported and/or calculated position estimate(s) to the SUPL Agent in an MLP TLREP message.

Steps J to V are repeated as applicable. When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps W to CC may be performed (a repeat of steps J to P). Alternatively – and if applicable – step R is repeated.

DD. This step is optional. When real-time reporting is used, it is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due. When batch or quasi real-time reporting is used, step DD is executed if and as soon as the following conditions apply:

i. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.

ii. The SET is able to establish communication with the H-SLP.

iii. In the case of batch reporting, the conditions for sending have arisen or the SET has obtained the last fix according to the number of fixes (in which case an incomplete batch of positions is sent).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step J. If no criteria are received in step J, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

EE. This step is optional: if in step DD the SET sent enhanced cell/sector measurements, the H-SLC needs to engage the help of the V-SLP to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLC sends an RLP SRLIR message to the V-SLP.

FF. This step is optional and only takes place if step EE has occurred: after receiving the enhanced cell/sector measurements the V-SLP translates the received enhanced cell/sector measurements into position estimates and returns the results to the H-SLC in an RLP SRLIA message.

GG. The H-SLC forwards the reported and/or calculated historical position estimate(s) to the SUPL Agent in an MLP TLREP message. As an option (e.g. if the SUPL Agent is not available), the H-SLC could retain the historic position fixes for later retrieval by the SUPL Agent.

HH. After the last position result has been reported to the SUPL Agent in step GG, or following some timeout on not receiving stored position estimates in step DD, the H-SLC ends the periodic triggered session by sending a SUPL END message to the SET.

II. The H-SLC informs the V-SLP about the end of the periodic triggered session by sending a SUPL END message using an SSRP message over RLP tunnel.

JJ. The H-SLC informs the H-SPC about the end of the periodic triggered session in a PEND message. PEND contains session-id2.

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6.2 Network Initiated – Non-Proxy mode

This section describes the Network Initiated Non-Proxy mode scenarios. It is assumed that the trigger resides in the SET.

The concept of the R-SLC applies as with Immediate Service but for the sake of simplicity has been omitted in this section.

6.2.1 Non-Roaming Successful Case

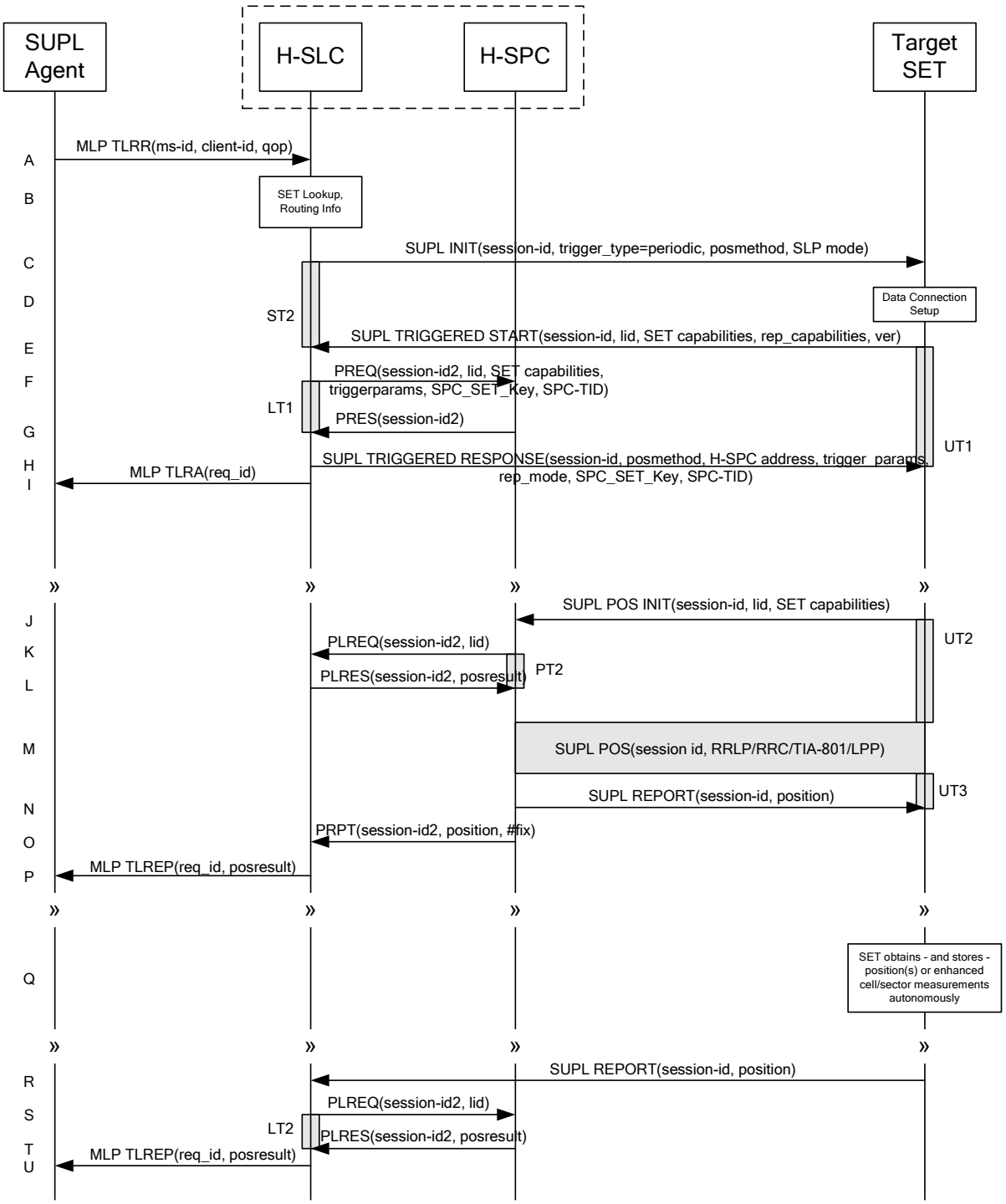

Figure 31: Network Initiated Periodic Trigger Service Non-Roaming Successful Case – Non-Proxy Mode (Part I)

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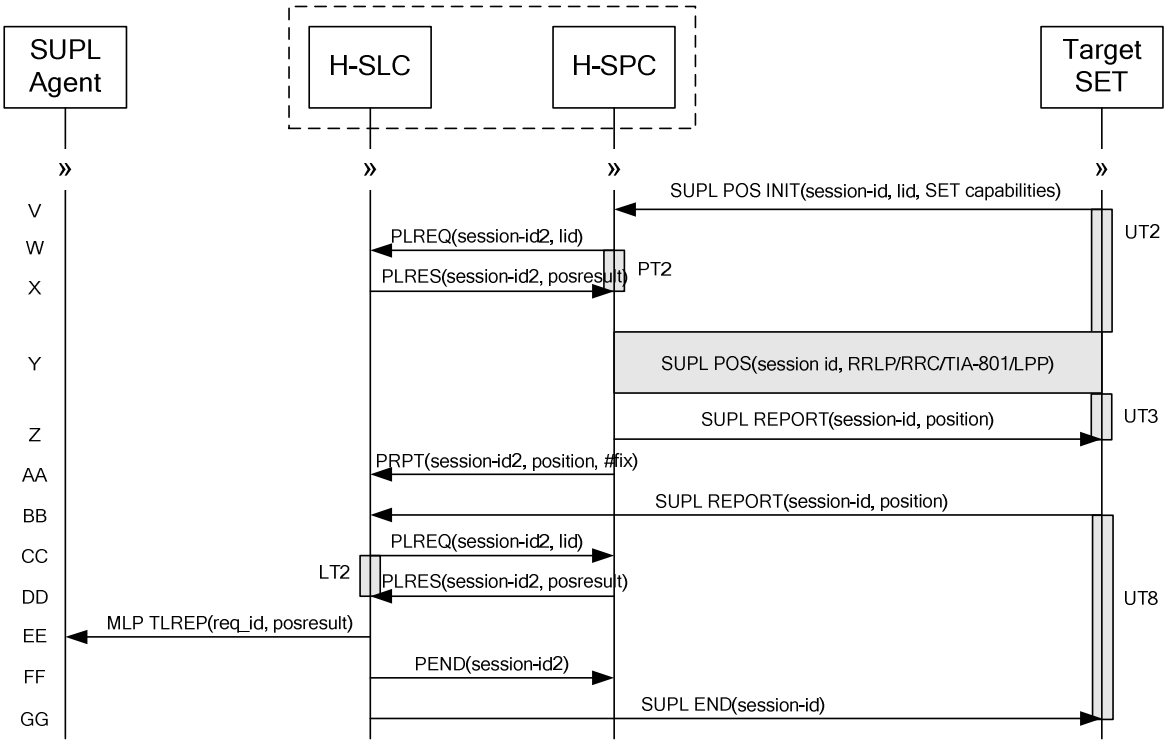

Figure 32: Network Initiated Periodic Trigger Service Non-Roaming Successful Case – Non-Proxy Mode (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id. The TLRR message may indicate that batch reporting or quasi-real time reporting is to be used instead of real time reporting.In the case of batch reporting, the TLRR indicates the conditions for sending batch reports to the H-SLC and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates (e.g. QoP, time window).

B. The H-SLC verifies that the target SET is currently not SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLC initiates the periodic trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case periodic), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL set notification mode to notification based on current location and SHALL NOT include the notification element in the SUPL INIT message; otherwise, the H-SLP SHALL set the notification mode indicator to normal notification and if notification or verification to the target subscriber is needed, the H-SLP SHALL also include the notification element in the SUPL INIT message.Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the message.

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D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, non-proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using the H-SLC address which has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start a periodic triggered session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver), and Location ID (lid) and reporting capabilities (rep_capabilities). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The rep_capabilities parameter indicates whether the SET is capable of batch reporting, real-time reporting and/or quasi-real time reporting.

F. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The H-SLC generates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication and forwards both to the H-SPC in the PREQ message. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

G. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

H. Consistent with the SET capabilities received in the SUPL TRIGGERED START message the H-SLC selects a positioning method to be used for the periodic triggered session. This posmethod may either be the posmethod recommended by the H-SPC in step G, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. The H-SLC responds with a SUPL TRIGGERED RESPONSE message including session-id, posmethod, H-SPC address, periodic trigger parameters, SPC_SET_Key and SPC-TID. Consistent with the rep_capabilities of the SET, the H-SLC also indicates the reporting mode (rep_mode parameter) to be used by the SET: real time reporting, quasi-real time reporting or batch reporting. In the case of batch reporting, the SUPL TRIGGERED RESPONSE message indicates the conditions for sending batch reports to the H-SLC and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates and/or (if allowed) particular stored enhanced cell/sector measurements. In the case of quasi-real time reporting, the SUPL TRIGGERED RESONSE message indicates whether the SET is allowed to send enhanced cell/sector measurements in lieu of or in addition to position estimates. If enhanced cell/sector positioning was selected for batch or quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates if the SET is permitted to send stored enhanced cell/sector measurements. In this case, if batch reporting was selected, the SET MAY skip steps J to N.

I. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the periodic triggered session.
The SET and the H-SLC MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

J. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the H-SPC MAY directly proceed to step N and not engage in a SUPL POS session.

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K. If the H-SPC cannot translate the lid received in step J into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into coarse position itself.

L. This step is conditional and only occurs if step K was performed. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step N and not engage in a SUPL POS session.

M. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step F, the H-SPC SHALL only choose an approved method. The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

N. Once the position calculation is complete the H-SPC sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the H-SPC. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the H-SPC and therefore needs to be included in the message for batch reporting mode.

O. This step is optional: Once the position calculation is complete and if real time or quasi-real time reporting is used the H-SPC sends the position estimate in a PRPT message to the H-SLC. PRPT contains the session-id2, the position result and the number of the fix. This message is optional and only used if the position was calculated by the H-SPC i.e. in SET Assisted mode.

   If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the H-SLP) steps J to O are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLC using a SUPL REPORT message containing the session-id and the position estimate.

P. This step is optional: once the position calculation is complete and if real time or quasi-real time reporting is used, the H-SLC sends a MLP TLREP message to the SUPL Agent. The MLP TLREP message includes the req_id and the position result. If the reporting mode is set to batch reporting, this message is not used.

Q. This step is optional: If the SET cannot communicate with the H-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported - perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the H-SLP.

R. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the session-id and the position result(s) including date and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step H. If no criteria are received in step H, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

S. This step is optional: if the SUPL REPORT message in step R contained enhanced cell/sector measurements and the H-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step R.

T. This step is conditional and only used if step S occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

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U. The H-SLP forwards the reported and/or calculated position estimate(s) to the SUPL Agent in an MLP TLREP message.

Steps J to U are repeated as applicable. When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps V to AA may be performed (a repeat of steps J to O). Alternatively - and if applicable - step Q is repeated.

BB. This step is optional. When real-time reporting is used, it is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due. When batch or quasi real-time reporting is used, step BB is executed if and as soon as the following conditions apply:

i. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.

ii. The SET is able to establish communication with the H-SLP

iii. In the case of batch reporting, the conditions for sending have arisen or the SET has obtained the last fix according to the number of fixes (in which case an incomplete batch of positions is sent).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step H. If no criteria are received in step H, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

CC. This step is optional: if the SUPL REPORT message in step BB contained enhanced cell/sector measurements and the H-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step BB.

DD. This step is conditional and only used if step CC occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

EE. The H-SLC forwards the reported and/or calculated historical position estimate(s) to the SUPL Agent in an MLP TLREP message. As an option (e.g. if the SUPL Agent is not available), the H-SLC could retain the historic position fixes for later retrieval by the SUPL Agent.

FF. After the last position result has been reported to the SUPL Agent in step EE the H-SLC informs the H-SPC about the end of the periodic triggered session by sending a PEND message. PEND contains the session-id2.

GG. The H-SLC ends the periodic triggered session by sending a SUPL END message to the SET. Please note that if the last position was calculated in step Y and step BB was not performed, the SUPL END message is sent from the H-SPC to the SET (as opposed to from the H-SLC to the SET).

6.2.2 Roaming with V-SPC Positioning Successful Case

SUPL Roaming where the V-SPC is involved in the position calculation.

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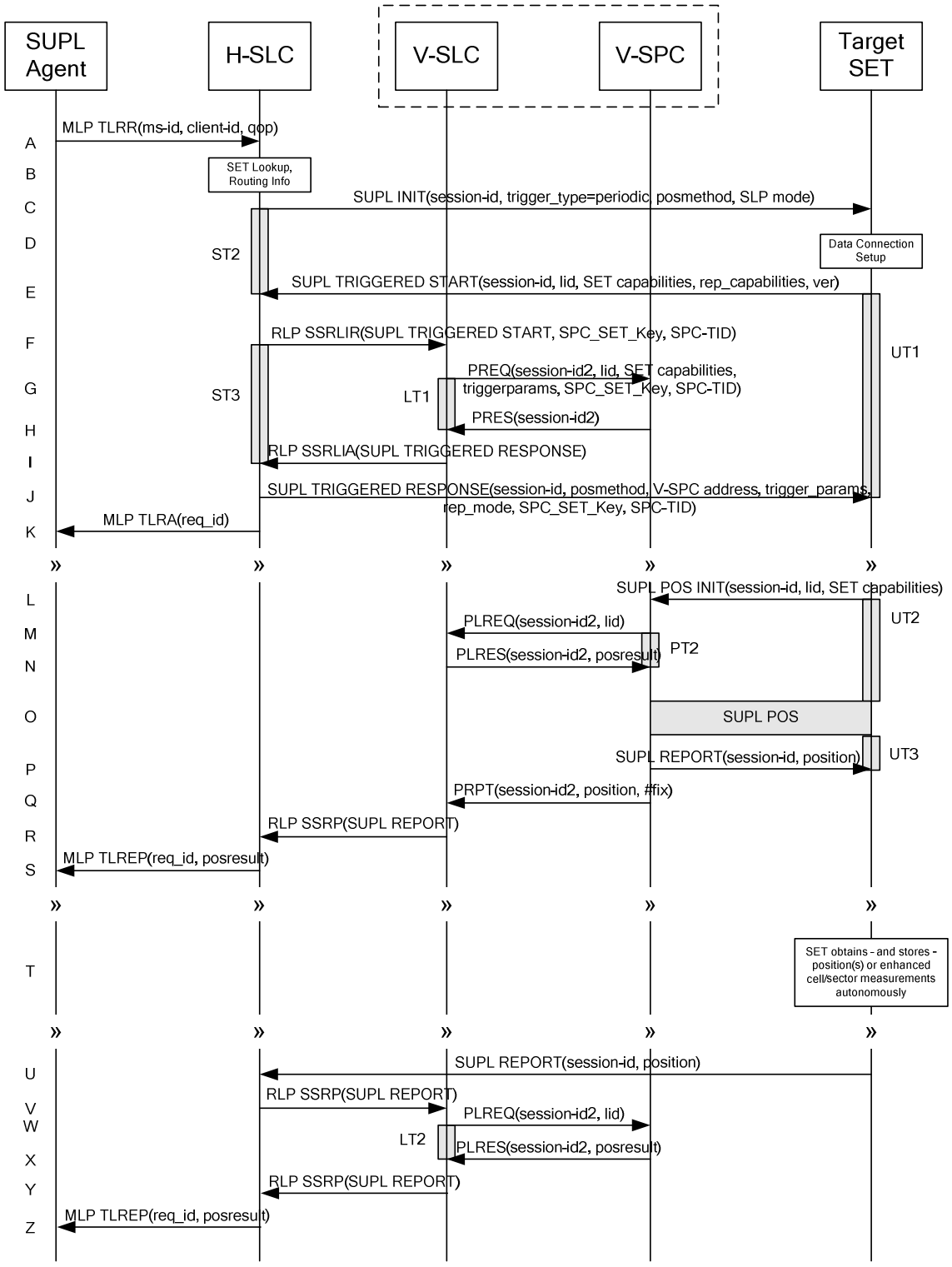

Figure 33: Network Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning (Part I)

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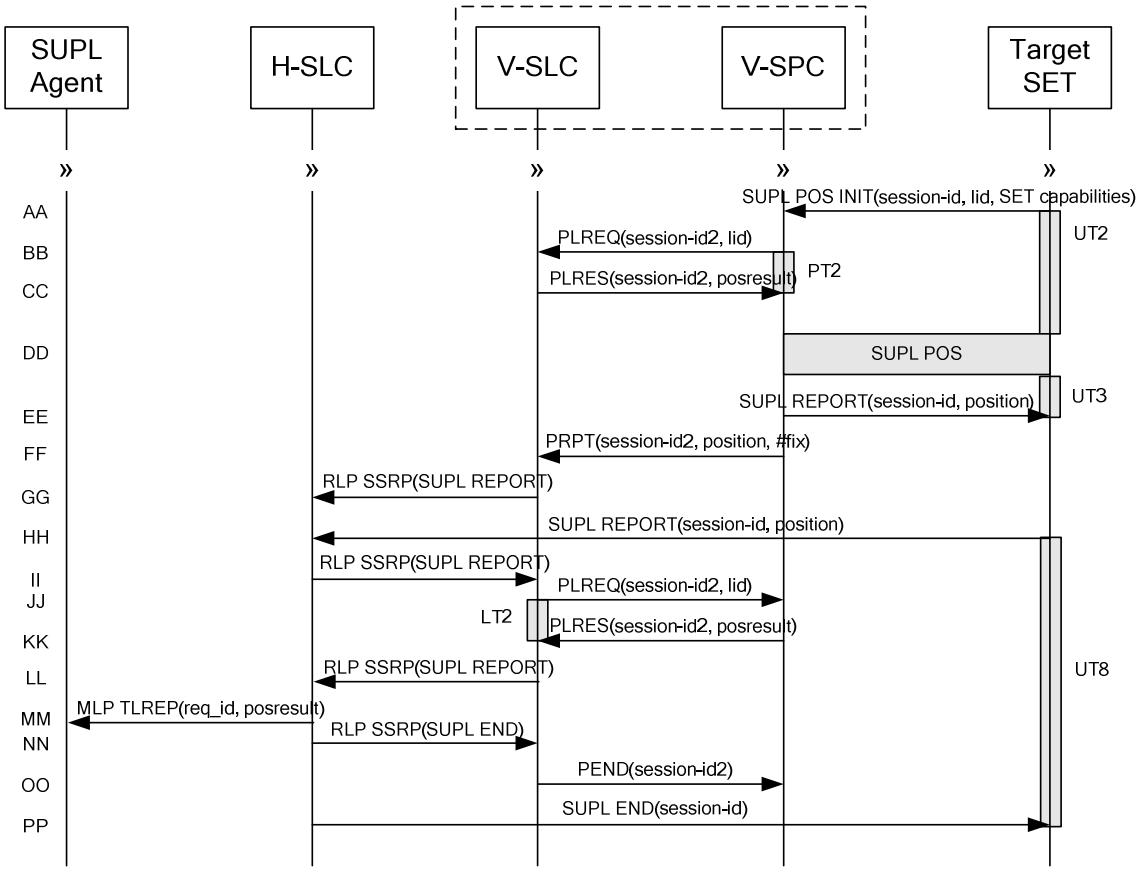

Figure 34: Network Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id. The TLRR message may indicate that batch reporting or quasi-real time reporting is to be used instead of real time reporting.In the case of batch reporting, the TLRR indicates the conditions for sending batch reports to the H-SLP and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates (e.g. QoP, time window).

B. The H-SLC verifies that the target SET is currently SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLC initiates the periodic trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case periodic), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL set notification mode to notification based on

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current location and SHALL NOT include the notification element in the SUPL INIT message; otherwise, the H-SLP SHALL set the notification mode indicator to normal notification and if notification or verification to the target subscriber is needed, the H-SLP SHALL also include the notification element in the SUPL INIT message.Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the message.

D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLC uses proxy or non-proxy mode. In this case, non-proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using the H-SLC address which has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start a periodic triggered session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver), Location ID (lid) and reporting capabilities (rep_capabilities). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The rep_capabilities parameter indicates whether the SET is capable of batch reporting, real-time reporting and/or quasi-real time reporting.

F. Based on the received lid or other mechanisms, the H-SLC determines the V-SLC and sends an RLP SSRLIR including the SUPL TRIGGERED START message to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. The H-SLC also generates SPC_SET_Key and SPC-TID to be used for V-SPC/SET mutual authentication and includes both in the RLP SSRLIR message.

G. The V-SLC requests service from the V-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The V-SLC also forwards SPC_SET_Key and SPC-TID received in step F to the V-SPC in the PREQ message. The PREQ MAY also optionally contain the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

H. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

I. Consistent with the SET capabilities received in step E, the V-SLC determines a posmethod to be used for the periodic triggered session. This posmethod may either be the posmethod recommended by the V-SPC in step H, or a different posmethod of the V-SLC's choosing, as long as it is one supported by the V-SPC. The V-SLC indicates its readiness for a periodic triggered session by sending a SUPL TRIGGERED RESPONSE message back to the H-SLC in an RLP SSRLIA message.

J. The H-SLC forwards the received SUPL TRIGGERED RESPONSE message to the SET including session-id, posmethod, V-SPC address, periodic trigger parameters, SPC_SET_Key and SPC-TID. Consistent with the rep_capabilities of the SET, the H-SLC also indicates the reporting mode (rep_mode parameter) to be used by the SET: real time reporting, quasi-real time reporting or batch reporting. In the case of batch reporting, the SUPL TRIGGERED RESPONSE message indicates the conditions for sending batch reports to the H-SLC and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates and/or (if allowed) particular stored enhanced cell/sector measurements. In the case of quasi-real time reporting, the SUPL TRIGGERED RESONSE message indicates whether the SET is allowed to send enhanced cell/sector measurements in lieu of or in addition to position estimates. If enhanced cell/sector positioning was selected for batch or quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates if the SET is permitted to send stored enhanced cell/sector measurements. In this case, if batch reporting was selected, the SET MAY skip steps L to P.

K. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the periodic triggered session. The SET and the H-SLC MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

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L. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the V-SPC to start a positioning session with the V-SPC. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the V-SPC MAY directly proceed to step P and not engage in a SUPL POS session.

M. If the V-SPC cannot translate the lid received in step L into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into coarse position itself.

N. This step is conditional and only occurs if step M was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the V-SPC MAY directly proceed to step P and not engage in a SUPL POS session.

O. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the V-SPC SHALL determine the posmethod. If the V-SLC included its approved positioning methods in step G, the V-SPC SHALL only choose an approved method. The SET and the V-SPC exchange several successive positioning procedure messages.
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

P. Once the position calculation is complete the V-SPC sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the V-SLP. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the V-SPC and therefore needs to be included in the message for batch reporting mode.

Q. This step is optional: once the position calculation is complete and real time or quasi-real time reporting is used, the V-SPC sends the position estimate in a PRPT message to the V-SLC. PRPT contains the session-id2, the position result and the number of the fix. This message is optional and only used if the position was calculated by the V-SPC i.e. in SET Assisted mode.

R. This step is conditional and is only used after step Q occurred. The V-SLC sends the position estimate to the H-SLC in a SUPL REPORT message. The SUPL REPORT message includes at a minimum the session-id and the position estimate. The SUPL REPORT message is carried within an RLP SSRP message.

If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the V-SLP) steps L to R are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLC using a SUPL REPORT message containing the session-id and the position estimate.

S. This step is optional: if real time or quasi-real time reporting is used, the H-SLC forwards the position estimate received in an MLP TLREP message to the SUPL Agent. The MLP TLREP message includes the req_id and the position result. If the reporting mode is set to batch reporting, this message is not needed.

T. This step is optional: If the SET cannot communicate with the V-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported - perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case, of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the V-SLP.

U. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP/V-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the session-id and the position result(s)

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including date and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step J. If no criteria are received in step J, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

V. This step is optional: if the H-SLC received stored enhanced cell/sector measurements in the SUPL REPORT message in step U, the V-SLP may need to be involved to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLC sends a SUPL REPORT message to the V-SLC using an SSRP message over RLP tunnel.

W. This step is optional: if the SUPL REPORT message in step V contained enhanced cell/sector measurements and the V-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the V-SLC sends a PLREQ message to the V-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step V.

X. This step is conditional and only used if step W occurred: the V-SPC returns the calculated position estimates to the V-SLC in a PLRES message. PLRES contains session-id2 and the position results.

Y. This step is conditional and takes place after step V and - optionally - steps W and X. A SUPL REPORT message containing position estimates calculated from enhanced cell/sector measurements received in step V is sent from the V-SLC to the H-SLC using an SSRP message over RLP tunnel.

Z. The H-SLC forwards the reported and/or calculated position estimate(s) to the SUPL Agent in an MLP TLREP message.

Steps L to Z are repeated as applicable. When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps AA to GG may be performed (a repeat of steps L to R). Alternatively – and if applicable – step T is repeated.

HH. This step is optional. When real-time reporting is used, it is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due. When batch or quasi real-time reporting is used, step HH is executed if and as soon as the following conditions apply:

i. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.

ii. The SET is able to establish communication with the H-SLP.

iii. In the case of batch reporting, the conditions for sending have arisen or the SET has obtained the last fix according to the number of fixes (in which case an incomplete batch of positions is sent)..

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step J. If no criteria are received in step J, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

II. This step is optional: if the H-SLC received stored enhanced cell/sector measurements in the SUPL REPORT message in step HH, the V-SLP may need to be involved to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLC sends a SUPL REPORT message to the V-SLC using an SSRP message over RLP tunnel.

JJ. This step is optional: if the SUPL REPORT message in step HH contained enhanced cell/sector measurements and the V-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the V-SLC sends a PLREQ message to the V-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step HH.

KK. This step is conditional and only used if step JJ occurred: the V-SPC returns the calculated position estimates to the V-SLC in a PLRES message. PLRES contains session-id2 and the position results.

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LL. This step is conditional and takes place after step II and - optionally - steps JJ and KK. A SUPL REPORT message containing position estimates calculated from enhanced cell/sector measurements received in step II is sent from the V-SLC to the H-SLC using an SSRP message over RLP tunnel.

MM. The H-SLC forwards the reported and/or calculated historical position estimate(s) to the SUPL Agent in an MLP TLREP message. As an option (e.g. if the SUPL Agent is not available), the H-SLC could retain the historic position fixes for later retrieval by the SUPL Agent.

NN. After the last position result has been reported to the SUPL Agent in step MM, the H-SLC informs the V-SLC about the end of the periodic triggered session through an SUPL END message carried within an SSRP message over RLP tunnel.

OO. The V-SLC informs the V-SPC about the end of the periodic triggered session in a PEND messaage. PEND contains the session-id2.

PP. The H-SLC ends the periodic triggered session with the SET by sending a SUPL END message. The SUPL END message includes at least the session-id. Please note that if the last position was calculated in step DD and step HH was not performed, the SUPL END message is sent from the V-SPC to the SET (as opposed to from the H-SLC to the SET).

6.2.3 Roaming with H-SPC Positioning Successful Case

SUPL Roaming where the H-SPC is involved in the position calculation.

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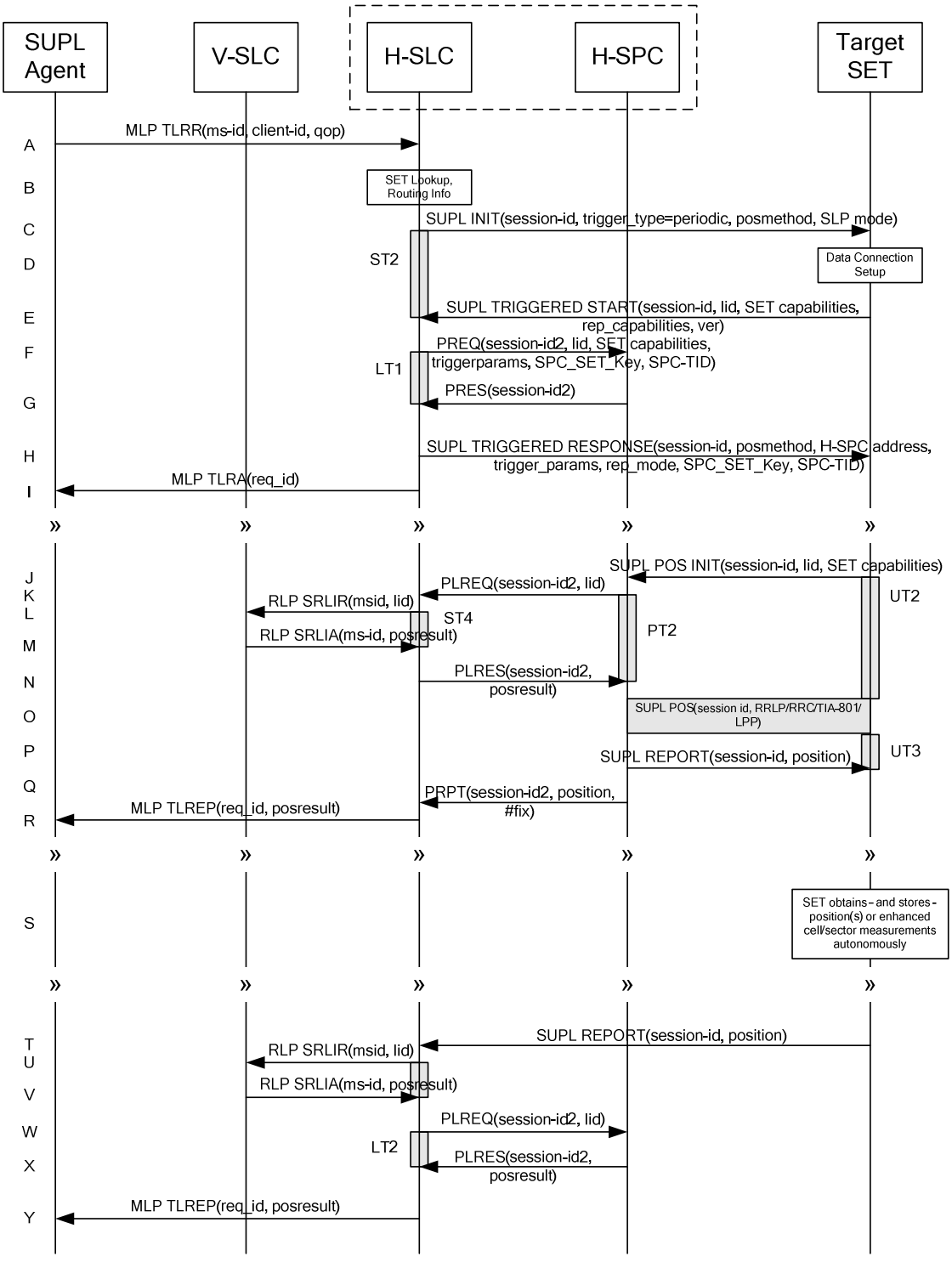

Figure 35: Network Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning (Part I)

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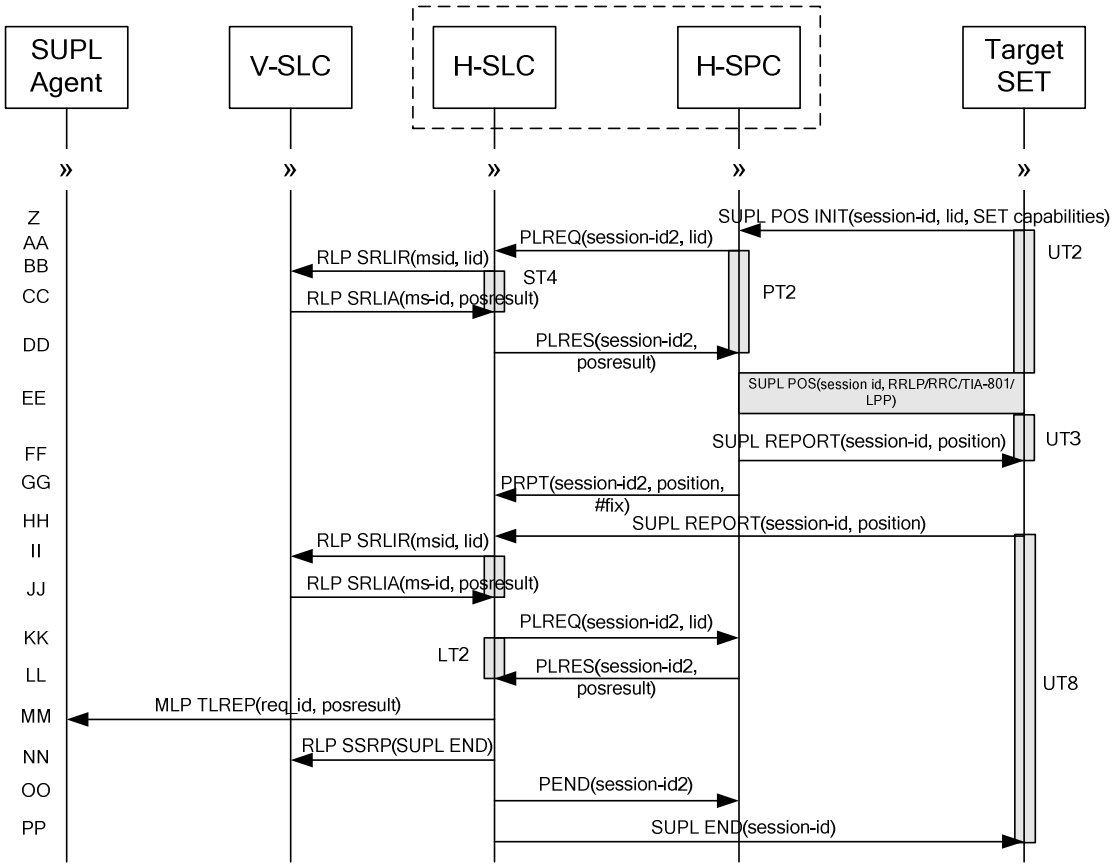

Figure 36: Network Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id. The TLRR message may indicate that batch reporting or quasi-real time reporting is to be used instead of real time reporting.In the case of batch reporting, the TLRR indicates the conditions for sending batch reports to the H-SLP and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates (e.g. QoP, time window).

B. The H-SLC verifies that the target SET is currently SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLC may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLC initiates the periodic trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case periodic), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL set notification mode to notification based on

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current location and SHALL NOT include the notification element in the SUPL INIT message; otherwise, the H-SLP SHALL set the notification mode indicator to normal notification and if notification or verification to the target subscriber is needed, the H-SLP SHALL also include the notification element in the SUPL INIT message.Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the message.

D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, non-proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using the H-SLC address that has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start a periodic triggered session with the H-SLC. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver), Location ID (lid) and reporting capabilities (rep_capabilities). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The rep_capabilities parameter indicates whether the SET is capable of batch reporting, real-time reporting and/or quasi-real time reporting.

F. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The H-SLC generates SPC_SET_Key and SPC-TID for mutual H-SPC/SET authentication and forwards both to the H-SPC in the PREQ message. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

G. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

H. Consistent with the SET capabilities received in step E, the H-SLC determines a posmethod to be used for the periodic triggered session. This posmethod may either be the posmethod recommended by the H-SPC in step G, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. The H-SLC indicates its readiness for a periodic triggered session by sending a SUPL TRIGGERED RESPONSE message back to the SET. The SUPL TRIGGERED RESPONSE message to the SET includes at a minimum the session-id, posmethod, H-SPC address, periodic trigger parameters, SPC_SET_Key and SPC-TID. Consistent with the rep_capabilities of the SET, the H-SLC also indicates the reporting mode (rep_mode parameter) to be used by the SET: real time reporting, quasi-real time reporting or batch reporting. In the case of batch reporting, the SUPL TRIGGERED RESPONSE message indicates the conditions for sending batch reports to the H-SLC and any criteria, when the conditions for sending arise, for including or excluding particular stored position estimates and/or (if allowed) particular stored enhanced cell/sector measurements. In the case of quasi-real time reporting, the SUPL TRIGGERED RESONSE message indicates whether the SET is allowed to send enhanced cell/sector measurements in lieu of or in addition to position estimates. If enhanced cell/sector positioning was selected for batch or quasi-real time reporting, the SUPL TRIGGERED RESPONSE message indicates if the SET is permitted to send stored enhanced cell/sector measurements. In this case, if batch reporting was selected, the SET MAY skip steps J to P.

I. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the periodic triggered session. The SET and the H-SLC MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

J. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the H-SPC to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data

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element in the SUPL POS INIT.
If the SUPL POS INIT message contains a position that meets the required QoP, the H-SPC MAY directly proceed to step P.

K. To translate the lid received in step J into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid.

L. To obtain a coarse position the H-SLC sends an RLP SRLIR message to the V-SLP.

M. The V-SLP translates the received lid into a position estimate and returns the result to the H-SLC in an RLP SRLIA message.
For real-time or quasi-real time reporting, if the returned position meets the required QoP, the H-SLC MAY directly proceed to step R and not engage in a SUPL POS session. For batch reporting, if the returned position meets the required QoP, the H-SLC MAY send the position result through internal communication to the H-SPC (step N) and the H-SPC will forward the position result to the SET using a SUPL REPORT message (step P) without engaging in a SUPL POS session (step O).

N. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC SHALL directly proceed to step P and not engage in a SUPL POS session.

O. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step F, the H-SPC SHALL only choose an approved method. The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

P. Once the position calculation is complete the H-SPC sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the H-SLP. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the H-SPC and therefore needs to be included in the message for batch reporting mode.

Q. This step is optional: once the position calculation is complete and if real time or quasi-real time reporting is used, the H-SPC sends the position estimate in a PRPT message to the H-SLC. PRPT contains the session-id2, the position result and the number of the fix. This message is optional and only used if the position was calculated by the H-SPC i.e. in SET Assisted mode.

If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the H-SLP) steps J to Q are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLC using a SUPL REPORT message containing the session-id and the position estimate.

R. This step is optional: if real time or quasi-real time reporting is used, the H-SLC forwards the calculated position estimate to the SUPL Agent in an MLP TLREP message. The MLP TLREP message includes the req_id and the position result. If the reporting mode is set to batch reporting, this message is not needed.

S. This step is optional: If the SET cannot communicate with the H-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported - perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case, of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the H-SLP.

T. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the session-id and the position result(s) including date and time information for each position result and optionally the position method used. In the case of batch

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reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step H. If no criteria are received in step H, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

U. This step is optional: if the H-SLC received stored enhanced cell/sector measurements in the SUPL REPORT message in step T, the V-SLP may need to be involved to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLC sends an RLP SRLIR message to the V-SLC.

V. This step is conditional and takes place only if step U occurred. The V-SLC sends the position result calculated based on the enhanced cell/sector measurements received in step U to the H-SLC.

W. This step is optional and only takes place if after the translation into a position estimate in steps U and V the H-SPC is required to calculate the position estimate. In this case the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step T.

X. This step is conditional and only used if step W occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

Y. The H-SLC forwards the reported and/or calculated position estimate(s) to the SUPL Agent in an MLP TLREP message.

Steps J to Y are repeated as applicable. When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps Z to FF may be performed (a repeat of steps J to Q). Alternatively – and if applicable – step S is repeated.

HH. This step is optional. When real-time reporting is used, it is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due. When batch or quasi real-time reporting is used, step HH is executed if and as soon as the following conditions apply:

i. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.

ii. The SET is able to establish communication with the H-SLP.

iii. In the case of batch reporting, the conditions for sending have arisen or the SET has obtained the last fix according to the number of fixes (in which case an incomplete batch of positions is sent).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step H. If no criteria are received in step H, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

II. This step is optional: if the H-SLC received stored enhanced cell/sector measurements in the SUPL REPORT message in step HH, the V-SLP may need to be involved to translate the enhanced cell/sector measurements into actual position estimates To this end the H-SLC sends an RLP SRLIR message to the V-SLC.

JJ. This step is conditional and takes place only if step II occurred. The V-SLC sends the position result calculated based on the enhanced cell/sector measurements received in step II to the H-SLC.

KK. This step is optional and only takes place if after the translation into a position estimate in steps II and JJ the H-SPC is required to calculate the position estimate. In this case the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step HH.

LL. This step is conditional and only used if step KK occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

MM. The H-SLC forwards the reported and/or calculated historical position estimate(s) to the SUPL Agent in an MLP TLREP message. As an option (e.g. if the SUPL Agent is not available), the H-SLC could retain the historic position fixes for later retrieval by the SUPL Agent.

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NN. When the last position result was reported to the SUPL Agent in step OO, the H-SLC closes the periodic triggered session with the V-SLC by sending a SUPL END message encapsulated in an SSRP message over RLP tunnel.

OO. The H-SLC informs the H-SPC about the end of the periodic triggered session by sending a PEND message. PEND contains the session-id2.

PP. The H-SLC ends the periodic triggered session with the SET by sending a SUPL END message. The SUPL END message includes at least the session-id. Please note that if the last position was calculated in step EE and step HH was not performed, the SUPL END message is sent from the H-SPC to the SET (as opposed to from the H-SLC to the SET).

6.3 Exception Procedures

This section describes the exception procedures for triggered scenarios.

6.3.1 SET does not allow Triggered Position

This error case does not impact the Llp interface.

6.3.2 Network cancels the triggered location request

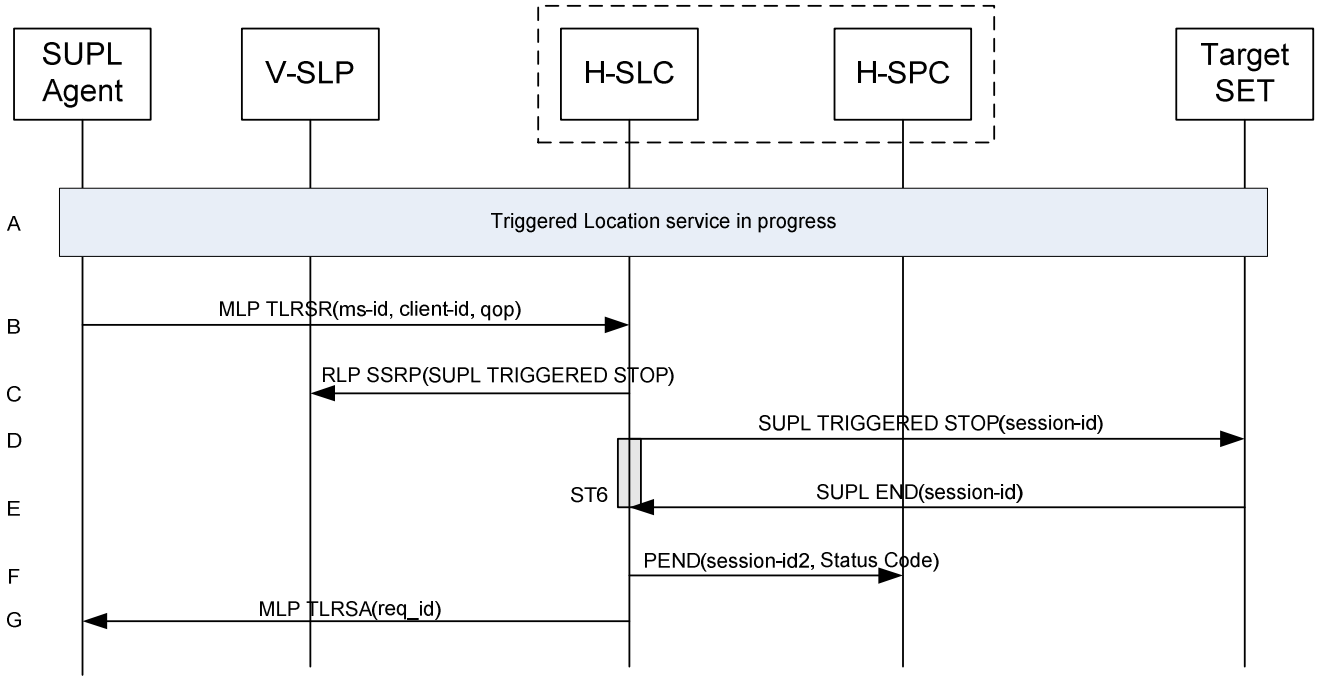

Figure 37: Network Initiated Triggered location, Network cancels the triggered location request

NOTE 1: See Appendix C for timer descriptions.

A. The triggered location procedure is in progress.

B. The SUPL Agent sends a MLP TLRSR message to cancel the ongoing triggered session.

NOTE 2: The MLP TLRSR in this flow is only used to illustrate a possible triggered session cancellation initiated by the SUPL Agent. The triggered session could also be cancelled by the H-SLC i.e. without the SUPL Agent's involvement.

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C. This step is optional. For roaming with V-SLP scenarios where the V-SLP is involved, an RLP SSRP message carrying the SUPL TRIGGERED STOP message is sent by the H-SLC to the V-SLP to notify the V-SLP that the triggered session has been cancelled and that all resource allocated to this session are to be released.

D. The H-SLP sends a SUPL TRIGGERED STOP message with the session-id to the target SET to request cancellation of the triggered session.

E. The target SET acknowledges that it has cancelled the positioning procedure with the SUPL END message back to the H-SLP.

F. The H-SLC cancels the triggered session with the H-SPC by sending a PEND message including the appropriate Status Code.

G. The H-SLC confirms cancellation of the triggered SUPL session by sending a MLP TLRSA message to the SUPL Agent.

6.3.3 SET cancels the triggered location request

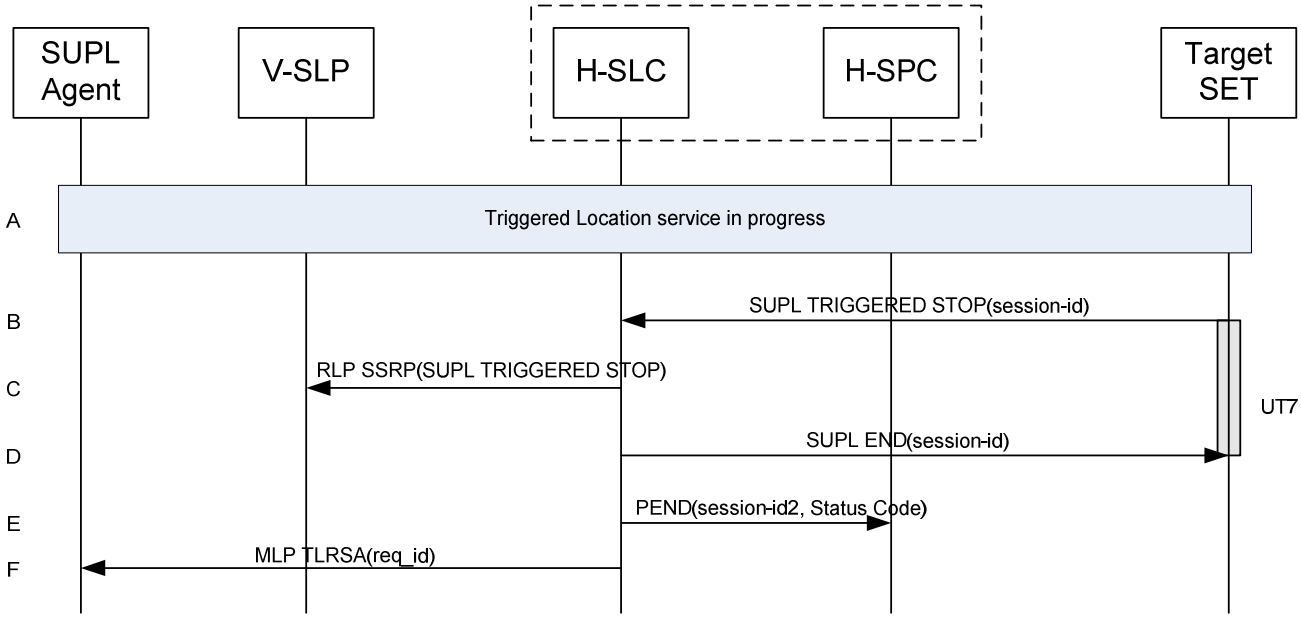

Figure 38: Network Initiated Triggered location, SET cancels the triggered location request

NOTE 1: See Appendix C for timer descriptions.

A. The triggered location procedure is in progress.

B. The SET sends a SUPL TRIGGERED STOP message including the session-id to the H-SLC to request cancellation of the triggered session.

C. This step is optional. For roaming with V-SLP scenarios where the V-SLP is involved, an RLP SSRP message carrying the SUPL TRIGGERED STOP message is sent by the H-SLC to the V-SLP to notify the V-SLP that the triggered session has been cancelled and that all resource allocated to this session are to be released.

D. The H-SLC sends a SUPL END message to the SET. The SET SHALL release the secure connection and release all resources related to this session.

E. The H-SLC cancels the triggered session with the H-SPC by sending a PEND message including the appropriate Status Code.

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F. The H-SLC sends an MLP TLRSA message to the SUPL Agent to inform the SUPL Agent that the triggered session has been cancelled.

6.4 SET Initiated – Proxy mode

This section describes the SET Initiated Proxy mode scenarios. It is assumed that the trigger resides in the SET.

6.4.1 Non-Roaming Successful Case

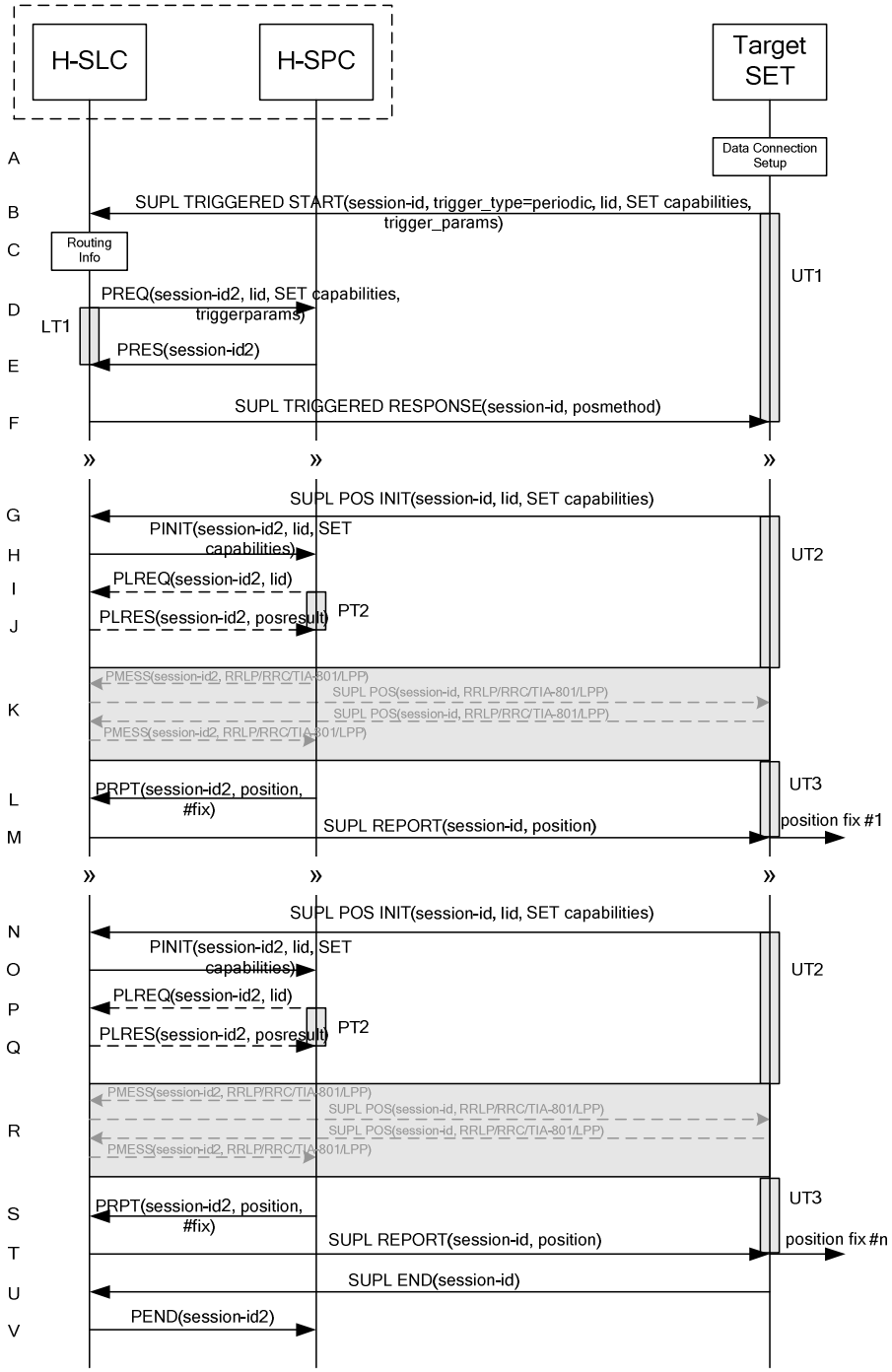

Figure 39: SET Initiated Periodic Trigger Service Non-Roaming Successful Case – Proxy Mode

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NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid) and periodic trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently not SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

F. Consistent with the SUPL TRIGGERED START message including the SET capabilities of the SET, the H-SLP MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLP SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC SHALL respond with a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE contains the session-id but no H-SLC address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL TRIGGERED RESPONSE also contains the posmethod. The SET and the H-SLC MAY release the secure connection.

G. When the periodic trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the H-SLC MAY directly proceed to step M and not engage in a SUPL POS session.

H. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id and SET capabilities. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step E, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step D. If a coarse position calculated based on information received in the SUPL POS INIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

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I. If the H-SPC cannot translate the lid received in step H into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into coarse position itself.

J. This step is conditional and only occurs if step I was performed. The H-SLC calculates a coarse position based on lid and reports the result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

K. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

L. Once the position calculation is complete the H-SPC sends a PRPT message to the H-SLC. PRPT contains the session-id2, the position result if calculated in H-SPC and the number of the fix.

M. Once the position calculation is complete the H-SLC sends a SUPL REPORT message to the SET. The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SPC and therefore needs to be sent to the SET. The SET MAY release the secure connection to the H-SLC.

NOTE 3: steps G to M are optional and not performed for A-GPS SET Based mode in the case where no GPS assistance data is required from the network. In this case the SET autonomously calculates a position fix based on the currently available GPS assistance data stored in the SET.

Steps G to M are repeated if so required for calculating any of the remaining position estimates of the periodic triggered session. The last position estimate which – as shown in this case - requires the execution of steps G to M, is shown in steps N to T.

U. After the last position result has been calculated, the SET ends the periodic triggered session by sending a SUPL END message to the H-SLC.

V. The H-SLC ends the periodic triggered session with the H-SPC by sending a PEND message. PEND contains the session-id2.

NOTE 4: Note that for A-GPS SET Based mode where the SET calculates the position estimate based on GPS assistance data available in the SET, steps G to M are performed whenever new GPS assistance data is required by the SET.

6.4.2 Roaming with V-SLP Positioning Successful Case

SUPL Roaming where the V-SLP is involved in the position calculation.

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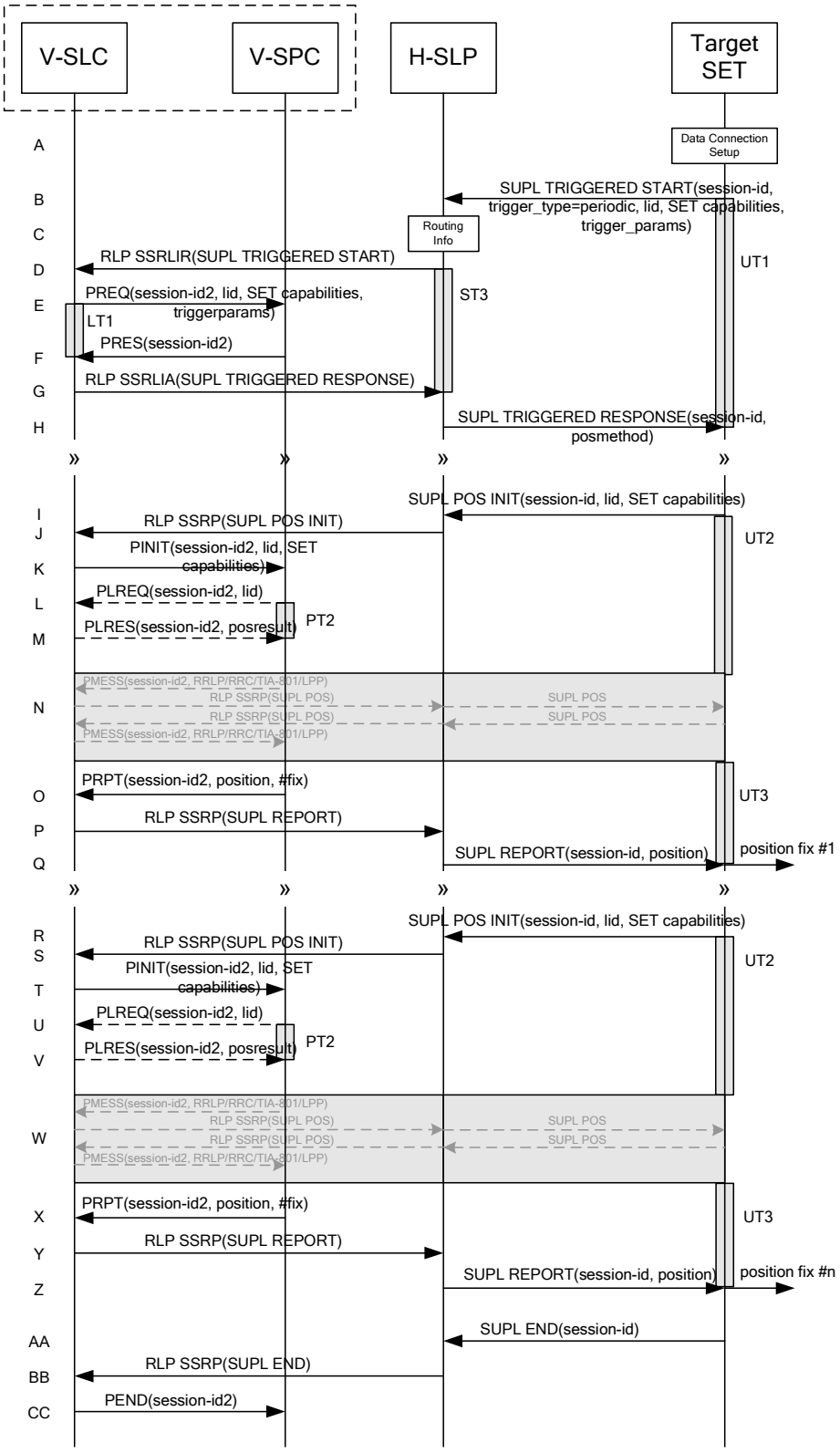

Figure 40: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with V-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

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A. The SUPL Agent on the SET receives a request for a periodic triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLP and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid) and periodic trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLP verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. Based on the received lid or other method, the H-SLC determines the V-SLP and sends an SSRLIR SUPL TRIGGERED START message over RLP tunnel to the V-SLC.

E. The V-SLC requests service from the V-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY optionally contain the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

F. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

G. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the V-SLC MAY determine the posmethod. If the V-SPC included a list of supported posmethods in step F, the chosen posmethod SHALL be on this list. If required for the posmethod, the V-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The V-SLC responds with a SUPL TRIGGERED RESPONSE tunnelled over RLP in a SSRLIA message back to the H-SLP that it is capable of supporting this request. The SUPL TRIGGERED RESPONSE contains at least the sessionid and posmethod.

H. The H-SLP forwards the SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE contains the session-id but no H-SLP address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL TRIGGERED RESPONSE also contains the posmethod. The SET and the H-SLP MAY release the secure connection.

I. When the periodic trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If the SUPL POS INIT message contains a position that meets any required QoP, the H-SLP MAY directly proceed to step Q.

J. The H-SLP forwards the SUPL POS INIT message to the V-SLC over the RLP tunnel in an SSRP message.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the V-SLC MAY directly proceed to step P and not engage in a SUPL POS session.

K. The V-SLC sends a PINIT message to the V-SPC including session-id2, location id and SET capabilities. The V-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the V-SPC in step F, or a different posmethod of the V-SLC's choosing, as long as it is one supported by the V-SPC.

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Based on the PINIT message including the SET capabilities, the V-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the V-SLC, the V-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the V-SPC shall choose any posmethod in line with the SET capabilities which was approved by the V-SLC in step E. If a coarse position calculated based on information received in the PINIT message is available that meets the required QoP, the V-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

L. If the V-SPC cannot translate the lid received in step K into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into coarse position itself.

M. This step is conditional and only occurs if step L was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the V-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

N. The SET and the V-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SPC and the V-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SLC and the H-SLC using SUPL POS over RLP tunnel messages. The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages. The flow sequence PMESS – RLP SSRP(SUPL POS) – SUPL POS – SUPL POS – RLP SSRP(SUPL POS) – PMESS is conceptually shown in dotted lines. The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

O. Once the position calculation is complete, the V-SPC sends a PRPT message to the V-SLC. PRPT contains the session-id2, the position result if calculated in V-SPC and the number of the fix.

P. Once the position calculation is complete, the V-SLC sends a SUPL REPORT message in an RLP tunnel using an SSRP message to the H-SLP.

Q. The H-SLP forwards the SUPL REPORT message to the SET. The SUPL REPORT message includes the position result if the position estimate is calculated in the V-SPC and therefore needs to be sent to the SET. The SET and the H-SLP MAY release the secure connection.

NOTE 3: steps I to Q are optional and not performed for A-GPS SET Based in the case where no GPS assistance data is required from the network. In this case the SET autonomously calculates a position fix based on the currently available GPS assistance data stored in the SET.

Steps I to Q are repeated if so required for calculating any of the remaining position estimates of the periodic triggered session. The last position estimate which – as shown in this case - requires the execution of steps I to Q, is shown in steps R to Z.

AA. After the last position result has been calculated, the SET ends the periodic triggered session by sending a SUPL END message to the H-SLP.

BB. The H-SLP informs the V-SLC about the end of the periodic triggered session by sending a SUPL END message using an RLP SSRP tunnel message to the V-SLC.

CC. The V-SLC ends the periodic triggered session with the V-SPC by sending a PEND message. PEND contains the session-id2.

NOTE 4: Note that for A-GPS SET Based mode where the SET calculates the position estimate based on GPS assistance data available in the SET, steps I to Q are performed whenever new GPS assistance data is required by the SET.

6.4.3 Roaming with H-SLP Positioning Successful Case

SUPL Roaming where the H-SLP is involved in the position calculation.

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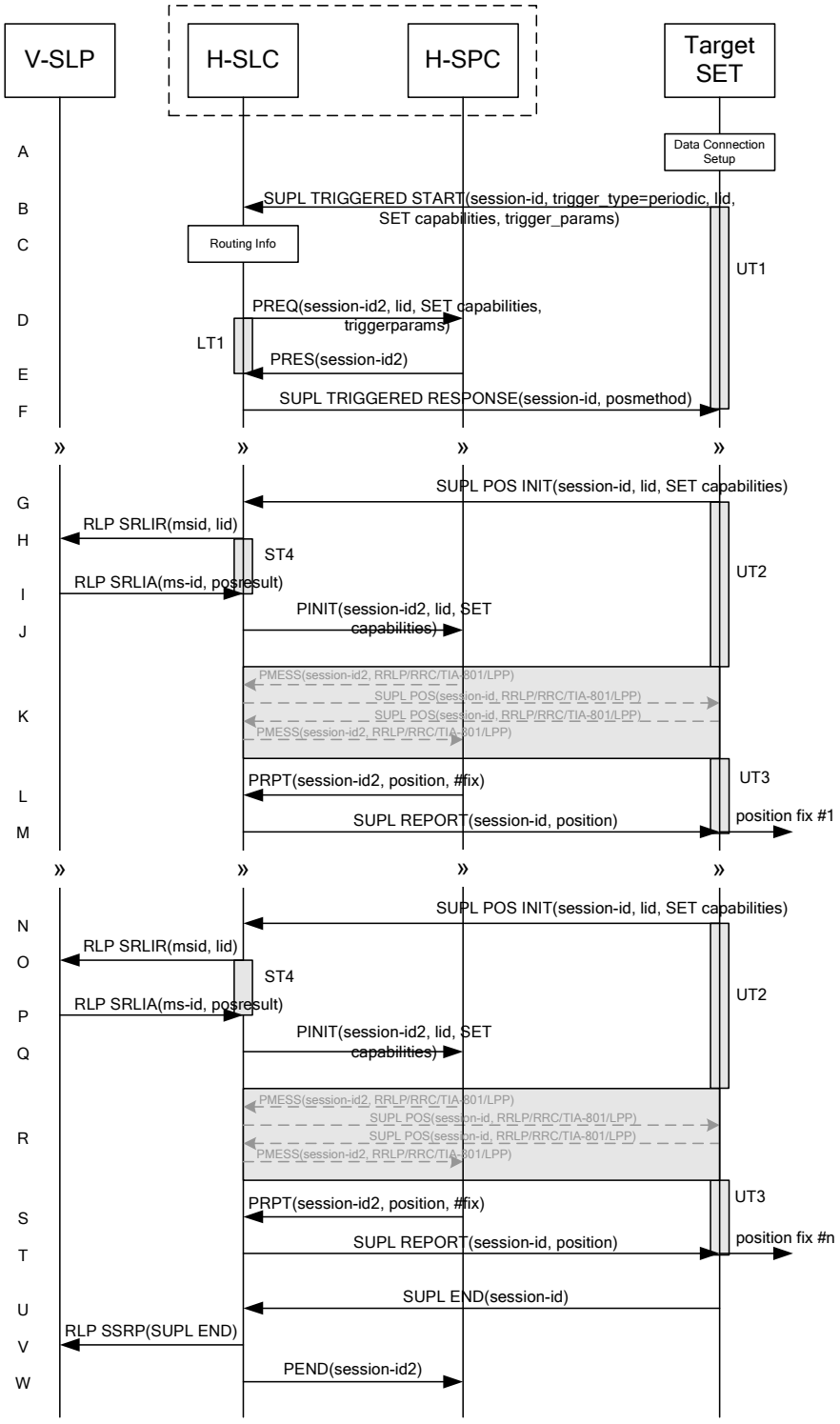

Figure 41: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with H-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

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B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid) and periodic trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

F. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC sends a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE contains the session-id but no H-SLP address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL TRIGGERED RESPONSE also contains the posmethod. The SET and the H-SLC MAY release the secure connection.

G. When the periodic trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLC. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If the SUPL POS INIT message contains a position that meets any required QoP, the H-SLC MAY directly proceed to step M.

H. To obtain a coarse position based on lid received in step G, the H-SLC sends an RLP SRLIR message to the V-SLP.

I. The V-SLP translates the received lid into a position estimate and returns the result to the H-SLC in an RLP SRLIA message.
If the position estimate meets any required QoP, the H-SLC MAY directly proceed to step M and not engage in a SUPL POS session.

J. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id and SET capabilities. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step E, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step D.

K. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The

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positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

L. Once the position calculation is complete, the H-SPC sends a PRPT message to the H-SLC. PRPT contains the session-id2, the position result if calculated in the H-SPC and the number of the fix.

M. Once the position calculation is complete, the H-SLC sends a SUPL REPORT message to the SET. The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SLP and therefore needs to be sent to the SET. The SET MAY release the secure connection to the H-SLC.

NOTE 3: steps G to M are optional and not performed for A-GPS SET Based in the case where no GPS assistance data is required from the network. In this case the SET autonomously calculates a position fix based on the currently available GPS assistance data stored in the SET.

Steps G to M are repeated if so required for calculating any of the remaining position estimates of the periodic triggered session. The last position estimate which – as shown in this case - requires the execution of steps G to M, is shown in steps N to T.

U. After the last position result has been calculated, the SET ends the periodic triggered session by sending a SUPL END message to the H-SLC.

V. The H-SLC informs the V-SLP about the end of the periodic triggered session by sending a SUPL END message using an RLP SSRP tunnel message to the V-SLP.

W. The H-SLC ends the periodic triggered session with the H-SPC by sending a PEND message. PEND contains the session-id2.

NOTE 4: Note that for A-GPS SET Based mode where the SET calculates the position estimate based on GPS assistance data available in the SET, steps G to M are performed whenever new GPS assistance data is required by the SET.

6.5 SET Initiated – Non-Proxy mode

This section describes the SET Initiated Non-Proxy mode scenarios. It is assumed that the trigger resides in the SET.

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6.5.1 Non-Roaming Successful Case

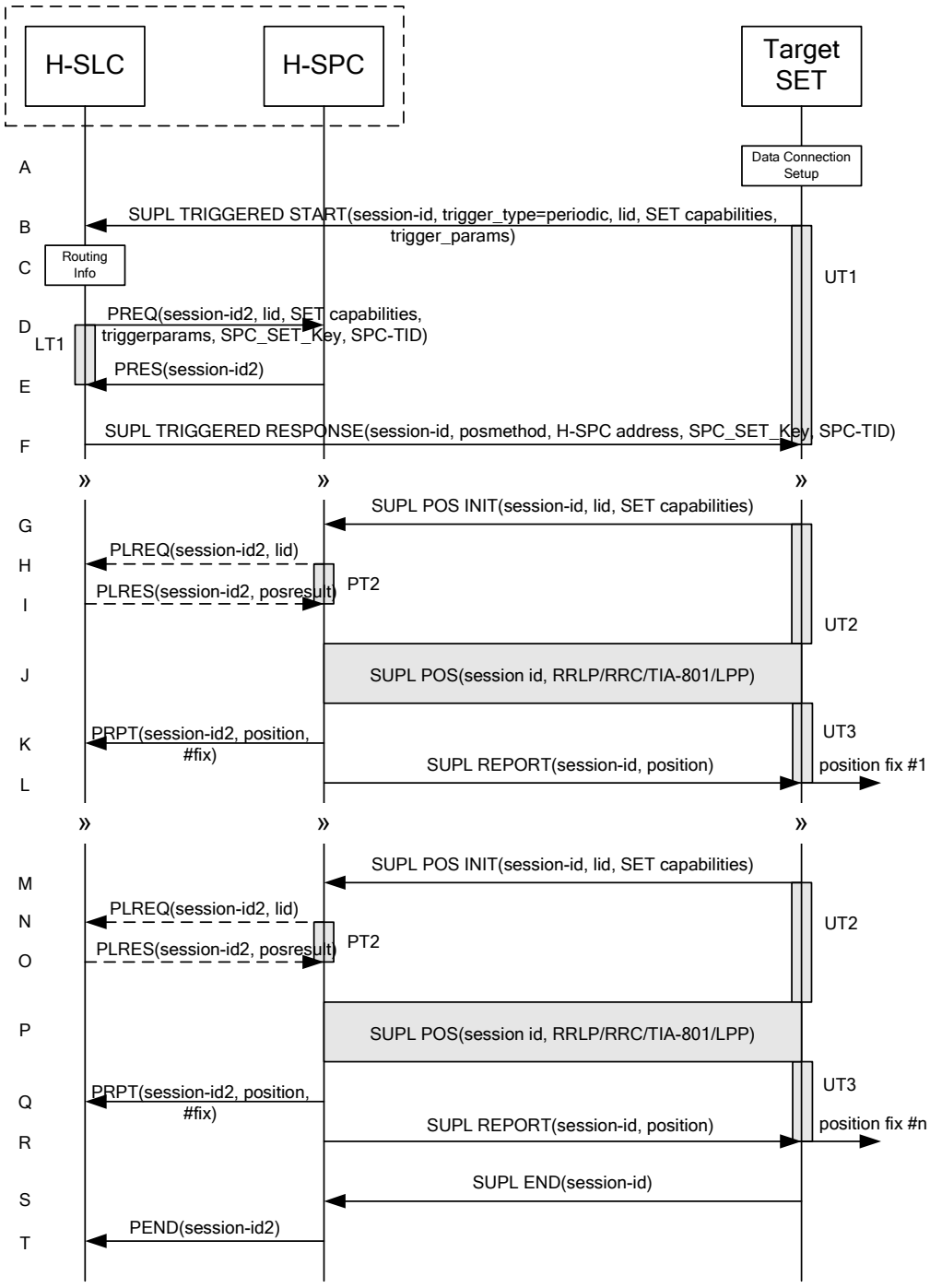

Figure 42: SET Initiated Periodic Trigger Service Non-Roaming Successful Case – Non-Proxy Mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the

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H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid) and periodic trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently not SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The H-SLC also creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. SPC_SET_Key and SPC-TID are forwarded to the H-SPC. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

F. Consistent with the SUPL TRIGGERED START message including the SET capabilities of the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC SHALL respond with a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains session-id, posmethod, H-SPC address and SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. The SET and the H-SLC MAY release the secure connection.

G. When the periodic trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.

H. If the H-SPC cannot translate the lid received in step G into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into coarse position itself.

I. This step is conditional and only occurs if step H was performed. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.

J. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step D, the H-SPC SHALL only choose an approved method. The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance data obtained from the H-SPC (SET-Based).

K. The H-SPC may optionally inform the H-SLC about the position fix or assistance data delivery process performed in step J. To this end the H-SPC sends a PRPT message to the H-SLC. PRPT contains at least session-id2.

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L. Once the position calculation is complete the H-SPC sends a SUPL REPORT message to the SET. The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SPC and therefore needs to be sent to the SET. The SET MAY release the secure connection to the H-SPC.

NOTE 3: steps G to L are optional and not performed for A-GPS SET Based in the case where no GPS assistance data is required from the network. In this case the SET autonomously calculates a position fix based on the currently available GPS assistance data stored in the SET.

Steps G to L are repeated if so required for calculating any of the remaining position estimates of the periodic triggered session. The last position estimate which – as shown in this case - requires the execution of steps G to L, is shown in steps M to R.

S. After the last position result has been calculated, the SET ends the periodic triggered session by sending a SUPL END message to the H-SPC.

T. The H-SPC informs the H-SLC through a PEND message that the periodic triggered session has ended. PEND contains session-id2.

NOTE 4: Note that for A-GPS SET Based mode where the SET calculates the position estimate based on GPS assistance data available in the SET, steps G to L are performed whenever new GPS assistance data is required by the SET.

6.5.2 Roaming with V-SPC Positioning Successful Case

SUPL Roaming where the V-SPC is involved in the position calculation.

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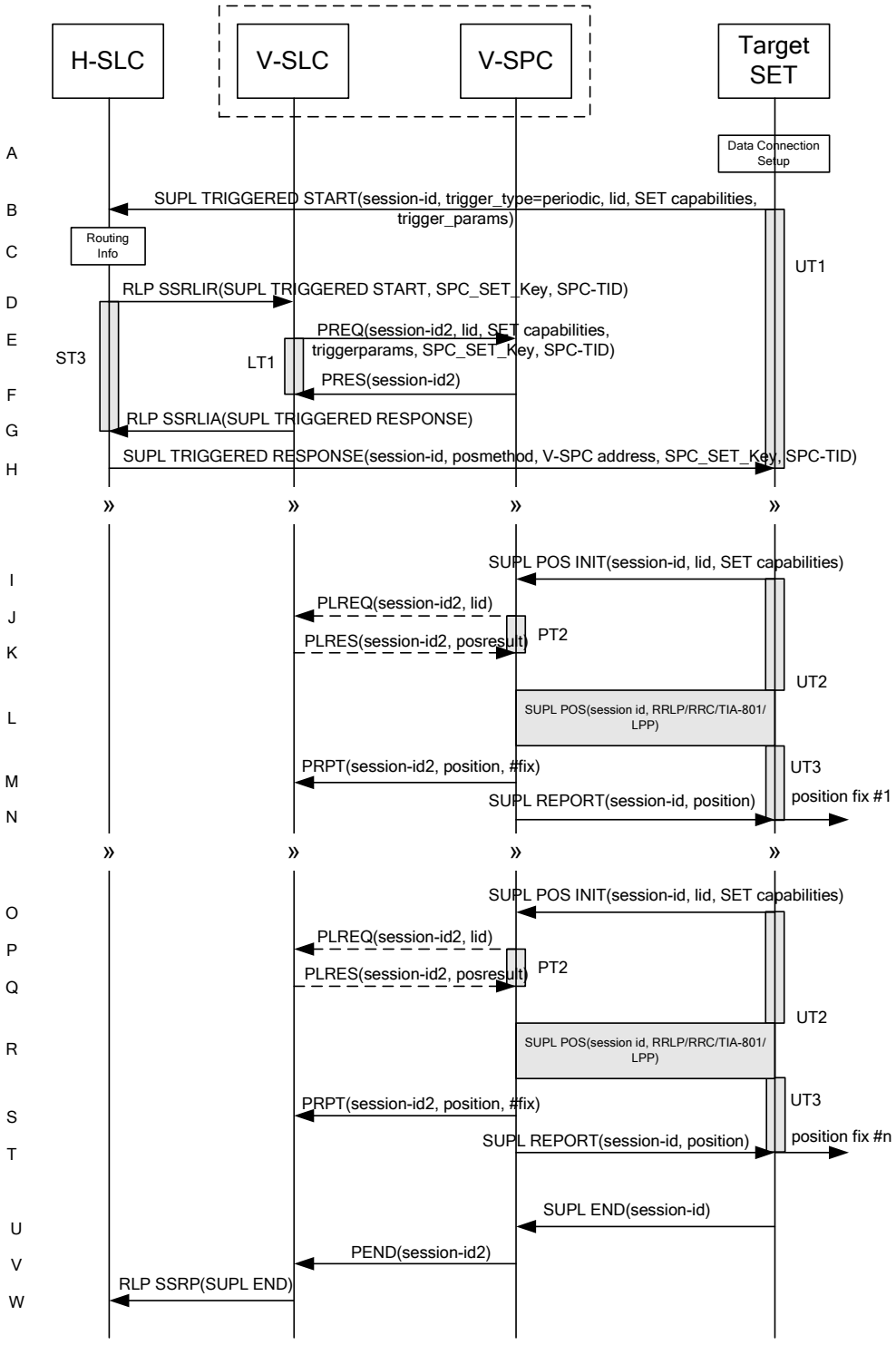

Figure 43: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the

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H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid) and periodic trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. Based on the received lid or other mechanisms, the H-SLC determines the V-SLP and sends an RLP SSRLIR including a SUPL TRIGGERED START message to the V-SLC to inform the V-SLP that a periodic triggered session is in the progress of being initiated. The H-SLC also creates SPC_SET_Key and SPC-TID to be used for mutual V-SPC/SET authentication and sends it to the V-SLC as part of the RLP SSRLIR message.

E. The V-SLC requests service from the V-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY also optionally contain the QoP. PREQ also contains SPC_SET_Key and SPC-TID for mutual V-SPC/SET authentication. The V-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

F. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

G. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the V-SLC MAY determine the posmethod. If the V-SPC included a list of supported posmethods in step F, the chosen posmethod SHALL be on this list. If required for the posmethod, the V-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The V-SLC responds with a SUPL TRIGGERED RESPONSE tunnelled over RLP in a SSRLIA message back to the H-SLC that it is capable of supporting this request. The SUPL TRIGGERED RESPONSE contains at least the sessionid, posmethod and the V-SPC address.

H. The H-SLC sends a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains session-id, posmethod, V-SPC address and SPC_SET_Key and SPC-TID. The SET and the H-SLC MAY release the secure connection.

I. When the periodic trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the V-SPC. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the V-SPC MAY directly proceed to step M and not engage in a SUPL POS session.

J. If the V-SPC cannot translate the lid received in step I into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into coarse position itself.

K. This step is conditional and only occurs if step J was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the V-SPC MAY directly proceed to step M and not engage in a SUPL POS session.

L. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the V-SPC SHALL determine the posmethod. If the V-SLC included its approved positioning methods in step E, the V-SPC SHALL only choose

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an approved method. The SET and the V-SPC exchange several successive positioning procedure messages. The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance data obtained from the V-SPC (SET-Based).

M. The V-SPC may optionally inform the V-SPC about the position fix or assistance data delivery process performed in step L. To this end the V-SPC sends a PRPT message to the V-SLC. PRPT contains at least session-id2.

N. Once the position calculation is complete, the V-SPC sends a SUPL REPORT message to the SET. The SUPL REPORT message includes the position result if the position estimate is calculated in the V-SPC and therefore needs to be sent to the SET. The SET and the V-SPC MAY release the secure connection.

NOTE 3: steps I to N are optional and not performed for A-GPS SET Based in the case where no GPS assistance data is required from the network. In this case the SET autonomously calculates a position fix based on the currently available GPS assistance data stored in the SET.

Steps I to N are repeated if so required for calculating any of the remaining position estimates of the periodic triggered session. The last position estimate which – as shown in this case - requires the execution of steps I to N, is shown in steps O to T.

U. After the last position result has been calculated, the SET ends the periodic triggered session by sending a SUPL END message to the V-SPC.

V. The V-SPC informs the V-SLC through a PEND message that the periodic triggered session has ended. PEND contains session-id2.

W. The V-SLC informs the H-SLC about the end of the periodic triggered session by sending a SUPL END message using an RLP SSRP tunnel message to the H-SLC.

NOTE 4: Note that for A-GPS SET Based mode where the SET calculates the position estimate based on GPS assistance data available in the SET, steps I to N are performed whenever new GPS assistance data is required by the SET.

6.5.3 Roaming with H-SPC Positioning Successful Case

SUPL Roaming where the H-SPC is involved in the position calculation.

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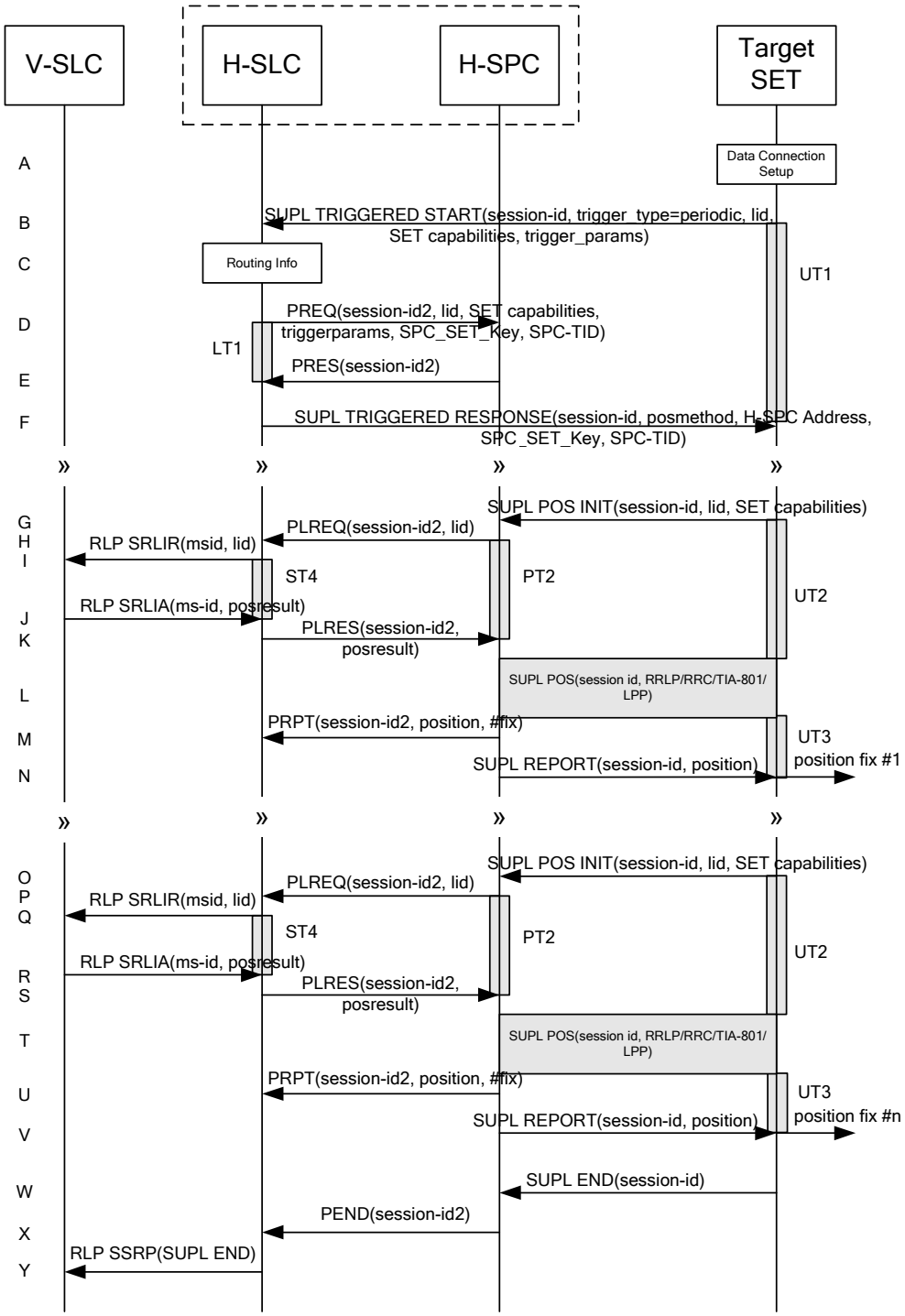

Figure 44: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in

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this case periodic), Location ID (lid) and periodic trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The H-SLC also creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. SPC_SET_Key and SPC-TID are forwarded to the H-SPC. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

F. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC sends a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains session-id, posmethod, H-SPC address and SPC_SET_Key and SPC-TID for mutual H-SPC/SET authentication. The SET and the H-SLC MAY release the secure connection.

G. When the periodic trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If the SUPL POS INIT message contains a position that meets any required QoP, the H-SPC MAY directly proceed to step M.

H. The H-SPC sends a PLREQ message to the H-SLC to request translation of the received lid into a coarse position. The PLREQ message contains the session-id2 and the lid.

I. To obtain a coarse position the H-SLC sends an RLP SRLIR message to the V-SLP.

J. The V-SLC translates the received lid into a position estimate and returns the result to the H-SLC in an RLP SRLIA message.

K. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets any required QoP, the H-SPC MAY directly proceed to step M and not engage in a SUPL POS session.

L. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step D, the H-SPC SHALL only choose an approved method. The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance data obtained from the H-SPC (SET-Based).

M. The H-SPC may optionally inform the H-SPC about the position fix or assistance data delivery process performed in step L. To this end the H-SPC sends a PRPT message to the H-SLC. PRPT contains at least session-id2.

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N. Once the position calculation is complete, the H-SPC sends a SUPL REPORT message to the SET. The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SPC and therefore needs to be sent to the SET. The SET and the H-SPC MAY release the secure connection.

NOTE 3: steps G to N are optional and not performed for A-GPS SET Based in the case where no GPS assistance data is required from the network. In this case the SET autonomously calculates a position fix based on the currently available GPS assistance data stored in the SET.

Steps G to N are repeated if so required for calculating any of the remaining position estimates of the periodic triggered session. The last position estimate which – as shown in this case - requires the execution of steps G to N, is shown in steps O to V.

W. After the last position result has been calculated, the SET ends the periodic triggered session by sending a SUPL END message to the H-SPC.

X. The H-SPC informs the H-SLC through a PEND message that the periodic triggered session has ended. PEND contains session-id2.

Y. The H-SLC informs the V-SLC about the end of the periodic triggered session by sending a SUPL END message using an RLP SSRP tunnel message to the V-SLC.

NOTE 4: Note that for A-GPS SET Based mode where the SET calculates the position estimate based on GPS assistance data available in the SET, steps G to N are performed whenever new GPS assistance data is required by the SET.

6.6 SET Initiated Periodic Location Request with Transfer to 3rd Party – Proxy mode

This section describes the flows for SET Initiated Periodic Location Requests with transfer of the position results to a 3rd party.

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6.6.1 Non-Roaming Successful Case

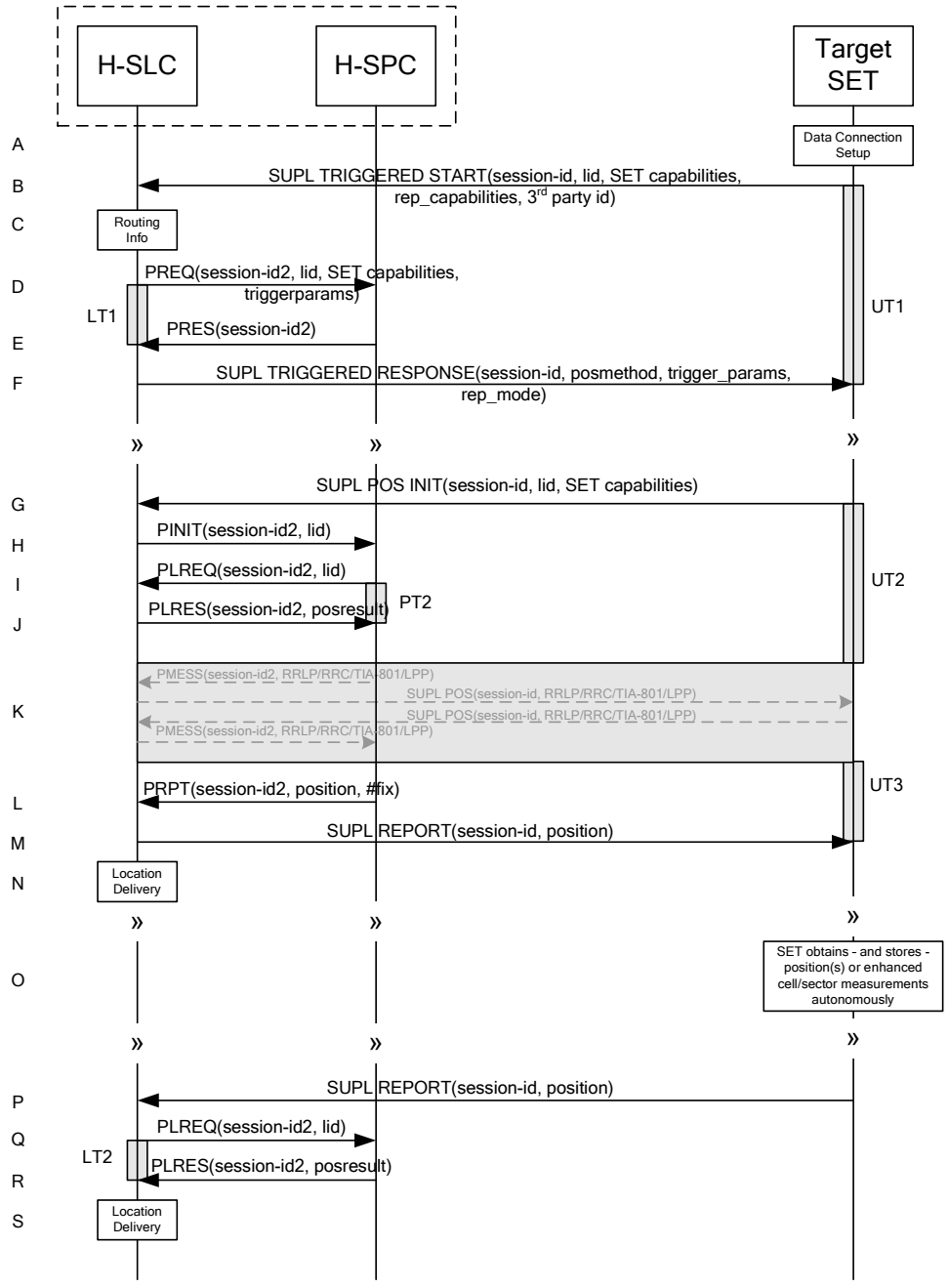

Figure 45: SET Periodic Trigger Service Non-Roaming Successful Case – Proxy Mode (Part I)

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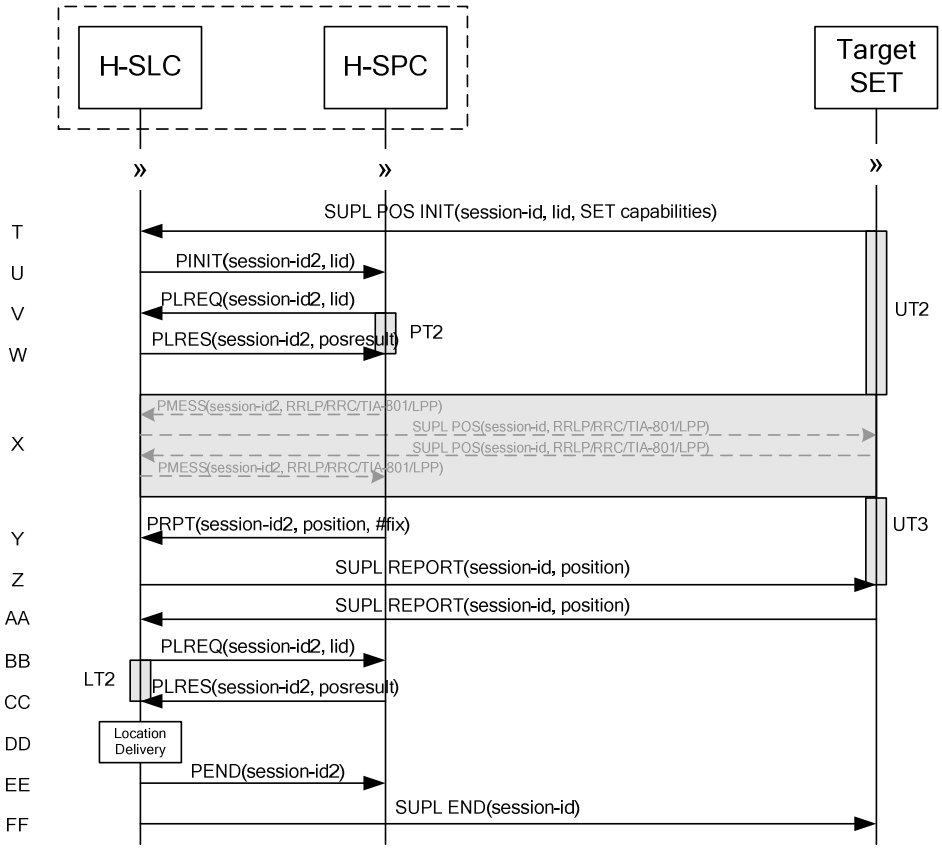

Figure 46: SET Periodic Trigger Service Non-Roaming Successful Case – Proxy Mode (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service with transfer to a 3rd party from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid), periodic trigger parameters and Third Party ID. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently not SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

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F. Consistent with the SUPL TRIGGERED START message including the SET capabilities of the SET, the H-SPC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLP SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC SHALL respond with a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE contains the session-id but no H-SLC address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL TRIGGERED RESPONSE also contains the posmethod. The SET and the H-SLC MAY release the secure connection.

G. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id and the Location ID (lid) and the SET capabilities parameter. The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the H-SLC MAY directly proceed to step M and not engage in a SUPL POS session.

H. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id and SET capabilities. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step E, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step D. If a coarse position calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

I. If the H-SPC cannot translate the lid received in step H into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into coarse position itself.

J. This step is conditional and only occurs if step I was performed. The H-SLC calculates a coarse position based on lid and reports the result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

K. The SET and the H-SLP exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines). The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

L. Once the position calculation is complete the H-SPC sends a PRPT message to the H-SLC. PRPT contains the session-id2, the position result if calculated in H-SPC and the number of the fix.

M. The H-SLC sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the H-SLP. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the H-SLP and therefore needs to be included in the message for batch reporting mode.

If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the H-SLP) steps G to H are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLP using a SUPL REPORT message containing the session-id and the position estimate.

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N. This step is optional: Once the position calculation is complete and if real time or quasi-real time reporting is used, the H-SLC delivers the position estimate(s) to the 3rd party. If the reporting mode is set to batch reporting, this message is not used.

O. This step is optional: If the SET cannot communicate with the H-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported - perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the H-SLP.

P. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the session-id and the position result(s) including date and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step F. If no criteria are received in step F, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

Q. This step is optional: if the SUPL REPORT message in step P contained enhanced cell/sector measurements and the H-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step P.

R. This step is conditional and only used if step Q occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

S. The H-SLC delivers the position estimate(s) to the 3rd party.

When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps T to Z may be performed (a repeat of steps G to M). Alternatively - and if applicable - step O is repeated.

AA. This step is optional and is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due, and at any time up until step EE, if and as soon as all the following conditions apply:

i. Batch reporting or quasi-real time reporting is used.

ii. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.

iii. The SET is able to establish communication with the H-SLP

iv. In the case of batch reporting, the conditions for sending have arisen (e.g. the conditions define sending after the last position estimate is obtained).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step F. If no criteria are received in step F, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

BB. This step is optional: if the SUPL REPORT message in step AA contained enhanced cell/sector measurements and the H-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step AA.

CC. This step is conditional and only used if step BB occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

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DD. The H-SLC delivers the reported and/or calculated historical position estimate(s) to the 3d party.

EE. After the last position result has been reported to the 3rd party in step DD or following some timeout on not receiving stored position estimates in step AA, the H-SLC informs the H-SPC about the end of the periodic triggered session by sending a PEND message. PEND contains session-id2.

FF. The H-SLC ends the periodic triggered session by sending a SUPL END message to the SET.

6.6.2 Roaming with V-SLP Positioning Successful Case

SUPL Roaming where the V-SLP is involved in the position calculation.

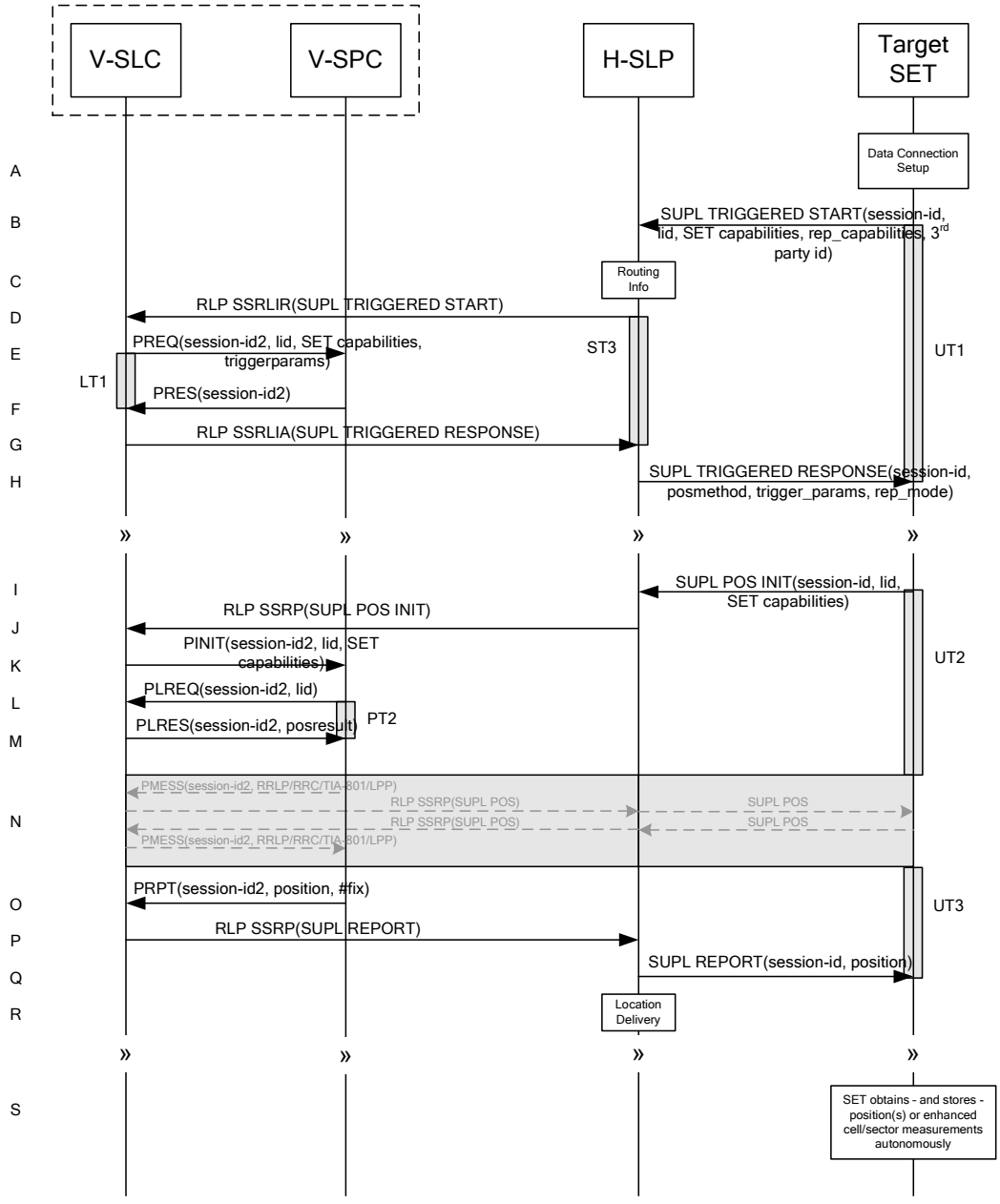

Figure 47: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with V-SLP positioning (Part I)

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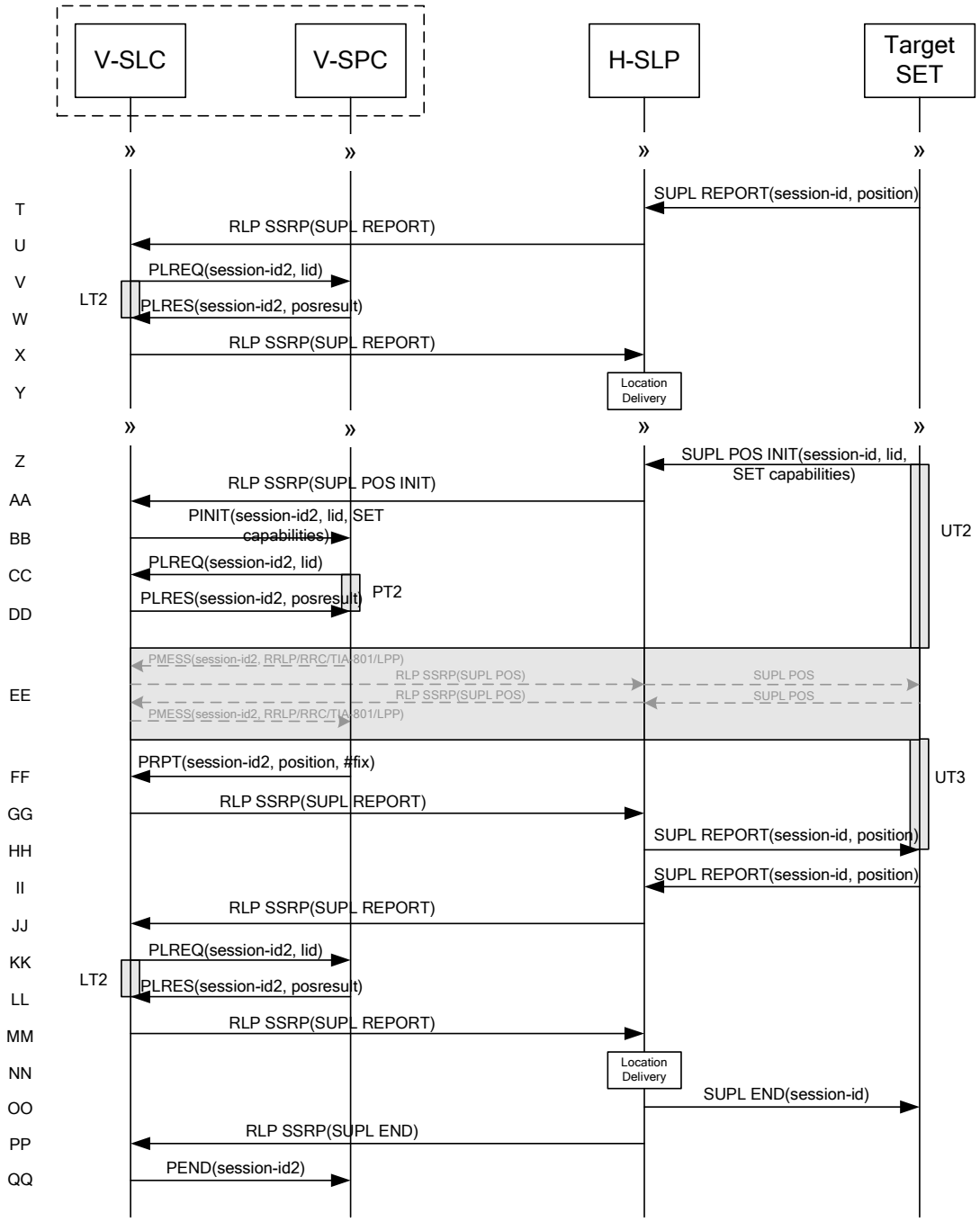

Figure 48: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with V-SLP positioning (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service with transfer to a 3rd party from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLP and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid), periodic trigger parameters and Third Party ID. The SET capabilities include

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the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLP verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. Based on the received lid or other method, the H-SLC determines the V-SLP and sends an SSRLIR SUPL TRIGGERED START message over RLP tunnel to the V-SLC.

E. The V-SLC requests service from the V-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY optionally contain the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

F. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

G. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the V-SLC MAY determine the posmethod. If the V-SPC included a list of supported posmethods in step F, the chosen posmethod SHALL be on this list. If required for the posmethod, the V-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The V-SLC responds with a SUPL TRIGGERED RESPONSE tunnelled over RLP in a SSRLIA message back to the H-SLP that it is capable of supporting this request. The SUPL TRIGGERED RESPONSE contains at least the sessionid and posmethod.

H. The H-SLP forwards the SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE contains the session-id but no H-SLP address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL TRIGGERED RESPONSE also contains the posmethod. The SET and the H-SLP MAY release the secure connection.

I. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the H-SLP to start a positioning session with the V-SLP. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If the SUPL POS INIT message contains a position that meets any required QoP, the H-SLP MAY directly proceed to step Q.

J. The H-SLP forwards the SUPL POS INIT message to the V-SLC using a RLP SSRP message.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the V-SLC MAY directly proceed to step P and not engage in a SUPL POS session.

K. The V-SLC sends a PINIT message to the V-SPC including session-id2, location id and SET capabilities. The V-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the V-SPC in step F, or a different posmethod of the V-SLC's choosing, as long as it is one supported by the V-SPC. Based on the PINIT message including the SET capabilities, the V-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the V-SLC, the V-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the V-SPC shall choose any posmethod in line with the SET capabilities which was approved by the V-SLC in step E. If a coarse position calculated based on information received in the PINIT message is available that meets the required QoP, the V-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

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L. If the V-SPC cannot translate the lid received in step K into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into coarse position itself.

M. This step is conditional and only occurs if step L was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets any required QoP, the V-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

N. The SET and the V-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SPC and the V-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SLC and the H-SLC using SUPL POS over RLP tunnel messages. The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages. The flow sequence PMESS – RLP SSRP(SUPL POS) – SUPL POS – SUPL POS – RLP SSRP(SUPL POS) – PMESS is conceptually shown in dotted lines.
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

O. Once the position calculation is complete, the V-SPC sends a PRPT message to the V-SLC. PRPT contains the session-id2, the position result if calculated in V-SPC and the number of the fix.

P. Once the position calculation is complete, the V-SLC sends a SUPL REPORT message to the H-SLP in an RLP tunnel using an SSRP message.

Q. The H-SLC sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the H-SLP. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the H-SLP and therefore needs to be included in the message for batch reporting mode.

If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the H-SLP) steps I to Q are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLC using a SUPL REPORT message containing the session-id and the position estimate.

R. This step is optional: once the position calculation is complete and if real time or quasi-real time reporting is used, the H-SLP delivers the received position estimate to the 3rd party. If the reporting mode is set to batch reporting, this message is not used.

S. This step is optional: if the SET cannot communicate with the H-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported – perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the H-SLP.

T. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLP. The SUPL REPORT message contains the session-id and the position result(s) including data and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step H. If no criteria are received in step H, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

U. This step is optional: if in step T the SET sent enhanced cell/sector measurements, the H-SLP needs to engage the help of the V-SLP to translate the enhanced cell/sector measurements into actual position estimates. To this end the

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H-SLP sends the received enhanced cell/sector measurements in a SUPL REPORT message to the V-SLC using an SSRP message over RLP tunnel.

V. This step is optional: if the SUPL REPORT message in step U contained enhanced cell/sector measurements and the V-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the V-SLC sends a PLREQ message to the V-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step U.

W. This step is conditional and only used if step V occurred: the V-SPC returns the calculated position estimates to the V-SLC in a PLRES message. PLRES contains session-id2 and the position results.

X. This step is optional: if in step U the V-SLC received enhanced cell/sector measurements, the results of the translation into position estimate need to be returned to the H-SLP. To this end a SUPL REPORT message is sent to the H-SLP. The SUPL REPORT message is carried within an SSRP message over RLP tunnel.

Y. The H-SLC delivers the reported and/or calculated position estimate(s) to the 3rd party.

When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps Z to HH may be performed (a repeat of steps I to Q). Alternatively – and if applicable – step S is repeated.

II. This step is optional and is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due, and at any time up until step OO, if and as soon as all of the following conditions apply:

i. Batch reporting or quasi-real time reporting is used.

ii. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLP.

iii. The SET is able to establish communication with the H-SLP.

iv. In the case of batch reporting, the conditions for sending have arisen (e.g. the conditions define sending after the last position estimate is obtained).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLP. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step H. If no criteria are received in step H, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

JJ. This step is optional: if in step II the SET sent enhanced cell/sector measurements, the H-SLP needs to engage the help of the V-SLP to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLP sends the received enhanced cell/sector measurements in a SUPL REPORT message to the V-SLC using an SSRP message over RLP tunnel.

KK. This step is optional: if the SUPL REPORT message in step JJ contained enhanced cell/sector measurements and the V-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the V-SLC sends a PLREQ message to the V-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step JJ.

LL. This step is conditional and only used if step KK occurred: the V-SPC returns the calculated position estimates to the V-SLC in a PLRES message. PLRES contains session-id2 and the position results.

MM. This step is optional: if in step JJ the V-SLC received enhanced cell/sector measurements, the results of the translation into position estimate need to be returned to the H-SLP. To this end a SUPL REPORT message is sent to the H-SLP. The SUPL REPORT message is carried within an SSRP message over RLP tunnel.

NN. The H-SLC delivers the reported and/or calculated historical position estimate(s) to the 3rd party.

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OO. After the last position result has been reported to the 3rd party in step NN, or following some timeout on not receiving stored position estimates in step II, the H-SLC ends the periodic triggered session by sending a SUPL END message to the SET.

PP. The H-SLC informs the V-SLC about the end of the periodic triggered session by sending a SUPL END message using an RLP SSRP tunnel message.

QQ. The V-SLC ends the periodic triggered session with the V-SPC by sending a PEND message. PEND contains the session-id2.

6.6.3 Roaming with H-SLP Positioning Successful Case

SUPL Roaming where the H-SLP is involved in the position calculation.

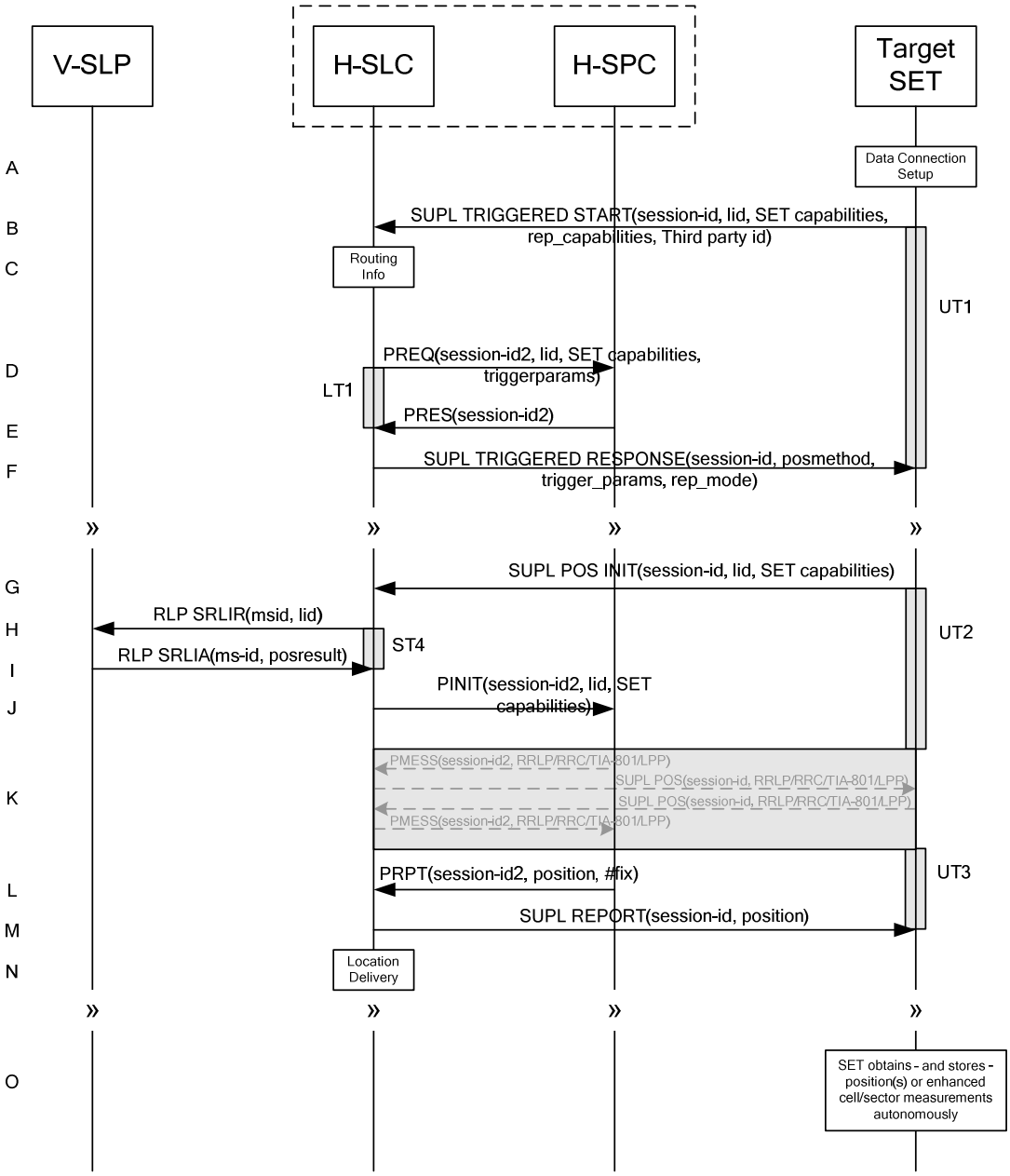

Figure 49: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with H-SLP positioning (Part I)

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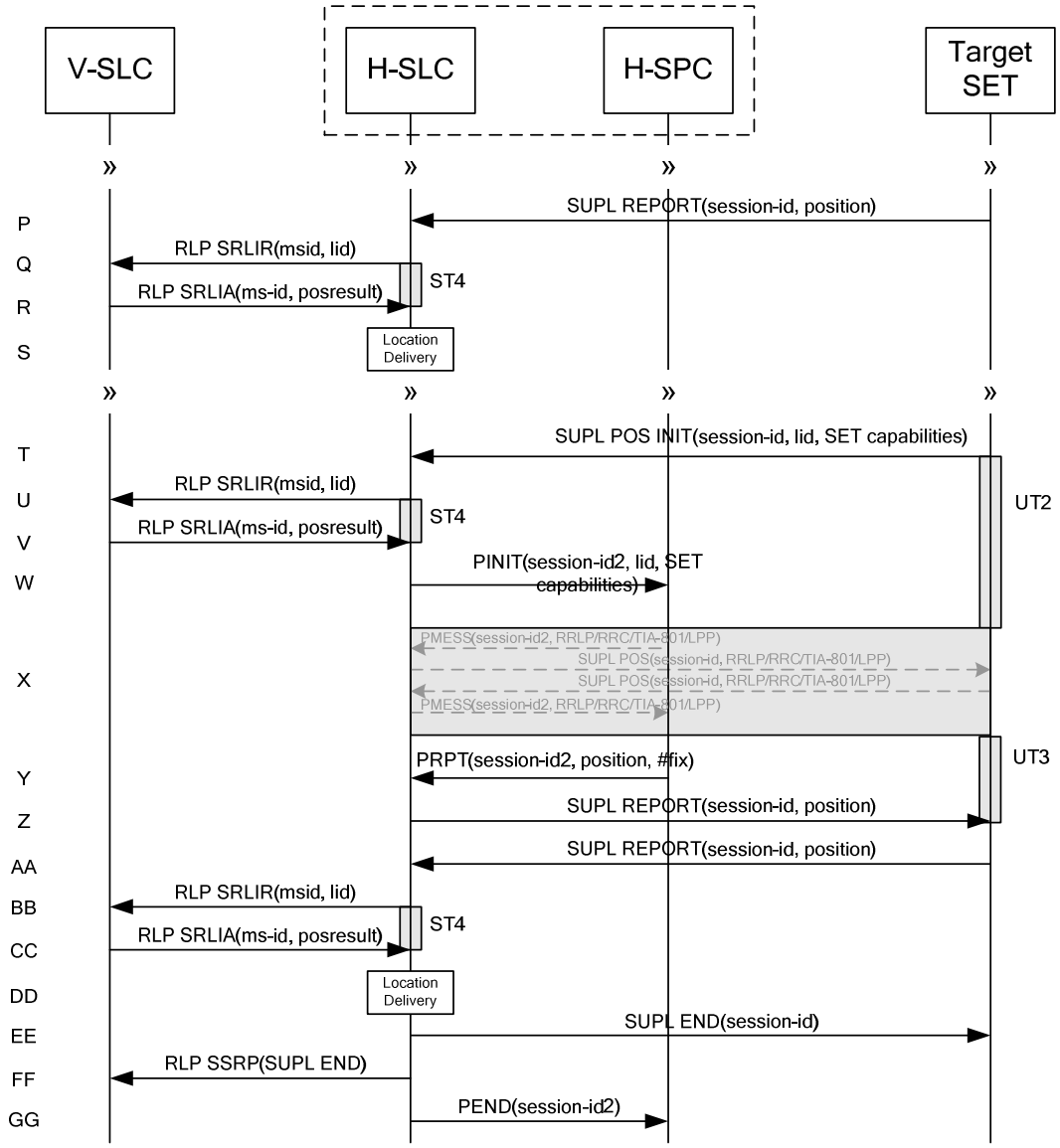

Figure 50: SET Initiated Periodic Trigger Service Roaming Successful Case – Proxy with H-SLP positioning (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service with transfer to a 3rd party from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid), periodic trigger parameters and Third Party ID. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

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D. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

F. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC sends a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE contains the session-id but no H-SLP address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL TRIGGERED RESPONSE also contains the posmethod. The SET and the H-SLC MAY release the secure connection.

G. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the H-SLC to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If the SUPL POS INIT message contains a position that meets any required QoP, the H-SLC MAY directly proceed to step M and not engage in a SUPL POS session.

H. To obtain a coarse position based on lid received in step G, the H-SLC sends an RLP SRLIR message to the V-SLP.

I. The V-SLP translates the received lid into a position estimate and returns the result to the H-SLC in an RLP SRLIA message.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the H-SLC MAY directly proceed to step M and not engage in a SUPL POS session.

J. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id, SET capabilities and position estimate (i.e. coarse position received from the V-SLC in the previous step). The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step E, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step D.

K. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

L. Once the position calculation is complete, the H-SPC sends a PRPT message to the H-SLC. PRPT contains the session-id2, the position result if calculated in H-SPC and the number of the fix.

M. The H-SLC sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the H-SLC. If the reporting mode is batch reporting, the SET stores

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all calculated position estimates. In SET Assisted mode the position is calculated by the H-SLP and therefore needs to be included in the message for batch reporting mode.

If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the H-SLP) steps G to M are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLP using a SUPL REPORT message containing the session-id and the position estimate.

N. This step is optional: once the position calculation is complete and if real time or quasi-real time reporting is used the H-SLC delivers the calculated position estimate to the 3rd party. If the reporting mode is set to batch reporting, this message is not used.

O. This step is optional: if the SET cannot communicate with the H-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported – perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the H-SLP.

P. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the session-id and the position result(s) including data and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step F. If no criteria are received in step F, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

Q. This step is optional: if in step P the SET sent enhanced cell/sector measurements, the H-SLC needs to engage the help of the V-SLP to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLC sends an RLP SRLIR message to the V-SLP.

R. This step is optional and only takes place if step Q has occurred: The V-SLP translates the received enhanced cell/sector measurements into position estimates and returns the results to the H-SLC in an RLP SRLIA message.

S. The H-SLC delivers the reported and/or calculated position estimate(s) to the 3rd party.

When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps T to Z may be performed (a repeat of steps G to M). Alternatively – and if applicable – step O is repeated.

AA. This step is optional and is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due, and at any time up until step EE, if and as soon as all of the following conditions apply:

i. Batch reporting or quasi-real time reporting is used.

ii. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.

iii. The SET is able to establish communication with the H-SLP.

iv. In the case of batch reporting, the conditions for sending have arisen (e.g. the conditions define sending after the last position estimate is obtained).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step F. If no criteria are received in step F, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

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BB. This step is optional: if in step AA the SET sent enhanced cell/sector measurements, the H-SLC needs to engage the help of the V-SLP to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLC sends an RLP SRLIR message to the V-SLP.

CC. This step is optional and only takes place if step BB has occurred: after receiving the enhanced cell/sector measurements the V-SLP translates the received enhanced cell/sector measurements into position estimates and returns the results to the H-SLC in an RLP SRLIA message.

DD. The H-SLC delivers the reported and/or calculated historical position estimate(s) to the 3rd party.

EE. After the last position result has been reported to the 3rd party in step DD, or following some timeout on not receiving stored position estimates in step AA, the H-SLC ends the periodic triggered session by sending a SUPL END message to the SET.

FF. The H-SLC informs the V-SLP about the end of the periodic triggered session by sending a SUPL END message using an SSRP message over RLP tunnel.

GG. The H-SLC informs the H-SPC about the end of the periodic triggered session in a PEND message. PEND contains session-id2.

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6.7 SET Initiated Periodic Location Request with Transfer to 3rd Party – Non-Proxy mode

6.7.1 Non-Roaming Successful Case

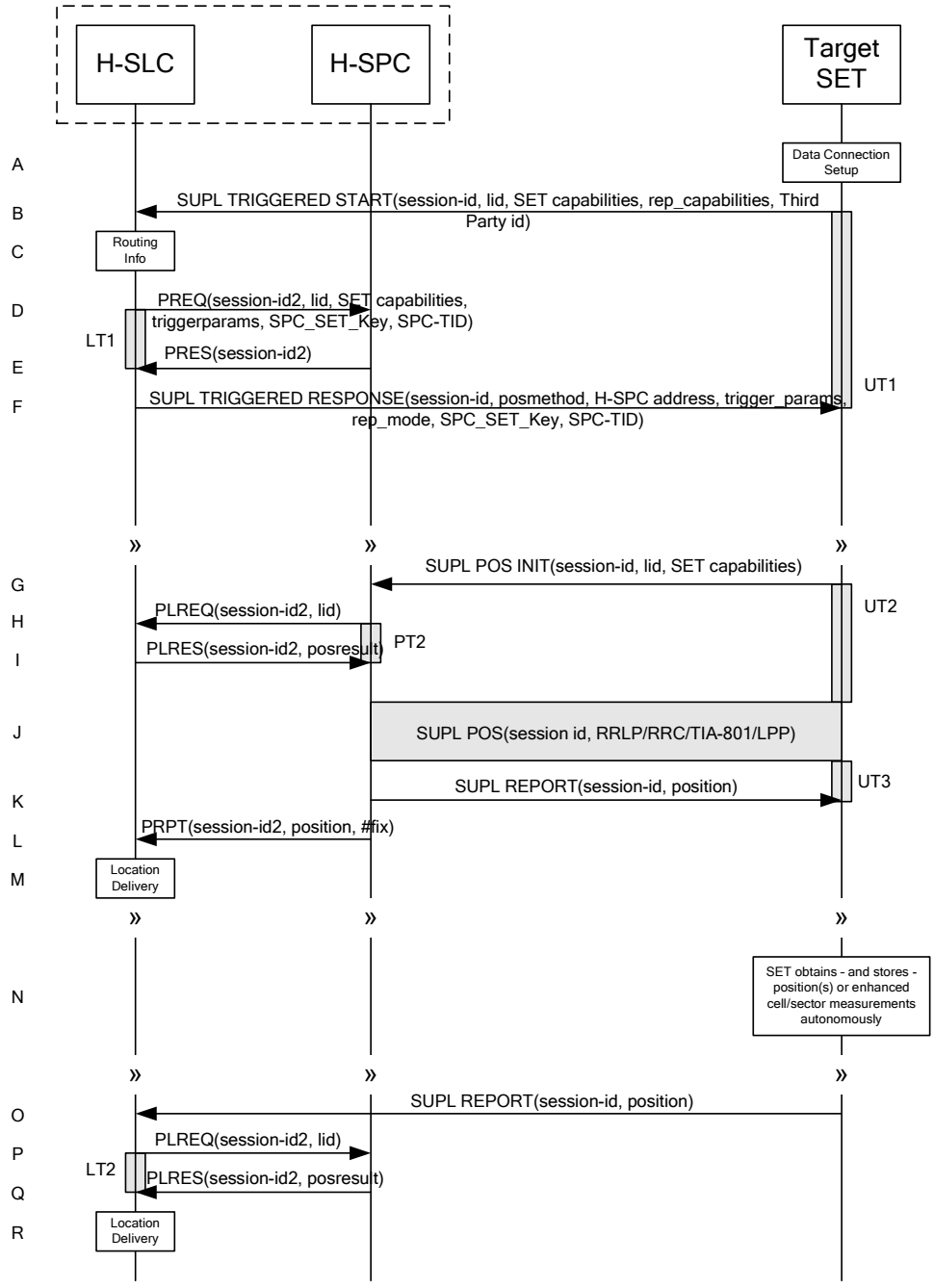

Figure 51: SET Initiated Periodic Trigger Service Non-Roaming Successful Case – Non-Proxy Mode (Part I)

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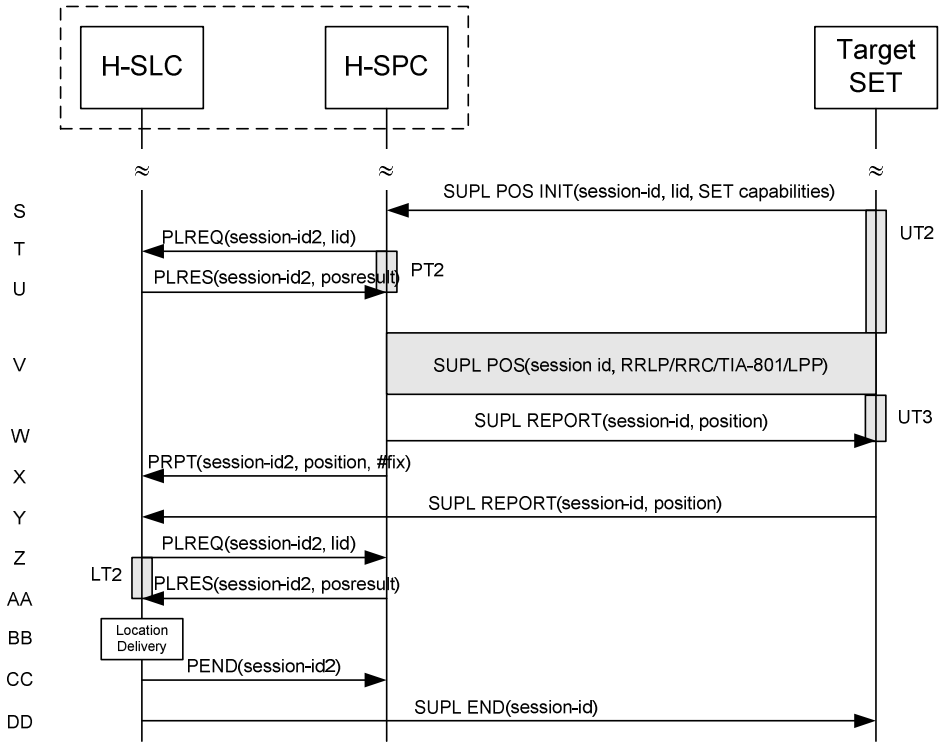

Figure 52: SET Initiated Periodic Trigger Service Non-Roaming Successful Case – Non-Proxy Mode (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service with transfer to a 3rd party from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid), periodic trigger parameters and Third Party ID. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently not SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid The H-SLC also creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. SPC_SET_Key and SPC-TID are forwarded to the H-SPC. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

F. Consistent with the SUPL TRIGGERED START message including the SET capabilities of the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen

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posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC SHALL respond with a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains session-id, posmethod, H-SPC address and SPC_SET_Key and SPC-TID for mutual H-SPC/SET authentication. The SET and the H-SLC MAY release the secure connection.

G. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.

H. If the H-SPC cannot translate the lid received in step G into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into coarse position itself.

I. This step is conditional and only occurs if step H was performed. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets any required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.

J. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step D, the H-SPC SHALL only choose an approved method. The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

K. Once the position calculation is complete the H-SPC sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the H-SPC. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the H-SPC and therefore needs to be included in the message for batch reporting mode.

L. This step is optional: Once the position calculation is complete and if real time or quasi-real time reporting is used the H-SPC sends the position estimate in a PRPT message to the H-SLC. PRPT contains the session-id2, the position result and the number of the fix. This message is optional and only used if the position was calculated by the H-SPC i.e. in SET Assisted mode.

   If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the H-SLP) steps G to L are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLC using a SUPL REPORT message containing the session-id and the position estimate.

M. This step is optional: once the position calculation is complete and if real time or quasi-real time reporting is used, the H-SLC delivers the position estimate to the 3rd party. If the reporting mode is set to batch reporting, this message is not used.

N. This step is optional: If the SET cannot communicate with the H-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported - perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the H-SLP.

O. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position

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estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the session-id and the position result(s) including date and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step F. If no criteria are received in step F, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

P. This step is optional: if the SUPL REPORT message in step O contained enhanced cell/sector measurements and the H-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step O.

Q. This step is conditional and only used if step P occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

R. The H-SLC delivers the reported and/or calculated position estimate(s) to the 3rd party.

When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps S to X may be performed (a repeat of steps G to L). Alternatively - and if applicable - step N is repeated.

Y. This step is optional and is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due, and at any time up until step CC, if and as soon as all the following conditions apply:

i. Batch reporting or quasi-real time reporting is used.

ii. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.

iii. The SET is able to establish communication with the H-SLP

iv. In the case of batch reporting, the conditions for sending have arisen (e.g. the conditions define sending after the last position estimate is obtained).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step F. If no criteria are received in step F, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

Z. This step is optional: if the SUPL REPORT message in step Y contained enhanced cell/sector measurements and the H-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step Y.

AA. This step is conditional and only used if step Z occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

BB. The H-SLC delivers the reported and/or calculated historical position estimate(s) to the 3rd party.

CC. After the last position result has been reported to the 3rd party in step BB the H-SLC informs the H-SPC about the end of the periodic triggered session by sending a PEND message. PEND contains the session-id2.

DD. The H-SLC ends the periodic triggered session by sending a SUPL END message to the SET. Please note that if the last position was calculated in step V and step Y was not performed, the SUPL END message is sent from the H-SPC to the SET (as opposed to from the H-SLC to the SET).

6.7.2 Roaming with V-SPC Positioning Successful Case

SUPL Roaming where the V-SPC is involved in the position calculation.

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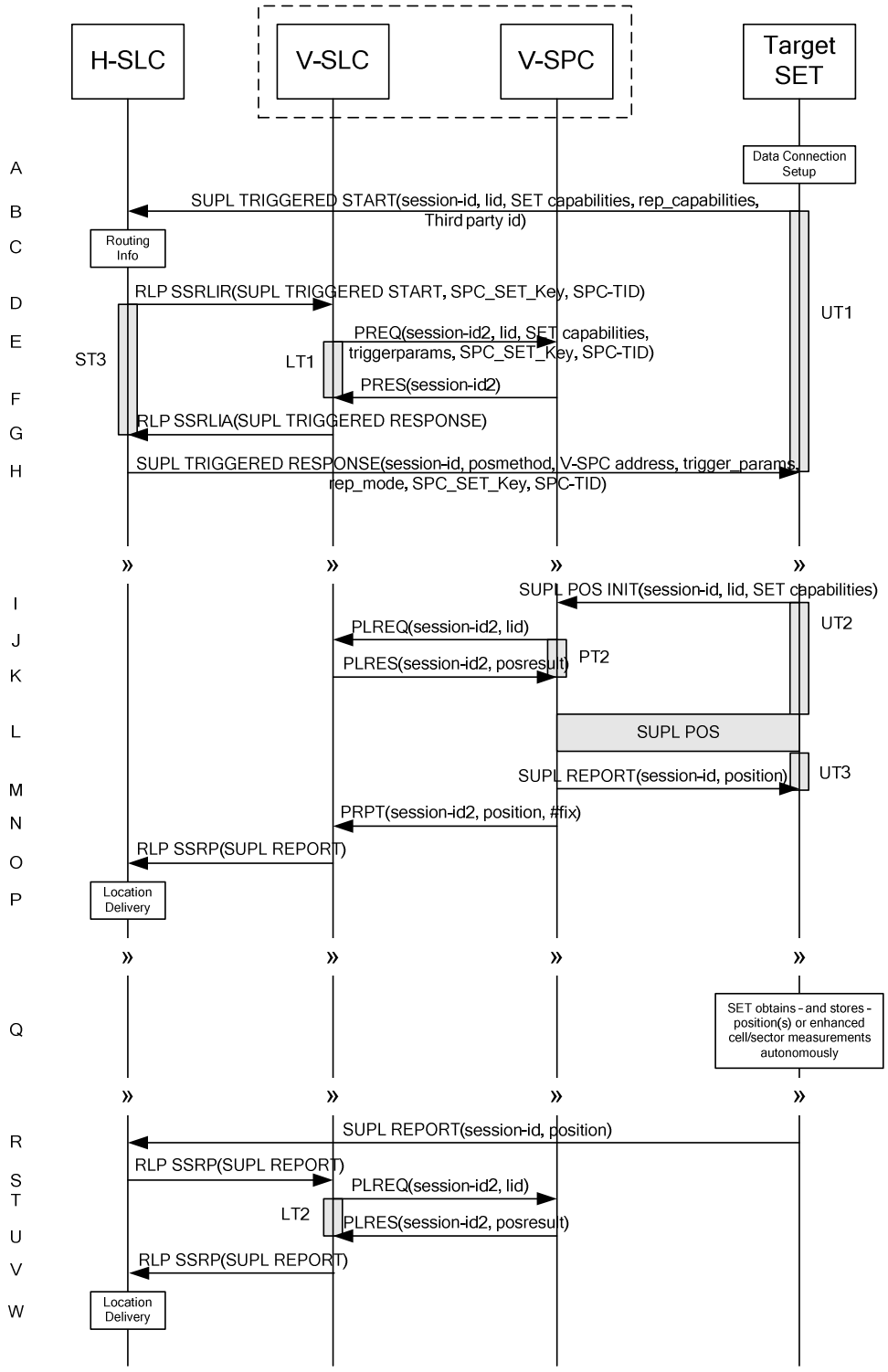

Figure 53: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning (Part I)

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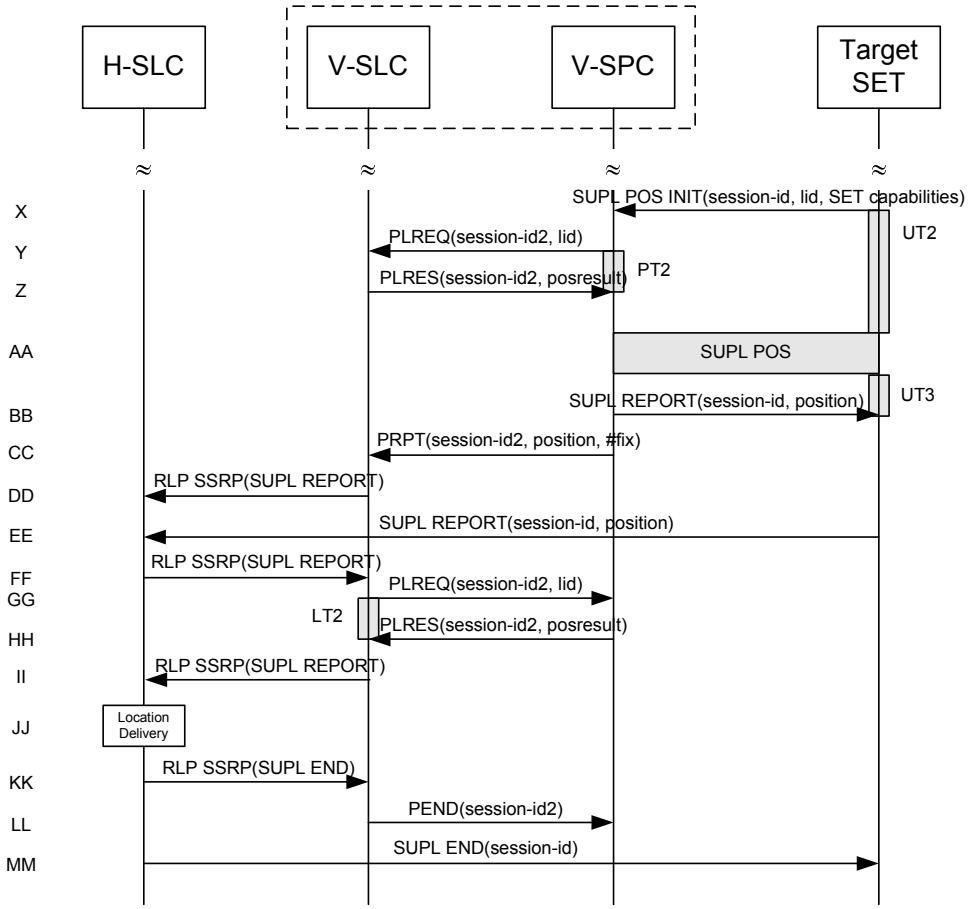

Figure 54: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service with transfer to a 3rd party from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid), periodic trigger parameters and Third Party ID. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. Based on the received lid or other mechanisms, the H-SLC determines the V-SLP and sends an RLP SSRLIR including a SUPL TRIGGERED START message to the V-SLC to inform the V-SLP that a periodic triggered session is in the progress of being initiated. The H-SLC also creates SPC_SET_Key and SPC-TID to be used for mutual V-SPC/SET authentication and sends it as part of the RLP SSRLIR message to the V-SLC.

E. The V-SLC requests service from the V-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY also optionally

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contain the QoP. The PREQ message also contains SPC_SET_Key and SPC-TID for mutual V-SPC/SET authentication. The V-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

F. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

G. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the V-SLC MAY determine the posmethod. If the V-SPC included a list of supported posmethods in step F, the chosen posmethod SHALL be on this list. If required for the posmethod, the V-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The V-SLC responds with a SUPL TRIGGERED RESPONSE tunnelled over RLP in a SSRLIA message back to the H-SLC that it is capable of supporting this request. The SUPL TRIGGERED RESPONSE contains at least the sessionid, posmethod and the V-SPC address.

H. The H-SLC sends a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains session-id, posmethod, V-SPC address, and SPC_SET_Key and SPC-TID for mutual V-SPC/SET authentication. The SET and the H-SLC MAY release the secure connection.

I. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the V-SPC to start a positioning session with the V-SPC. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the V-SPC MAY directly proceed to step M and not engage in a SUPL POS session.

J. If the V-SPC cannot translate the lid received in step I into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into coarse position itself.

K. This step is conditional and only occurs if step J was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets any required QoP, the V-SPC MAY directly proceed to step M and not engage in a SUPL POS session.

L. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the V-SPC SHALL determine the posmethod. If the V-SLC included its approved positioning methods in step E, the V-SPC SHALL only choose an approved method. The SET and the V-SPC exchange several successive positioning procedure messages.
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

M. Once the position calculation is complete the V-SPC sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the V-SPC. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the V-SPC and therefore needs to be included in the message for batch reporting mode.

N. This step is optional: once the position calculation is complete and real time or quasi-real time reporting is used, the V-SPC sends the position estimate in a PRPT message to the V-SLC. PRPT contains the session-id2, the position result and the number of the fix. This message is optional and only used if the position was calculated by the V-SPC i.e. in SET Assisted mode.

O. This step is conditional and is only used after step N occurred. The V-SLC sends the position estimate to the H-SLC in a SUPL REPORT message. The SUPL REPORT message includes at a minimum the session-id and the position estimate. The SUPL REPORT message is carried within an RLP SSRP message.

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If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not require an assistance data update from the H-SLP) steps I to N are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLC using a SUPL REPORT message containing the session-id and the position estimate.

P. This step is optional: if real time or quasi-real time reporting is used, the H-SLC delivers the position estimate received to the 3rd party. If the reporting mode is set to batch reporting, this message is not needed.

Q. This step is optional: If the SET cannot communicate with the V-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported - perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case, of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the V-SLP.

R. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP/V-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the session-id and the position result(s) including date and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step H. If no criteria are received in step H, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

S. This step is optional: if the H-SLC received stored enhanced cell/sector measurements in the SUPL REPORT message in step R, the V-SLP may need to be involved to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLC sends a SUPL REPORT message to the V-SLC using an SSRP message over RLP tunnel.

T. This step is optional: if the SUPL REPORT message in step S contained enhanced cell/sector measurements and the V-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the V-SLC sends a PLREQ message to the V-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step S.

U. This step is conditional and only used if step T occurred: the V-SPC returns the calculated position estimates to the V-SLC in a PLRES message. PLRES contains session-id2 and the position results.

V. This step is conditional and takes place after step S and - optionally - steps T and U. A SUPL REPORT message containing position estimates calculated from enhanced cell/sector measurements received in step S is sent from the V-SLC to the H-SLC using an SSRP message over RLP tunnel.

W. The H-SLC delivers the reported and/or calculated position estimate(s) to the 3rd party.

When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps X to DD may be performed (a repeat of steps I to N). Alternatively – and if applicable – step Q is repeated.

EE. This step is optional and is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due, and at any time up until step KK, if and as soon as all the following conditions apply:

i. Batch reporting or quasi-real time reporting is used.

ii. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.

iii. The SET is able to establish communication with the H-SLP.

iv. In the case of batch reporting, the conditions for sending have arisen (e.g. the conditions define sending after the last position estimate is obtained).

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The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step H. If no criteria are received in step H, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

FF. This step is optional: if the H-SLC received stored enhanced cell/sector measurements in the SUPL REPORT message in step EE, the V-SLP may need to be involved to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLC sends a SUPL REPORT message to the V-SLC using an SSRP message over RLP tunnel.

GG. This step is optional: if the SUPL REPORT message in step EE contained enhanced cell/sector measurements and the V-SPC is required to translate the received enhanced cell/sector measurements into position estimates, the V-SLC sends a PLREQ message to the V-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step EE.

HH. This step is conditional and only used if step GG occurred: the V-SPC returns the calculated position estimates to the V-SLC in a PLRES message. PLRES contains session-id2 and the position results.

II. This step is conditional and takes place after step FF and - optionally - steps GG and HH. A SUPL REPORT message containing position estimates calculated from enhanced cell/sector measurements received in step FF is sent from the V-SLC to the H-SLC using an SSRP message over RLP tunnel.

JJ. The H-SLC delivers the reported and/or calculated historical position estimate(s) to the 3rd party.

KK. After the last position result has been reported to the 3rd party in step JJ, the H-SLC informs the V-SLC about the end of the periodic triggered session through an SUPL END message carried within an SSRP message over RLP tunnel.

LL. The V-SLC informs the V-SPC about the end of the periodic triggered session in a PEND messaage. PEND contains the session-id2.

MM. The H-SLC ends the periodic triggered session with the SET by sending a SUPL END message. The SUPL END message includes at least the session-id. Please note that if the last position was calculated in step AA and step EE was not performed, the SUPL END message is sent from the V-SPC to the SET (as opposed to from the H-SLC to the SET).

6.7.3 Roaming with H-SPC Positioning Successful Case

SUPL Roaming where the H-SPC is involved in the position calculation.

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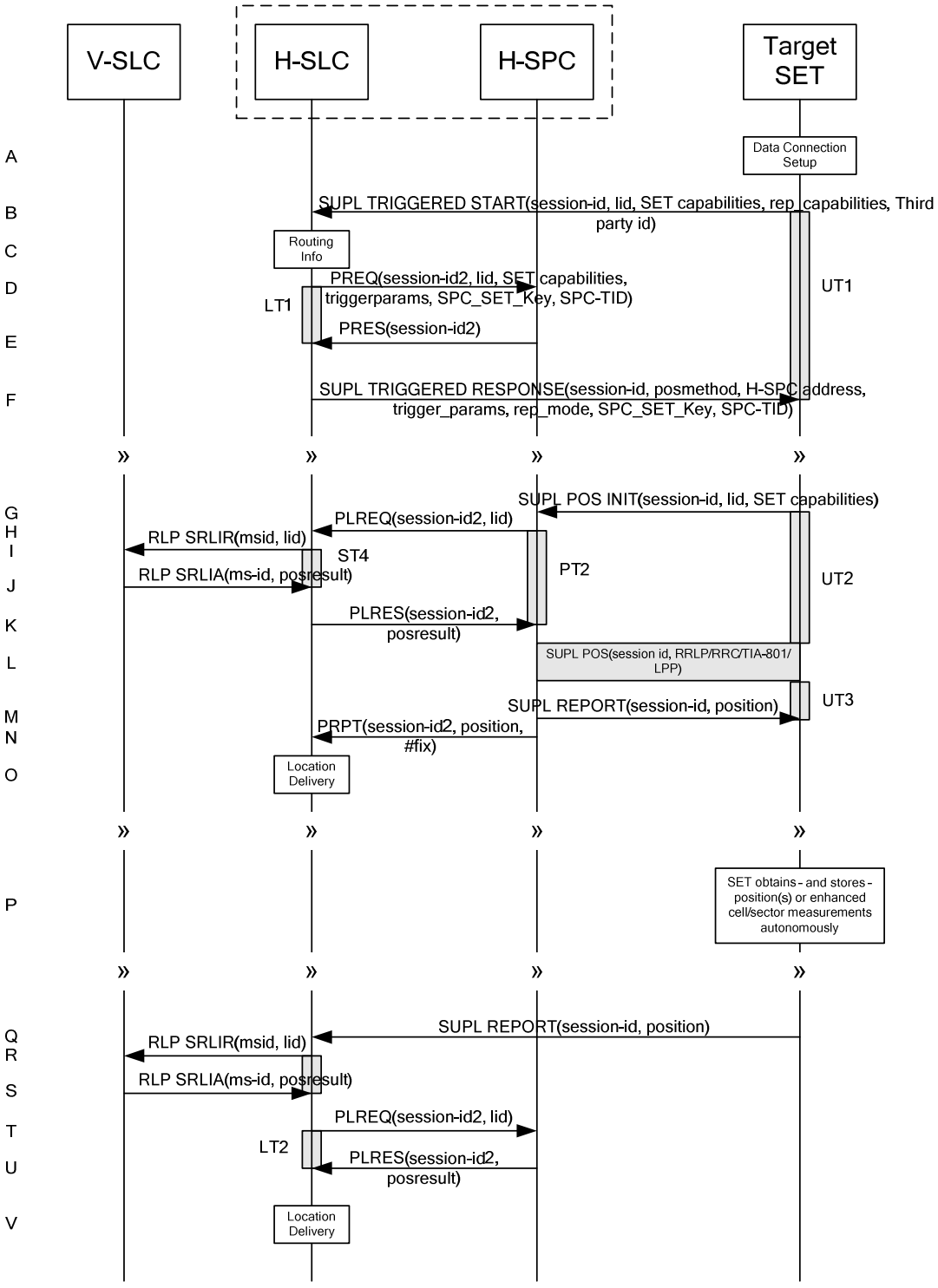

Figure 55: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning (Part I)

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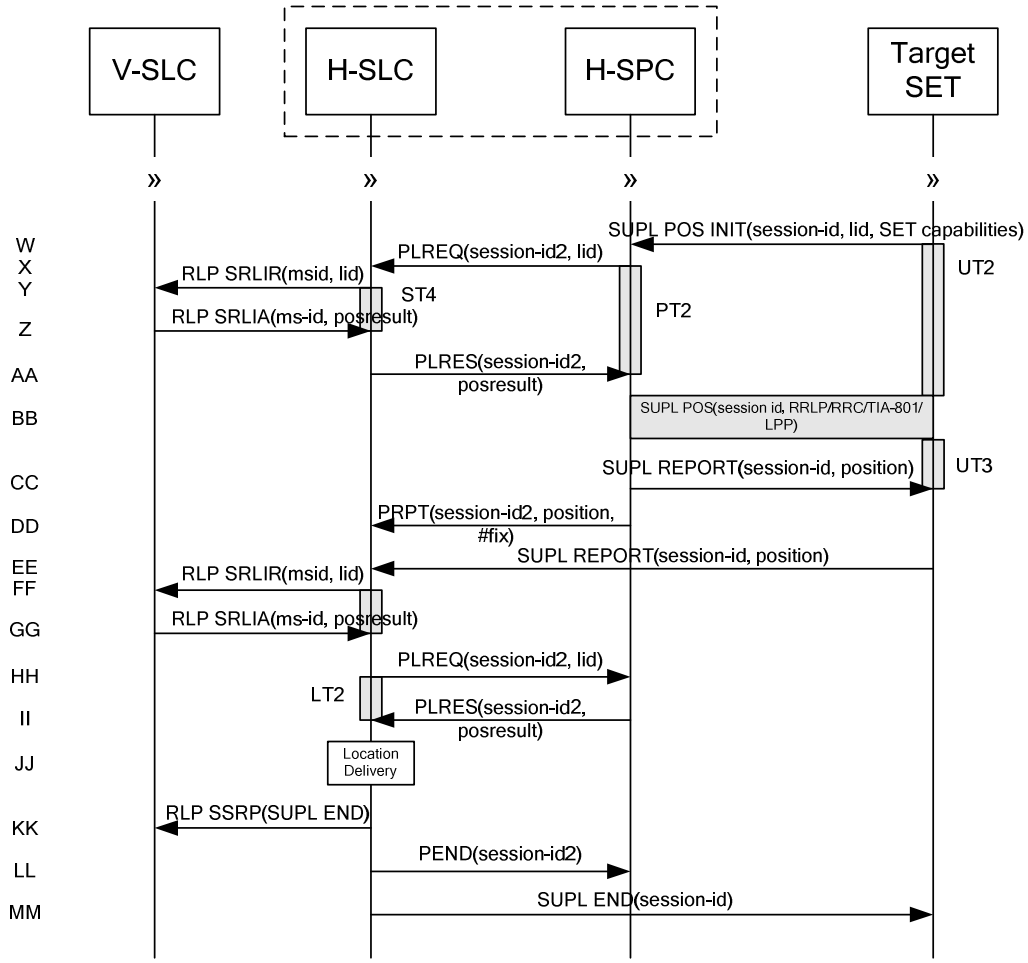

Figure 56: SET Initiated Periodic Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning (Part II)

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for a periodic triggered service with transfer to a 3rd party from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case periodic), Location ID (lid), periodic trigger parameters and Third Party ID. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. The H-SLC requests service from the H-SPC for a periodic triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The H-SLC also creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. SPC_SET_Key and SPC-TID are forwarded to the H-SPC in the PREQ message. The PREQ MAY also optionally contain the QoP. The H-SLC MAY

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include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

F. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC sends a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains session-id, posmethod, H-SPC address and SPC_SET_Key and SPC-TID for mutual H-SPC/SET authentication. The SET and the H-SLC MAY release the secure connection.

G. When the periodic trigger in the SET indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the H-SPC to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If the SUPL POS INIT message contains a position that meets any required QoP, the H-SPC MAY directly proceed to step M.

H. To translate the lid received in step G into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid.

I. To obtain a coarse position the H-SLC sends an RLP SRLIR message to the V-SLP.

J. The V-SLP translates the received lid into a position estimate and returns the result to the H-SLC in an RLP SRLIA message.
For real-time or quasi-real time reporting, if the returned position meets the required QoP, the H-SLC SHALL directly proceed to step N and not engage in a SUPL POS session. For batch reporting, if the returned position meets any required QoP, the H-SLC MAY send the position result through internal communication to the H-SPC (step K) and the H-SPC will forward the position result to the SET using a SUPL REPORT message (step M) without engaging in a SUPL POS session (step L).

K. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets any required QoP, the H-SPC MAY directly proceed to step M and not engage in a SUPL POS session.

L. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step D, the H-SPC SHALL only choose an approved method. The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

M. Once the position calculation is complete the H-SPC sends the SUPL REPORT message to the SET informing it that the positioning procedure is completed. The SET MAY release the secure connection to the H-SLP. If the reporting mode is batch reporting, the SET stores all calculated position estimates. In SET Assisted mode the position is calculated by the H-SPC and therefore needs to be included in the message for batch reporting mode.

N. This step is optional: once the position calculation is complete and if real time or quasi-real time reporting is used, the H-SPC sends the position estimate in a PRPT message to the H-SLC. PRPT contains the session-id2, the position result and the number of the fix. This message is optional and only used if the position was calculated by the H-SPC i.e. in SET Assisted mode.

If a SET Based positioning method was chosen which allows the SET to autonomously calculate a position estimate (e.g. autonomous GPS or A-GPS SET Based mode where the SET has current GPS assistance data and does not

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require an assistance data update from the H-SLP) steps G to N are not performed. Instead, the SET autonomously calculates the position estimate and – for real time or quasi-real time reporting – sends the calculated position estimate to the H-SLC using a SUPL REPORT message containing the session-id and the position estimate.

O. This step is optional: if real time or quasi-real time reporting is used, the H-SLC delivers the calculated position estimate to the 3rd party. If the reporting mode is set to batch reporting, this message is not needed.

P. This step is optional: If the SET cannot communicate with the H-SLP (e.g. no radio coverage available) and quasi-real time reporting is used or if batch reporting is used, the SET MAY – if supported - perform SET Based position fixes (autonomous GPS or SET Based A-GPS where the SET has current assistance data) and/or, if allowed by the H-SLP, enhanced cell/sector measurements. In the case, of batch reporting, and if explicitly allowed by the H-SLP, enhanced cell/sector measurements are permitted even when the SET can communicate with the H-SLP.

Q. This step is optional and is executed if batch reporting is used and if any of the conditions for sending batch reports have occurred. It is also executed, once the SET is able to re-establish communication with the H-SLP, if quasi-real time reporting is used if one or more previous reports have been missed. The SET sends the stored position estimates and/or, if allowed, the stored enhanced cell/sector measurements in an unsolicited SUPL REPORT message to the H-SLC. The SUPL REPORT message contains the session-id and the position result(s) including date and time information for each position result and optionally the position method used. In the case of batch reporting, the stored position estimates and/or enhanced cell/sector measurements included in the SUPL REPORT message may be chosen according to criteria received in step F. If no criteria are received in step F, the SET shall include all stored position estimates and/or enhanced cell/sector measurements not previously reported.

R. This step is optional: if the H-SLC received stored enhanced cell/sector measurements in the SUPL REPORT message in step Q, the V-SLP may need to be involved to translate the enhanced cell/sector measurements into actual position estimates. To this end the H-SLC sends an RLP SRLIR message to the V-SLC.

S. This step is conditional and takes place only if step R occurred. The V-SLC sends the position result calculated based on the enhanced cell/sector measurements received in step R to the H-SLC.

T. This step is optional and only takes place if after the translation into a position estimate in steps R and S the H-SPC is required to calculate the position estimate. In this case the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step Q.

U. This step is conditional and only used if step T occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

V. The H-SLC delivers the reported and/or calculated position estimate(s) to the 3rd party.

When the last position estimate needs to be calculated i.e. the end of the periodic triggered session has been reached, steps W to DD may be performed (a repeat of steps G to N). Alternatively – and if applicable – step P is repeated.

EE. This step is optional and is executed after the last position estimate or, if allowed, last set of enhanced cell/sector measurements has been obtained or was due, and at any time up until step KK, if and as soon as all the following conditions apply:

i. Batch reporting or quasi-real time reporting is used.

ii. The SET has stored historic location reports and/or stored historic enhanced cell/sector measurements that have not yet been sent to the H-SLC.

iii. The SET is able to establish communication with the H-SLP.

iv. In the case of batch reporting, the conditions for sending have arisen (e.g. the conditions define sending after the last position estimate is obtained).

The SUPL REPORT message is used to send all or a subset of stored position fixes and/or stored enhanced cell/sector measurements not previously reported to the H-SLC. In the case of batch reporting, the stored position estimates and/or stored enhanced cell/sector measurements included in the SUPL REPORT message may be chosen

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according to criteria received in step F. If no criteria are received in step F, the SET shall include all stored position estimates and/or stored enhanced cell/sector measurements not previously reported.

FF. This step is optional: if the H-SLC received stored enhanced cell/sector measurements in the SUPL REPORT message in step EE, the V-SLP may need to be involved to translate the enhanced cell/sector measurements into actual position estimates To this end the H-SLC sends an RLP SRLIR message to the V-SLC.

GG. This step is conditional and takes place only if step FF occurred. The V-SLC sends the position result calculated based on the enhanced cell/sector measurements received in step FF to the H-SLC.

HH. This step is optional and only takes place if after the translation into a position estimate in steps FF and GG the H-SPC is required to calculate the position estimate. In this case the H-SLC sends a PLREQ message to the H-SPC. The PLREQ message contains the session-id2 and the enhanced cell/sector measurements received in step EE.

II. This step is conditional and only used if step HH occurred: the H-SPC returns the calculated position estimates to the H-SLC in a PLRES message. PLRES contains session-id2 and the position results.

JJ. The H-SLC delivers the reported and/or calculated historical position estimate(s) to the 3rd party.

KK. When the last position result was reported to the 3rd party in step JJ, the H-SLC closes the periodic triggered session with the V-SLC by sending a SUPL END message encapsulated in an SSRP message over RLP tunnel.

LL. The H-SLC informs the H-SPC about the end of the periodic triggered session by sending a PEND message. PEND contains the session-id2.

MM. The H-SLC ends the periodic triggered session with the SET by sending a SUPL END message. The SUPL END message includes at least the session-id. Please note that if the last position was calculated in step BB and step EE was not performed, the SUPL END message is sent from the H-SPC to the SET (as opposed to from the H-SLC to the SET).

6.8 Retrieval of Historical Positions and/or Enhanced Cell Sector Measurements

This section describes the retrieval of stored historical positions and/or enhanced cell/sector measurements. Please note that the concept of non-proxy mode does not apply since the SET is not involved in a positioning session i.e. does not directly communicate with the SPC.

6.8.1 Retrieval of Historical Position Results – non-roaming successful case

The following flow defines the retrieval of historical position results from the SET for non-roaming. In the context of retrieval of historical position and/or enhanced cell/sector measurements non-roaming means that enhanced cell/sector measurements which the SET reports were taken while the SET was not SUPL Roaming.

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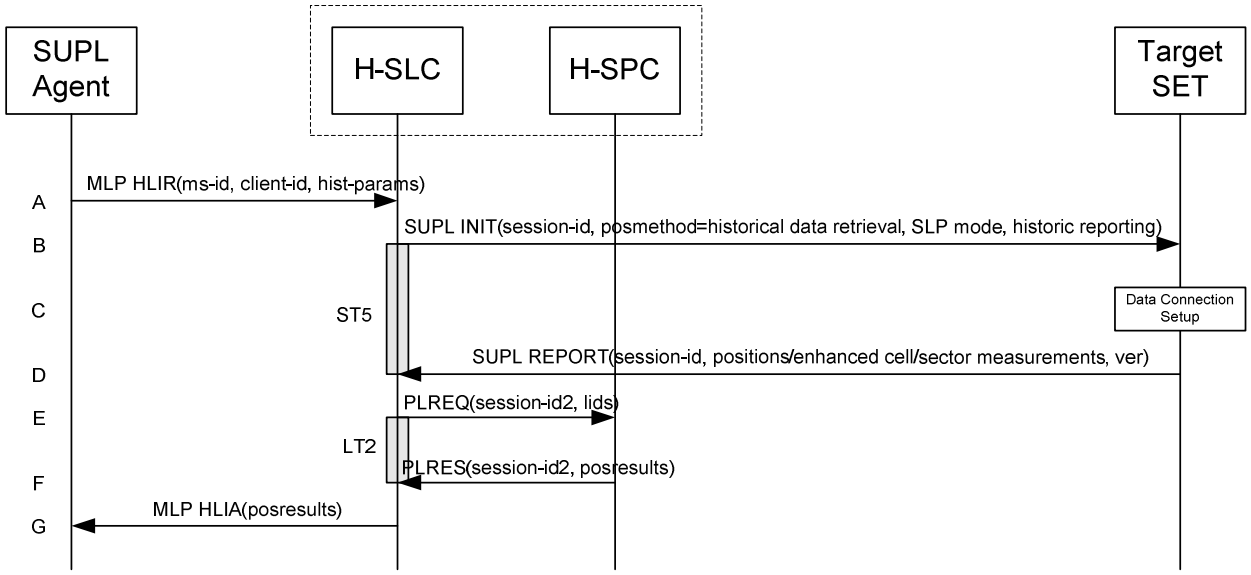

Figure 57: Retrieval of historical positions and/or enhanced cell/sector measurements – non-roaming

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP HLIR message to the H-SLC, with which SUPL Agent is associated. The H-SLC SHALL authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLC SHALL apply subscriber privacy against the client-id. The hist-params parameter in the HLIR message defines criteria to be applied by the SET when selecting historical position to be reported to the SUPL Agent (e.g. time window, QoP, positioning method, etc.).

B. The H-SLC initiates the retrieval of historical positions with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, posmethod, SLP mode, supported network measurements and criteria for selecting stored historical position estimates and/or stored enhanced cell/sector measurements (historic reporting). Historical data retrieval is indicated by posmethod: *historical data retrieval*. If the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL set notification mode to notification based on current location and SHALL NOT include the notification element in the SUPL INIT message; otherwise, the H-SLP SHALL set the notification mode indicator to normal notification and if notification or verification to the target subscriber is needed, the H-SLP SHALL also include the notification element in the SUPL INIT message.Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the message.

C. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

D. The SET will evaluate the Notification rules and follow the appropriate actions. The SET then establishes a secure connection to the H-SLC using an H-SLP address that has been provisioned by the Home Network to the SET. The SET selects historical position estimates and/or historic enhanced cell/sector measurements based on the criteria received in step B and sends the positions and/or enhanced cell/sector measurements in a SUPL REPORT message to the H-SLC. The SUPL REPORT message contains session-id, a hash of the received SUPL INIT message (ver) and positions and/or enhanced cell/sector measurements. After sending the SUPL REPORT message, the SET SHALL release all resources related to this session.

E. This step is optional: if the H-SLC cannot convert received historical enhanced cell/sector measurements into position estimates, it sends the measurements in a PLREQ message to the H-SPC for conversion.

F. This step is optional and only takes place if step E has taken place: the H-SPC sends the converted position estimates back to the H-SLC in a PLRES message.

G. The H-SLC reports the historical position estimates to the SUPL Agent in an MLP HLIA message.

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6.8.2 Retrieval of Historical Position Results – roaming successful case

The following flow defines the retrieval of historical position results from the SET for roaming. In the context of retrieval of historical position and/or enhanced cell/sector measurements roaming means that enhanced cell/sector measurements reported by the SET were taken while the SET was SUPL Roaming.

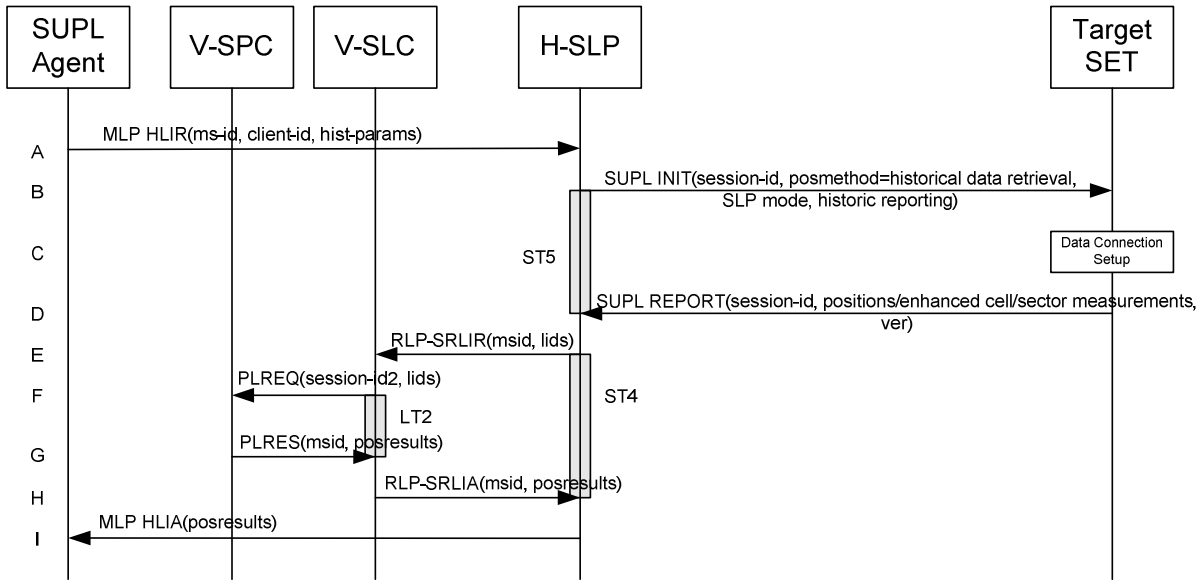

Figure 58: Retrieval of historical positions and/or enhanced cell/sector measurements – roaming

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent issues an MLP HLIR message to the H-SLP, with which SUPL Agent is associated. The H-SLP shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLP shall apply subscriber privacy against the client-id. The hist-params parameter in the HLIR message defines criteria to be applied by the SET when selecting historical position to be reported to the SUPL Agent (e.g. time window, QoP, positioning method, etc.).

B. The H-SLP initiates the retrieval of historical positions with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, posmethod, SLP mode, supported network measurements and criteria for selecting stored historical position estimates and/or stored enhanced cell/sector measurements (historic reporting). Historical data retrieval is indicated by posmethod: *historical data retrieval*. If the result of the privacy check in Step A indicates that notification or verification to the target subscriber is needed, the H-SLP SHALL also include the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent, the H-SLP also computes and stores a hash of the message.

C. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

D. The SET will evaluate the Notification rules and follow the appropriate actions. The SET then establishes a secure connection to the H-SLP using a H-SLP address that has been provisioned by the Home Network to the SET. The SET selects historical position estimates and/or historic enhanced cell/sector measurements based on the criteria received in step B and sends the positions and/or enhanced cell/sector measurements in a SUPL REPORT message to the H-SLP. The SUPL REPORT message contains session-id, a hash of the received SUPL INIT message (ver) and positions and/or enhanced cell/sector measurements.

E. If in step D the H-SLP received enhanced cell/sector measurements, the H-SLP converts them into position estimates. However, enhanced cell/sector measurements taken while the SET was SUPL Roaming, cannot to be

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converted into position estimates by the H-SLP. These measurements are instead forwarded to the respective V-SLC in an RLP-SRLIR message.

F. This step is optional: if the V-SLC cannot convert received historical enhanced cell/sector measurements into position estimates, it sends the measurements in a PLREQ message to the V-SPC for conversion.

G. This step is optional and only takes place if step F has taken place: the V-SPC sends the converted position estimates back to the V-SLC in a PLRES message.

H. The V-SLC returns the results to the H-SLP in an RLP-SRLIA message.

I. The H-SLP reports the historical position estimates to the SUPL Agent in an MLP HLIA message.

6.9 V-SLP to V-SLP Handover

The V-SLP to V-SLP handover which is defined in [SUPL 2 ULP TS] sections 5.1.11,and 5.2.12 does not have implications for ILP since the mechanism for determining of whether or not a SET is SUPL Roaming within a particular SLP's SUPL coverage is out of scope of SUPL.

6.10 V-SPC to V-SPC Handover

The V-SPC to V-SPC handover which is defined in [SUPL 2 ULP TS] sections 5.1.11 and 5.2.13 does not have implications for ILP since the mechanism for determining of whether or not a SET is SUPL Roaming within a particular SLP's SUPL coverage is out of scope of SUPL.

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7. Detailed Flows - Triggered Services: Area Event Triggers

The flows in this section are those in which area event triggers are used.

Set up and release of connections:

Before sending any ULP messages the SET SHALL take needed actions such that a TLS connection exists to the SLP/SLC. This can be achieved by establishing a new connection, resume a connection or reuse an existing TLS connection. This includes establishment or utilization of various data connectivity resources that depends on the terminal in which the SET resides and the type of access network. Data connectivity below IP-level is out of scope of this document.

The detailed flows in this section describes when a TLS connection no longer is needed. The TLS connection shall then be released unless another SUPL session is using the TLS connection.

7.1 Network Initiated – Proxy mode

This section describes the flows for Network Initiated area event triggered services for proxy mode. The trigger thereby resides in the SET and the SET makes the decision if an area event occurred based on continuously repeated position determinations.

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7.1.1 Non-Roaming Successful Case

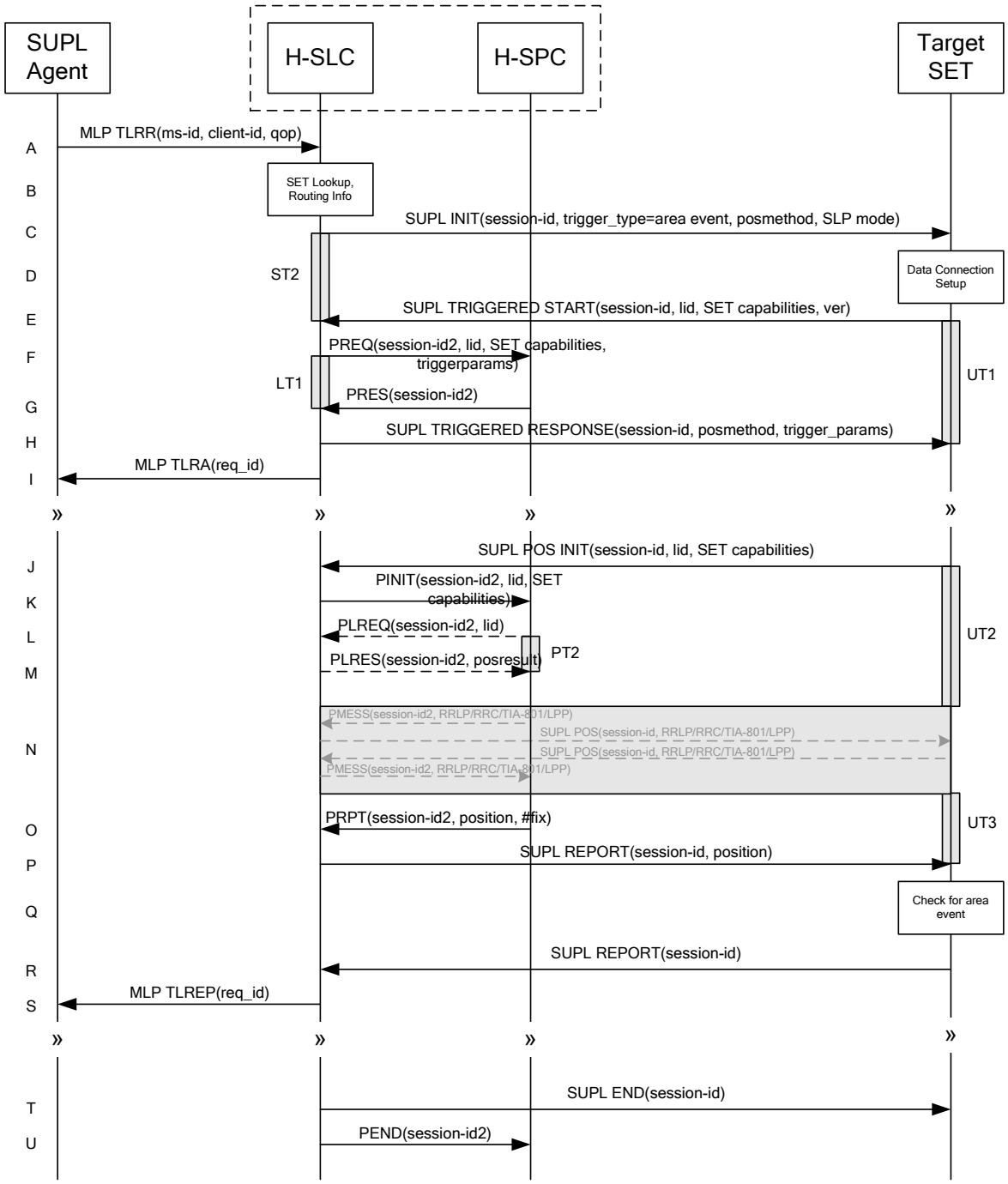

Figure 59: Network Initiated Area Event Trigger Service Non-Roaming Successful Case – Proxy Mode

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id.

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B. The H-SLC verifies that the target SET is currently not SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLC initiates the area event trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case area event), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL set notification mode to notification based on current location and SHALL NOT include the notification element in the SUPL INIT message; otherwise, the H-SLP SHALL set the notification mode indicator to normal notification and if notification or verification to the target subscriber is needed, the H-SLP SHALL also include the notification element in the SUPL INIT message.Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the message.

D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using SLP address that has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start an area event triggered session with the H-SLC. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

F. The H-SLC requests service from the H-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

G. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

H. Consistent with the SET capabilities received in the SUPL TRIGGERED START message the H-SLC selects a positioning method to be used for the area event triggered session. If the H-SPC included a list of supported posmethods in step G, the chosen posmethod SHALL be on this list. The H-SLC responds with a SUPL TRIGGERED RESPONSE message including session-id, posmethod and area event trigger parameters. The SUPL TRIGGERED RESPONSE message may contain the area ids of the specified area for the area event triggered session.

I. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the area event triggered session. The SET and the H-SLC MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

J. If the area ids are downloaded in step H, the SET SHALL compare the current area id to the downloaded area ids. When the area event trigger mechanism in the SET or the comparison of the current area id to the downloaded area ids indicates that a position fix is to be executed, the SET takes appropriate action establishing or resuming a secure

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connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the H-SLC MAY directly proceed to step P and not engage in a SUPL POS session.

K. The H-SLC sends a PINIT message to the H-SPC. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step G, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step F. If a coarse position calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

L. If the H-SPC cannot translate the lid received in step K into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into coarse position itself.

M. This step is conditional and only occurs if step L was performed. The H-SLC calculates a coarse position based on lid and reports the result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

N. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

O. Once the position calculation is complete the H-SPC sends a PRPT message to the H-SLC. PRPT contains the session-id2, the position result if calculated in H-SPC and the number of the fix.

P. Once the position calculation is complete the H-SLC sends a SUPL REPORT message to the SET. The SET MAY release the secure connection to the H-SLC.
The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SLP and therefore needs to be sent to the SET.

Q. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met. If no area event is triggered, the SET SHALL return to step J. If an area event is triggered, the SET SHALL proceed to step R.

R. The SET sends a SUPL REPORT message including the session id and the position estimate to the H-SLC unless the Location estimate parameter is set to "false" in which case no position estimate is included.

S. The H-SLC sends an MLP TLREP message to the SUPL Agent which may include the position result.

If the SUPL Agent has requested several reports and more reports are to be sent, the SET repeats steps J to S or steps J to Q depending on whether or not the area event condition has been met. Note that in this case, step R occurs only after the minimum time between reports has elapsed.

T. When the last report has been sent the H-SLC ends the area event triggered session by sending a SUPL END message to the SET.

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U. The H-SLC informs the H-SPC about the end of the triggered session by sending a PEND message. PEND contains the session-id2.

The flow described in Figure 59 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step N is not performed for cell-id based positioning methods.
- Steps K, L and M may or may not be performed for cell-id based positioning methods.

In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP is required to calculate a position estimate. Interaction with the H-SLP is only required for GPS assistance data update in which case steps J to P are performed.

7.1.2 Roaming with V-SLP Positioning Successful Case

SUPL Roaming where the V-SLP is involved in the position calculation.

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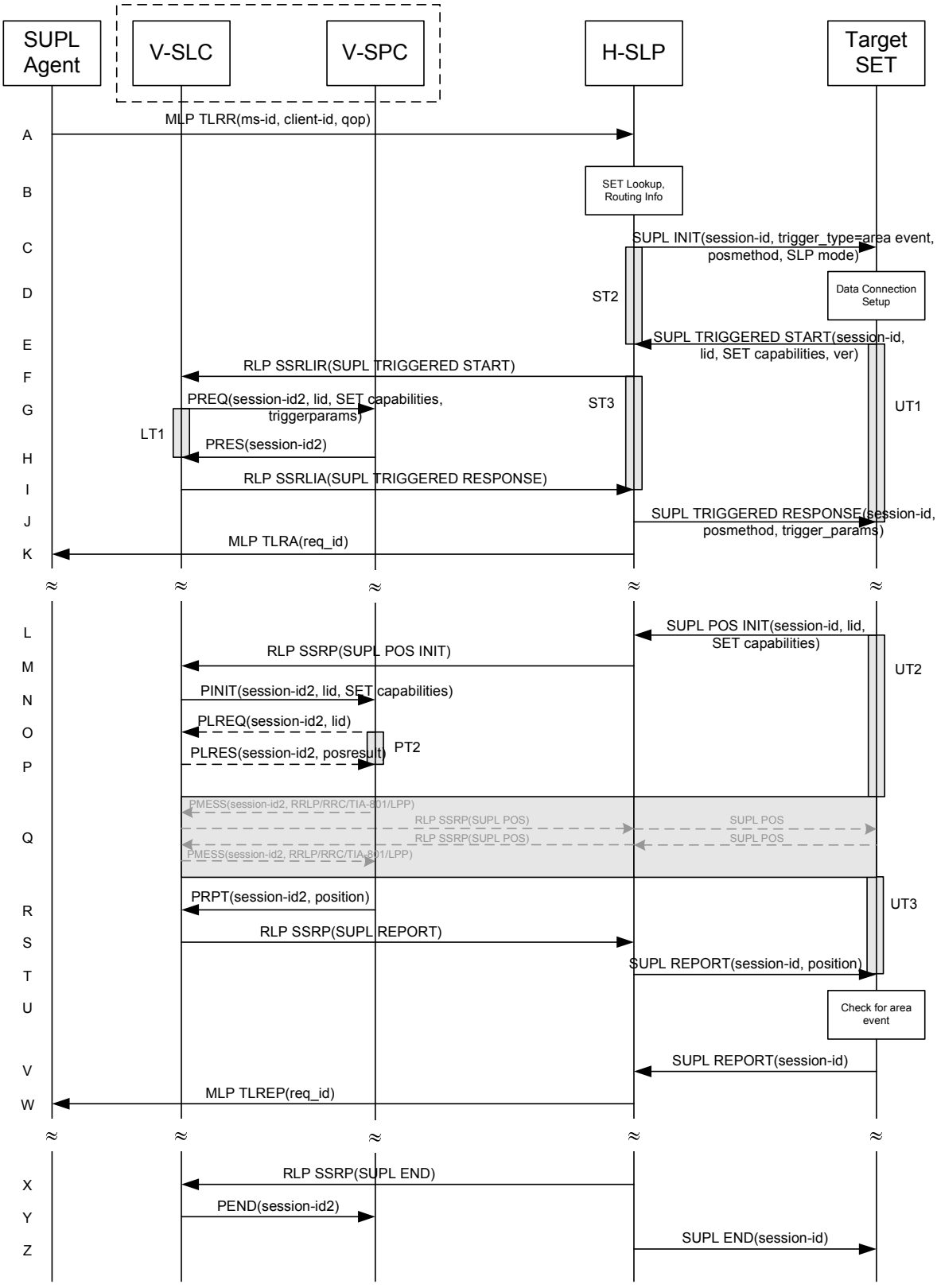

Figure 60: Network Initiated Area Event Trigger Service Roaming Successful Case – Proxy with V-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

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A. SUPL Agent issues an MLP TLRR message to the H-SLP, with which SUPL Agent is associated. The H-SLP shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLP shall apply subscriber privacy against the client-id.

B. The H-SLP verifies that the target SET is currently SUPL Roaming.
The H-SLP MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLP initiates the area event trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case area event), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that notification or verification to the target subscriber is needed, the H-SLP SHALL also include the Notification element in the SUPL INIT message. Before the SUPL INIT message is sent, the H-SLP also computes and stores a hash of the message.

D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLP using SLP address that has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start an area event triggered session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

F. Based on the received lid or other mechanisms, the H-SLP determines the V-SLP and sends an RLP SSRLIR including the SUPL TRIGGERED START message to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. The area event trigger parameters such as area information requested by SUPL Agent for the area event triggered session MAY be included in this message by the H-SLP.

G. The V-SLC requests service from the V-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY optionally contain the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

H. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

I. Consistent with the SET capabilities received in step F, the V-SLC determines a posmethod to be used for the area event triggered session. If the V-SPC included a list of supported posmethods in step H, the chosen posmethod SHALL be on this list. The V-SLC indicates its readiness for an area event triggered session by sending a SUPL TRIGGERED RESPONSE message back to the H-SLP in a RLP SSRLIA message. The V-SLC MAY include area ids corresponding to the area for the area event trigger session in the SUPL TRIGGERED RESPONSE message.

J. The H-SLP forwards the received SUPL TRIGGERED RESPONSE message to the SET including session-id, posmethod and area event trigger parameters. The SUPL TRIGGERED RESPONSE message may contain the area ids of the specified area for the area event triggered session.

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K. The H-SLP informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the area event triggered session. The SET and the H-SLP MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

L. If the area ids are downloaded in step J, the SET SHALL compare the current area id to the downloaded area ids. When the area event trigger in the SET or the comparison of the current area id to the downloaded area ids indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the H-SLP to start a positioning session with the V-SLP. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. If a position is received in the SUPL POS INIT message that meets the required QoP, the H-SLP MAY directly proceed to step T and not engage in a SUPL POS session.

M. The H-SLP forwards the SUPL POS INIT message to the V-SLC using a RLP SSRP message.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the V-SLC MAY directly proceed to step S and not engage in a SUPL POS session.

N. The V-SLC sends a PINIT message to the V-SPC including session-id2, location id and SET capabilities. The V-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the V-SPC in step G, or a different posmethod of the V-SLC's choosing, as long as it is one supported by the V-SPC. Based on the PINIT message including the SET capabilities, the V-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the V-SLC, the V-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the V-SPC shall choose any posmethod in line with the SET capabilities, which was approved by the V-SLC in step F. If a coarse position calculated based on information received in the PINIT message is available that meets the required QoP, the V-SPC MAY directly proceed to step R and not engage in a SUPL POS session.

O. If the V-SPC cannot translate the lid received in step N into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into coarse position itself.

P. This step is conditional and only occurs if step O was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the V-SPC MAY directly proceed to step R and not engage in a SUPL POS session.

Q. The SET and the V-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SPC and the V-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SLC and the H-SLC using SUPL POS over RLP tunnel messages. The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages. The flow sequence PMESS – RLP SSRP(SUPL POS) – SUPL POS – SUPL POS – RLP SSRP(SUPL POS) – PMESS is conceptually shown in dotted lines.
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

R. Once the position calculation is complete, the V-SPC sends a PRPT message to the V-SLC. PRPT contains the session-id2 and the position result if calculated in V-SPC. This message is optional and only used if the position was calculated by the V-SPC i.e. in SET Assisted mode.

S. Once the position calculation is complete, the V-SLC sends a SUPL REPORT message carried within an RLP SSRP message.
The SUPL REPORT message includes the position estimate if the position estimate is calculated in the V-SLP and therefore needs to be sent to the SET.

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T. The H-SLP forwards the received SUPL REPORT from the V-SLC in a SUPL REPORT message to the SET. The SET MAY release the secure connection to the H-SLP.
The SUPL REPORT message includes the position estimate if the position estimate is calculated in the V-SLP (or the H-SLP) and therefore needs to be sent to the SET.

U. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met. If no area event is triggered, the SET SHALL return to step L. If an area event is triggered, the SET SHALL proceed to step V.

V. The SET sends a SUPL REPORT message including the session id and the position estimate to the H-SLC unless the Location estimate parameter is set to "false" in which case no position estimate is included.

W. The H-SLP sends an MLP TLREP message to the SUPL Agent which may include the position reuslt.

If the SUPL Agent has requested several reports and more reports are to be sent, the SET repeats steps L to W or steps L to U depending on whether or not the area event condition has been met. Note that in this case, step V occurs only after the minimum time between reports has elapsed.

X. When the last report has been sent, the H-SLP ends the area event triggered session with the V-SLP by sending a SUPL END message using an RLP SSRP tunnel message to the V-SLC.

Y. The V-SLC informs the V-SPC about the end of the area event triggered session via a PEND message. PEND contains the session-id2.

Z. The H-SLP ends the area event triggered session by sending a SUPL END message to the SET.

The flow described in Figure 60 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step Q is not performed for cell-id based positioning methods.
- Steps N, O and P may or may not be performed for cell-id based positioning methods.

In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP/V-SLP is required to calculate a position estimate. Interaction with the H-SLP/V-SLP is only required for GPS assistance data update in which case steps L to T are performed.

7.1.3 Roaming with H-SLP Positioning Successful Case

SUPL Roaming where the H-SLP is involved in the position calculation.

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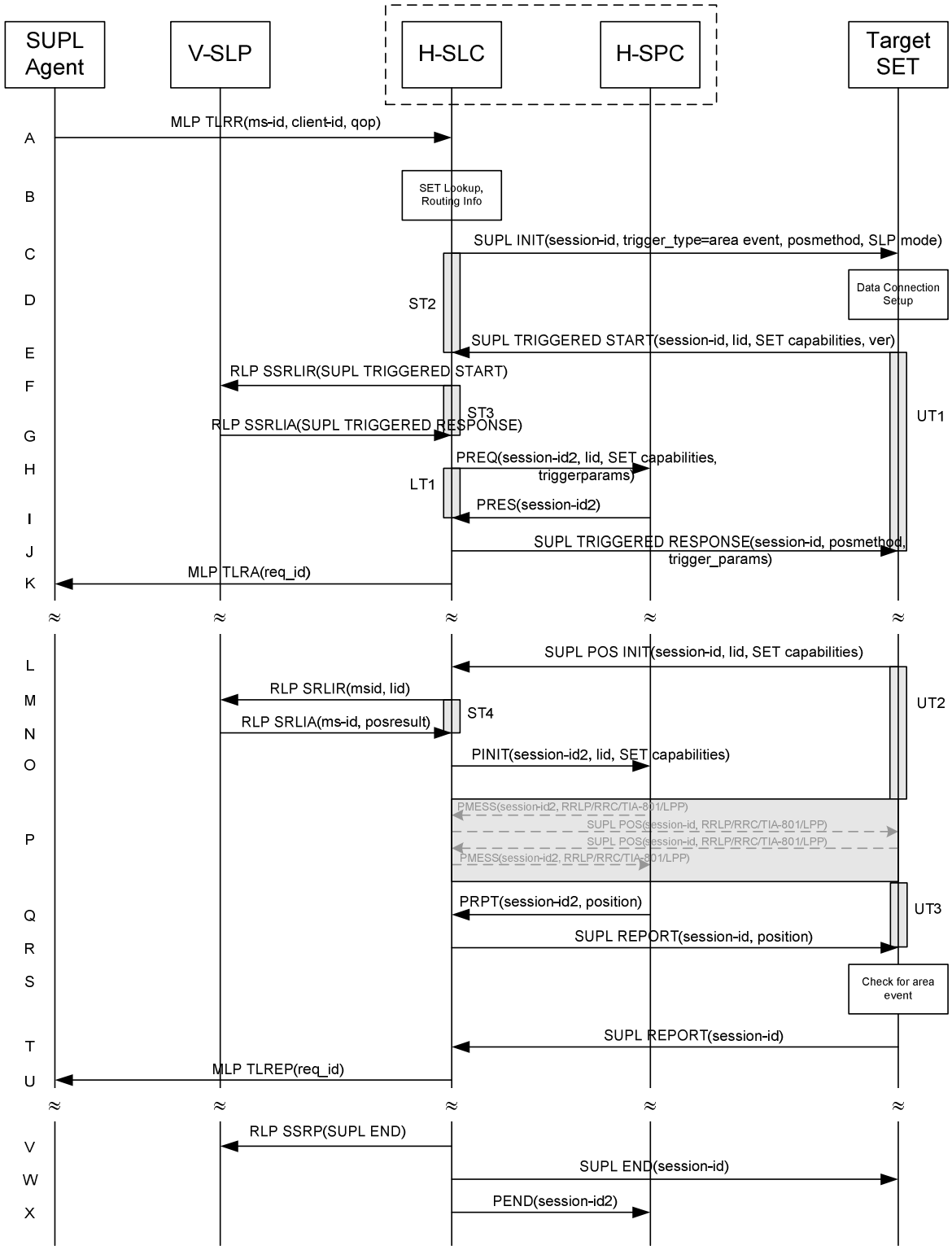

Figure 61: Network Initiated Area Event Trigger Service Roaming Successful Case – Proxy with H-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the

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client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id.

B. The H-SLC verifies that the target SET is currently SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLC initiates the area event trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case area event), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL set notification mode to notification based on current location and SHALL NOT include the notification element in the SUPL INIT message; otherwise, the H-SLP SHALL set the notification mode indicator to normal notification and if notification or verification to the target subscriber is needed, the H-SLP SHALL also include the notification element in the SUPL INIT message.Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the message.

D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using SLP address that has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start an area event triggered session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

F. Based on the received lid or other mechanisms, the H-SLC determines the V-SLP and sends an RLP SSRLIR including a SUPL TRIGGERED START to the V-SLP to inform the V-SLP that an area event triggered session is in the progress of being initiated with the H-SLP. The area event trigger parameters such as area information requested by SUPL Agent for the area event triggered session MAY be included in this message by the H-SLP.

G. The V-SLP acknowledges the RLP request received in step F with a SUPL TRIGGERED RESPONSE message which is carried inside an RLP SSRLIA message. The V-SLP MAY include area ids corresponding to the area for the area event trigger session in the SUPL TRIGGERED RESPONSE message.

H. The H-SLC requests service from the H-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

I. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

J. Consistent with the SET capabilities received in step E, the H-SLP determines a posmethod to be used for the area event triggered session. If the H-SPC included a list of supported posmethods in step I, the chosen posmethod SHALL be on this list. The H-SLC indicates its readiness for an area event triggered session by sending a SUPL TRIGGERED RESPONSE message back to the SET. The SUPL TRIGGERED RESPONSE message to the SET

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includes at a minimum the session-id, posmethod and area event trigger parameters. The SUPL TRIGGERED RESPONSE message may contain the area ids of the specified area for the area event triggered session.

K. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the area event triggered session. The SET and the H-SLP MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

L. If the area ids are downloaded in step J, the SET SHALL compare the current area id to the downloaded area ids. When the area event trigger in the SET or the comparison of the current area id to the downloaded area ids indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the H-SLC to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If the SUPL POS INIT message contains a position that meets the required QoP, the H-SLC MAY directly proceed to step R.

M. To obtain a coarse position based on lid received in step L, the H-SLC sends an RLP SRLIR message to the V-SLP.

N. The V-SLP translates the received lid into a position estimate and returns the result to the H-SLC in an RLP SRLIA message.
If the position estimate meets the required QoP, the H-SLC MAY directly proceed to step R and not engage in a SUPL POS session.

O. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id, SET capabilities and position estimate (i.e. coarse position received from the V-SLC in the previous step). The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step I, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step H. If a coarse position calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step Q and not engage in a SUPL POS session.

P. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

Q. Once the position calculation is complete, the H-SPC sends a PRPT message to the H-SLC. PRPT contains the session-id2 and the position result if calculated in H-SPC.

R. Once the position calculation is complete, the H-SLC sends a SUPL REPORT message to the SET.
The SUPL REPORT message includes the position estimate if the position estimate is calculated in the H-SLP and therefore needs to be sent to the SET.

S. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met. If no area event is triggered, the SET SHALL return to step L. If an area event is triggered, the SET SHALL proceed to step T.

T. The SET sends a SUPL REPORT message including the session id and the position estimate to the H-SLC unless the Location estimate parameter is set to "false" in which case no position estimate is included.

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U. The H-SLC sends an MLP TLREP message to the SUPL Agent which may include the position result.

If the SUPL Agent has requested several reports and more reports are to be sent, the SET repeats steps L to U or steps L to S depending on whether or not the area event condition has been met. Note that in this case, step T occurs only after the minimum time between reports has elapsed.

V. When the last report has been sent the H-SLC ends the area event triggered session with the V-SLP by sending a SUPL END message using an RLP SSRP tunnel message to the V-SLP.

W. The H-SLC ends the area event triggered session with the SET via a SUPL END message.

X. The H-SLC informs the H-SPC about the end of the area event triggered session via a PEND message. PEND contains session-id2.

The flow described in Figure 61 is applicable to all positioning methods; however, individual steps within the flows are optional:

- Step P is not performed for cell-id based positioning methods.
- Steps M, N and O may or may not be performed for cell-id based positioning methods.

In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP/V-SLP is required to calculate a position estimate. Interaction with the H-SLP/V-SLP is only required for GPS assistance data update in which case steps L to R are performed.

7.2 Network Initiated – Non-Proxy mode

This section describes the flows for Network Initiated area event triggered services for non-proxy mode. The trigger thereby resides in the SET and the SET makes the decision if an area event occurred based on continuously repeated position determinations.

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7.2.1 Non-Roaming Successful Case

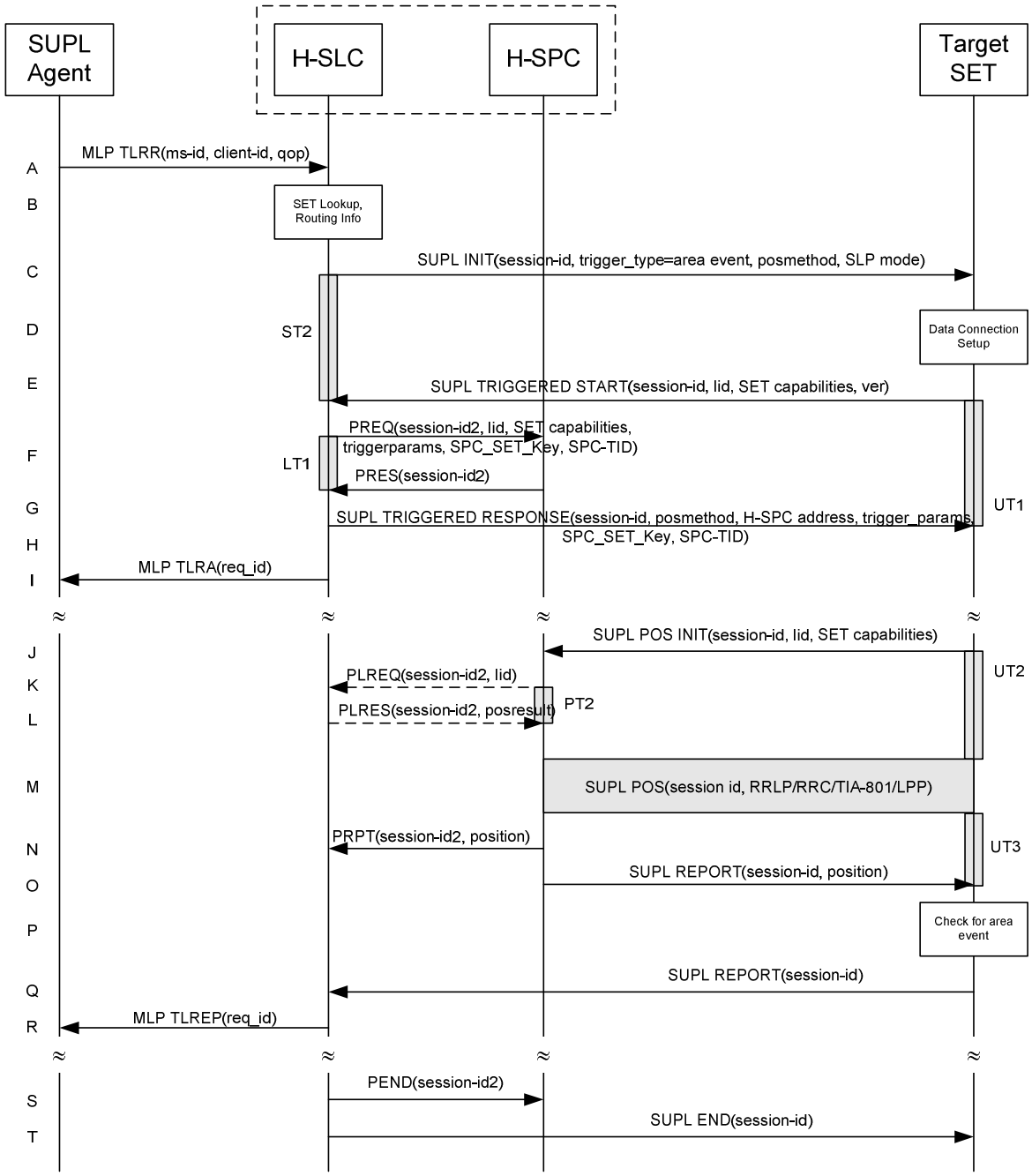

Figure 62: Network Initiated Area Event Trigger Service Non-Roaming Successful Case – Non-Proxy Mode

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id.

B. The H-SLC verifies that the target SET is currently not SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

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NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLC initiates the area event trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case area event), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL set notification mode to notification based on current location and SHALL NOT include the notification element in the SUPL INIT message; otherwise, the H-SLP SHALL set the notification mode indicator to normal notification and if notification or verification to the target subscriber is needed, the H-SLP SHALL also include the notification element in the SUPL INIT message.Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the message.

D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, non-proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using the H-SLP address which has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start an area event triggered session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

F. The H-SLC requests service from the H-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The H-SLC generates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication and forwards both to the H-SPC in the PREQ message. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

G. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

H. Consistent with the SET capabilities received in the SUPL TRIGGERED START message the H-SLC selects a positioning method to be used for the area event triggered session. If the H-SPC included a list of supported posmethods in step G, the chosen posmethod SHALL be on this list. The H-SLC responds with a SUPL TRIGGERED RESPONSE message including session-id, posmethod, H-SPC address, area event trigger parameters, SPC_SET_Key and SPC-TID. The SUPL TRIGGERED RESPONSE message may contain the area ids of the specified area for the area event triggered session.

I. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the area event triggered session.
The SET and the H-SLC MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

J. If the area ids are downloaded in step H, the SET SHALL compare the current area id to the downloaded area ids. When the area event trigger in the SET or the comparison of the current area id to the downloaded area ids indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure

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connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the H-SPC MAY directly proceed to step N and not engage in a SUPL POS session.

K. If the H-SPC cannot translate the lid received in step J into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into coarse position itself.

L. This step is conditional and only occurs if step K was performed. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step N and not engage in a SUPL POS session.

M. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step F, the H-SPC SHALL only choose an approved method. The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

N. The H-SPC may optionally inform the H-SLC about the position fix or assistance data delivery process performed in step M. To this end the H-SPC sends a PRPT message to the H-SLC. PRPT contains at least session-id2.

O. Once the position calculation is complete the H-SPC sends a SUPL REPORT message to the SET. The SET MAY release the secure connection to the H-SPC.
The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SPC and therefore needs to be sent to the SET.

P. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met. If no area event is triggered, the SET SHALL return to step J. If an area event is triggered, the SET SHALL proceed to step Q.

Q. The SET sends a SUPL REPORT message including the session id and the position estimate to the H-SLC unless the Location estimate parameter is set to “false” in which case no position estimate is included.

R. The H-SLC sends an MLP TLREP message to the SUPL Agent which may include the position result.

If the SUPL Agent has requested several reports and more reports are to be sent, the SET repeats steps J to R or steps J to P depending on whether or not the area event condition has been met. Note that in this case, step Q occurs only after the minimum time between reports has elapsed.

S. When the last report has been sent, the H-SLC informs the H-SPC about the end of the area event triggered session via a PEND message. PEND contains session-id2

T. The H-SLC ends the area event triggered session by sending a SUPL END message to the SET.

The flow described in Figure 62 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step M is not performed for cell-id based positioning methods.
- Steps K and L may or may not be performed for cell-id based positioning methods.

In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP is required to calculate a position estimate. Interaction with the H-SLP is only required for GPS assistance data update in which case steps J to O are performed.

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7.2.2 Roaming with V-SPC Positioning Successful Case

SUPL Roaming where the V-SPC is involved in the position calculation.

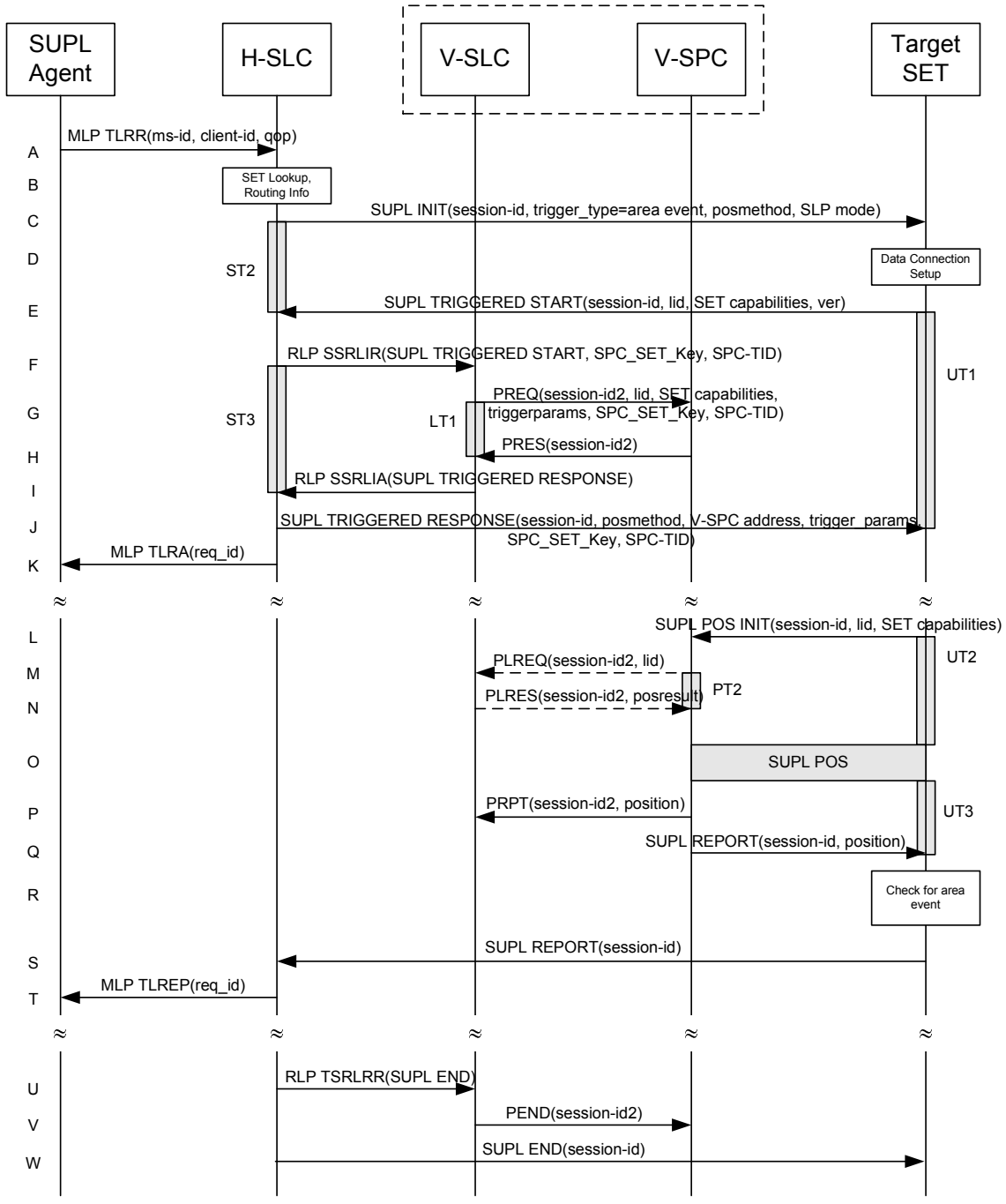

Figure 63: Network Initiated Area Event Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the

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client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id.

B. The H-SLC verifies that the target SET is currently SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLC initiates the area event trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case area event), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL set notification mode to notification based on current location and SHALL NOT include the notification element in the SUPL INIT message; otherwise, the H-SLP SHALL set the notification mode indicator to normal notification and if notification or verification to the target subscriber is needed, the H-SLP SHALL also include the notification element in the SUPL INIT message.Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the message.

D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLC uses proxy or non-proxy mode. In this case, non-proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using the H-SLC address which has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start an area event triggered session with the H-SLP. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

F. Based on the received lid or other mechanisms, the H-SLC determines the V-SLC and sends an RLP SSRLIR including the SUPL TRIGGERED START message to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. The H-SLC also generates SPC_SET_Key and SPC-TID to be used for V-SPC/SET mutual authentication and includes both in the RLP SSRLIR message. The area event trigger parameters such as area information requested by SUPL Agent for the area event triggered session MAY be included in this message by the H-SLC.

G. The V-SLC requests service from the V-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The V-SLC also forwards SPC_SET_Key and SPC-TID to the V-SPC in the PREQ message. The PREQ MAY also optionally contain the QoP. The V-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

H. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

I. Consistent with the SET capabilities received in step F. the V-SLC determines a posmethod to be used for the area event triggered session. If the V-SPC included a list of supported posmethods in step H, the chosen posmethod SHALL be on this list. The V-SLC indicates its readiness for an area event triggered session by sending a SUPL TRIGGERED RESPONSE message back to the H-SLC in an RLP SSRLIA message. The V-SLC MAY include

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area-ids corresponding to the area for the area event trigger session in the SUPL TRIGGERED RESPONSE message.

J. The H-SLC forwards the received SUPL TRIGGERED RESPONSE message to the SET including session-id, posmethod, V-SPC address, area event trigger parameters, SPC_SET_Key and SPC-TID. The SUPL TRIGGERED RESPONSE message may contain the area ids of the specified area for the area event triggered session.

K. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the area event triggered session. The SET and the H-SLC MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

L. If the area ids are downloaded in step J, the SET SHALL compare the current area id to the downloaded area ids. When the area event trigger in the SET or the comparison of the current area id to the downloaded area ids indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the V-SPC to start a positioning session with the V-SPC. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets the required QoP, the V-SPC MAY directly proceed to step P and not engage in a SUPL POS session.

M. If the V-SPC cannot translate the lid received in step L into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into coarse position itself.

N. This step is conditional and only occurs if step M was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the V-SPC MAY directly proceed to step P and not engage in a SUPL POS session.

O. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the V-SPC SHALL determine the posmethod. If the V-SLC included its approved positioning methods in step G, the V-SPC SHALL only choose an approved method. The SET and the V-SPC exchange several successive positioning procedure messages.
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

P. The V-SPC may optionally inform the V-SLC about the position fix or assistance data delivery process performed in step O. To this end the V-SPC sends a PRPT message to the V-SLC. PRPT contains at least session-id2.

Q. Once the position calculation is complete the V-SPC sends a SUPL REPORT message to the SET. The SET MAY release the secure connection to the V-SPC.
The SUPL REPORT message includes the position result if the position estimate is calculated in the V-SPC and therefore needs to be sent to the SET.

R. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met. If no area event is triggered, the SET SHALL return to step L. If an area event is triggered, the SET SHALL proceed to step S.

S. The SET sends a SUPL REPORT message including the session id and the position estimate to the H-SLC unless the Location estimate parameter is set to “false” in which case no position estimate is included.

T. The H-SLC sends an MLP TLREP message to the SUPL Agent which may include the position result.

If the SUPL Agent has requested several reports and more reports are to be sent, the SET repeats steps L to T or steps L to R depending on whether or not the area event condition has been met. Note that in this case, step S occurs only after the minimum time between reports has elapsed.

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U. When the last report has been sent, the H-SLC informs the V-SLC about the end of the area event triggered session through an SUPL END message carried within an SSRP message over RLP tunnel.,.

V. The V-SLC informs the V-SPC about the end of the area event triggered session via a PEND message. The PEND contains the session-id2

W. The H-SLC ends the area event triggered session by sending a SUPL END message to the SET.

The flow described in Figure 63 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step O is not performed for cell-id based positioning methods.
- Steps M and N may or may not be performed for cell-id based positioning methods.
- In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the V-SLP is required to calculate a position estimate. Interaction with the V-SLP is only required for GPS assistance data update in which case steps L to Q are performed.

7.2.3 Roaming with H-SPC Positioning Successful Case

SUPL Roaming where the H-SPC is involved in the position calculation.

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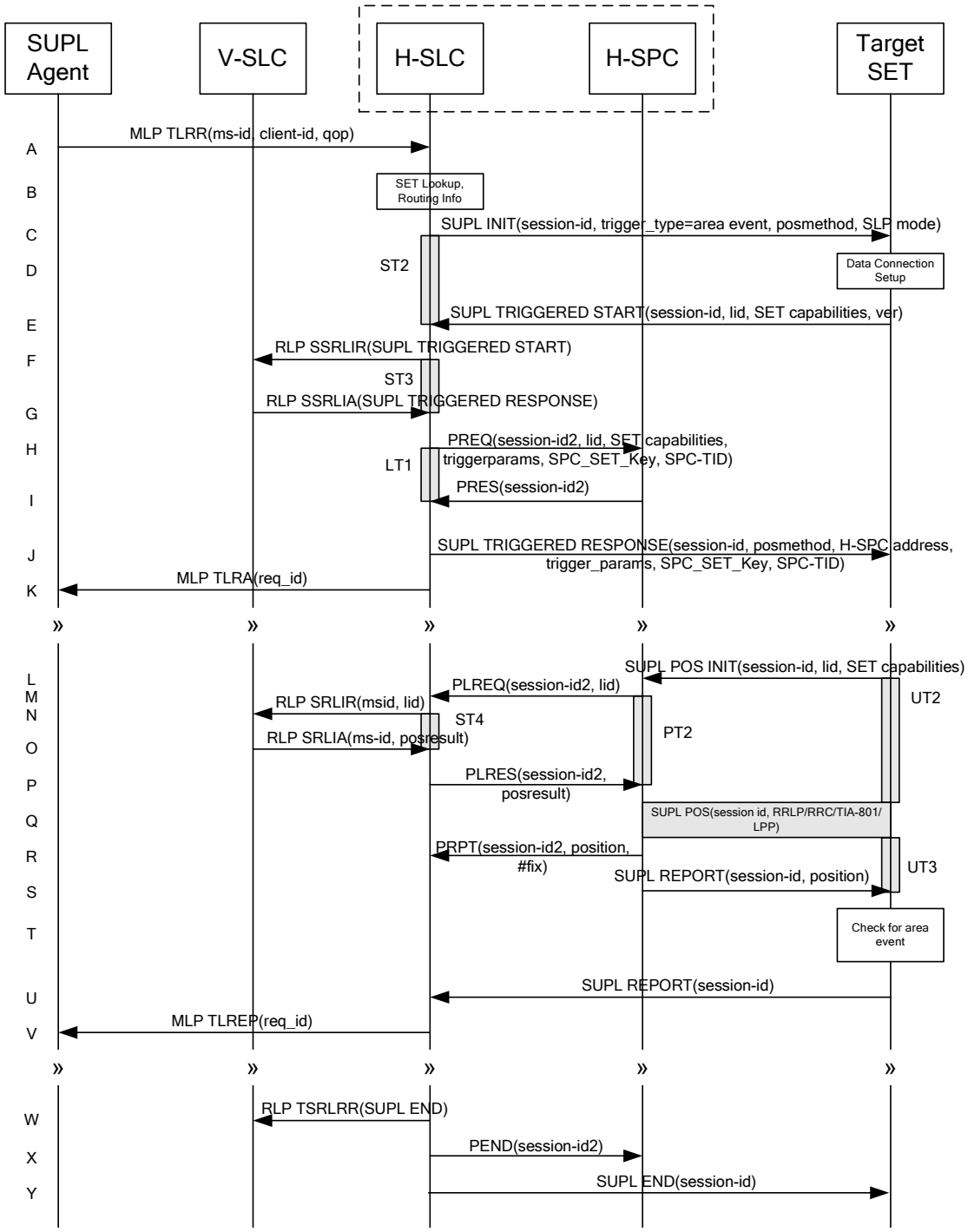

Figure 64: Network Initiated Area Event Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

A. SUPL Agent issues an MLP TLRR message to the H-SLC, with which SUPL Agent is associated. The H-SLC shall authenticate the SUPL Agent and check if the SUPL Agent is authorized for the service it requests, based on the client-id received. Further, based on the received ms-id the H-SLC shall apply subscriber privacy against the client-id.

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B. The H-SLC verifies that the target SET is currently SUPL Roaming.
The H-SLC MAY also verify that the target SET supports SUPL.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL. However, there are various environment dependent mechanisms.

NOTE 3: Alternatively, the H-SLP may determine whether the SET is SUPL Roaming in a later step using the location identifier (lid) received from the SET.

NOTE 4: The specifics for determining if the SET supports SUPL are beyond SUPL 2.0 scope.

C. The H-SLC initiates the area event trigger session with the SET using the SUPL INIT message. The SUPL INIT message contains at least session-id, trigger type indicator (in this case area event), proxy/non-proxy mode indicator and the intended positioning method. If the result of the privacy check in Step A indicates that subscriber privacy check based on current location is required, the H-SLP SHALL set notification mode to notification based on current location and SHALL NOT include the notification element in the SUPL INIT message; otherwise, the H-SLP SHALL set the notification mode indicator to normal notification and if notification or verification to the target subscriber is needed, the H-SLP SHALL also include the notification element in the SUPL INIT message.Before the SUPL INIT message is sent, the H-SLC also computes and stores a hash of the message.

D. The SET analyses the received SUPL INIT. If it is found to be non authentic, the SET takes no further action.Otherwise the SET takes needed action preparing for establishment or resumption of a secure connection.

E. The SET will evaluate the Notification rules and follow the appropriate actions. The SET also checks the proxy/non-proxy mode indicator to determine if the H-SLP uses proxy or non-proxy mode. In this case, non-proxy mode is used, and the SET SHALL establish a secure connection to the H-SLC using the H-SLC address that has been provisioned by the Home Network to the SET.
The SET then sends a SUPL TRIGGERED START message to start an area event triggered session with the H-SLC. The SET SHALL send the SUPL TRIGGERED START message even if the SET supported positioning technologies do not include the intended positioning method indicated in the SUPL INIT message. The SUPL TRIGGERED START message contains at least session-id, SET capabilities, a hash of the received SUPL INIT message (ver) and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

F. Based on the received lid or other mechanisms, the H-SLC determines the V-SLC and sends an RLP SSRLIR including a SUPL TRIGGERED START message to the V-SLC to inform the V-SLC that an area event triggered session is in the progress of being initiated with the H-SLP. The area event trigger parameters such as area information requested by SUPL Agent for the area event triggered session MAY be included in this message by the H-SLC.

G. The V-SLC acknowledges the RLP request received in step F with a SUPL TRIGGERED RESPONSE message which is carried inside an RLP SSRLIA message. The V-SLC MAY include area ids corresponding to the area for the area event trigger session in the SUPL TRIGGERED RESPONSE message.

H. The H-SLC requests service from the H-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The H-SLC generates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication and forwards both to the H-SPC in the PREQ message. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

I. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2.The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

J. Consistent with the SET capabilities received in step E, the H-SLC determines a posmethod to be used for the area event triggered session. If the H-SPC included a list of supported posmethods in step I, the chosen posmethod SHALL be on this list. The H-SLC indicates its readiness for an area event triggered session by sending a SUPL TRIGGERED RESPONSE message back to the SET. The SUPL TRIGGERED RESPONSE message to the SET

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includes at a minimum the session-id, posmethod, H-SPC address, area event trigger parameters, SPC_SET_Key and SPC-TID. The SUPL TRIGGERED RESPONSE message may contain the area ids of the specified area for the area event triggered session.

K. The H-SLC informs the SUPL Agent in an MLP TLRA message that the triggered location response request has been accepted and also includes a req_id parameter to be used as a transaction id for the entire duration of the area event triggered session. The SET and the H-SLC MAY release the secure connection.

NOTE 5: The MLP TLRA may be sent earlier at any time after the H-SLP receives the MLP TLRR.

L. If the area ids are downloaded in step J, the SET SHALL compare the current area id to the downloaded area ids. When the area event trigger in the SET or the comparison of the current area id to the downloaded area ids indicates that a position fix has to be performed, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to the H-SPC to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id and the Location ID (lid). The SET MAY provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT. If the SUPL POS INIT message contains a position that meets the required QoP, the H-SPC MAY directly proceed to step R.

M. To translate the lid received in step L into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid.

N. To obtain a coarse position the H-SLC sends an RLP SRLIR message to the V-SLC.

O. The V-SLC translates the received lid into a position estimate and returns the result to the H-SLC in an RLP SRLIA message.

P. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step R and not engage in a SUPL POS session.

Q. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step H, the H-SPC SHALL only choose an approved method. The SET and the H-SPC exchange several successive positioning procedure messages. The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

R. The H-SPC may optionally inform the H-SLC about the position fix or assistance data delivery process performed in step Q. To this end the H-SPC sends a PRPT message to the H-SLC. PRPT contains at least session-id2

S. Once the position calculation is complete the H-SPC sends a SUPL REPORT message to the SET. The SET MAY release the secure connection to the H-SPC.
The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SPC and therefore needs to be sent to the SET.

T. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met. If no area event is triggered, the SET SHALL return to step L. If an area event is triggered, the SET SHALL proceed to step U.

U. The SET sends a SUPL REPORT message including the session id and the position estimate to the H-SLC unless the Location estimate parameter is set to “false” in which case no position estimate is included.

V. The H-SLC sends an MLP TLREP message to the SUPL Agent which may include the position result.

If the SUPL Agent has requested several reports and more reports are to be sent, the SET repeats steps L to V or steps L to T depending on whether or not the area event condition has been met. Note that in this case, step U occurs only after the minimum time between reports has elapsed.

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W. When the last report has been sent, the H-SLC informs the V-SLC about the end of the area event triggered session by sending a SUPL END message using an RLP SSRP tunnel message to the V-SLC.

X. The H-SLC informs the H-SPC about the end of the area event triggered session via a PEND message. The PEND contains the session-id2.

Y. The H-SLC ends the area event triggered session by sending a SUPL END message to the SET.

The flow described in Figure 64 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step Q is not performed for cell-id based positioning methods.
- In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP/V-SLP is required to calculate a position estimate. Interaction with the H-SLP/V-SLP is only required for GPS assistance data update in which case steps L to S are performed.

7.3 SET Initiated – Proxy mode

This section describes the flows for SET Initiated area event triggered services for proxy mode. The trigger thereby resides in the SET and the SET makes the decision if an area event occurred based on continuously repeated position determinations.

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7.3.1 Non-Roaming Successful Case

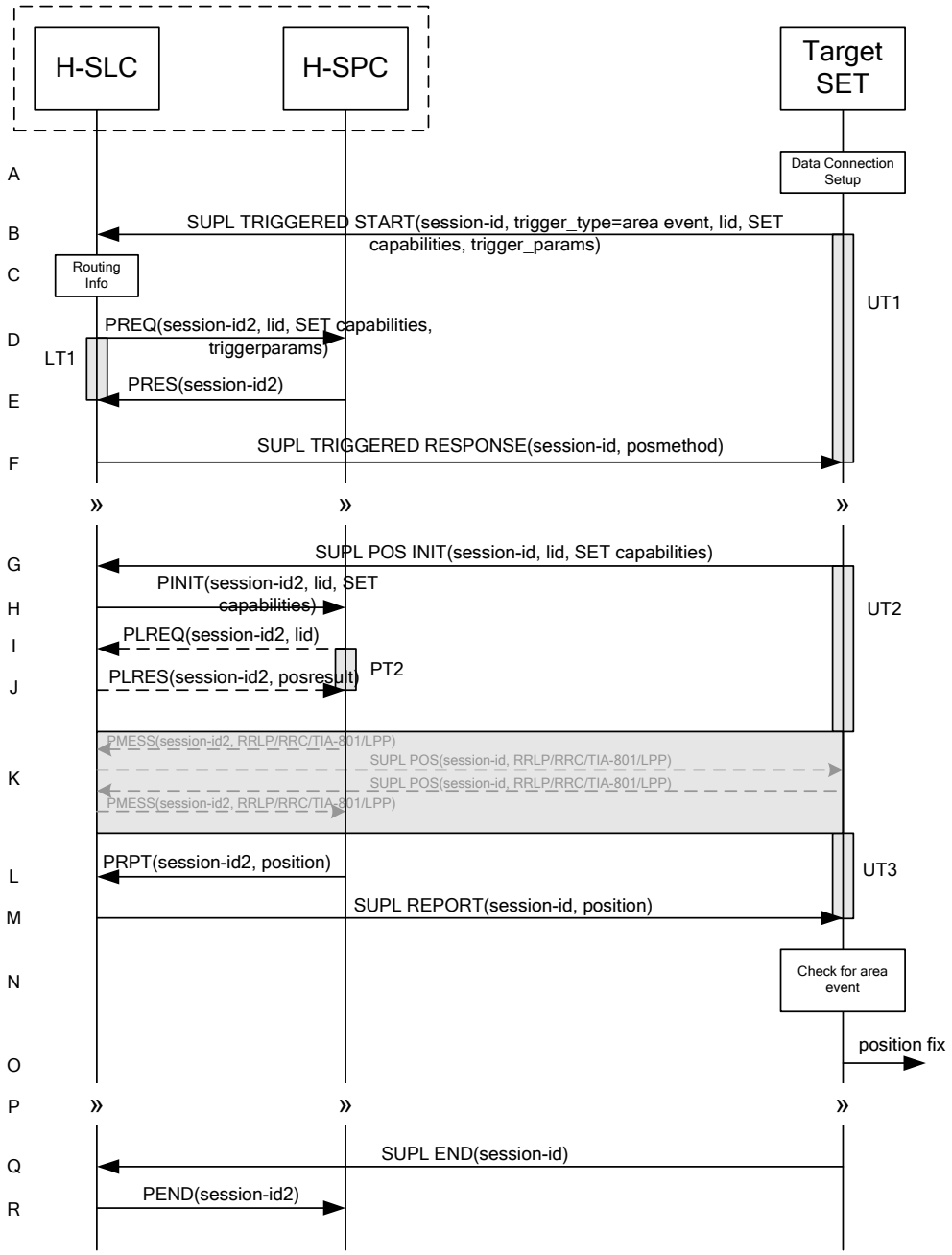

Figure 65: SET Initiated Area Event Trigger Service Non-Roaming Successful Case – Proxy Mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for an area event triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLP and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case area event), Location ID (lid) and area event trigger parameters. The SET capabilities include the supported

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positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLP verifies that the target SET is currently not SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. The H-SLC requests service from the H-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

F. Consistent with the SUPL TRIGGERED START message including the SET capabilities of the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC SHALL respond with a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE contains the session-id but no H-SLP address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL TRIGGERED RESPONSE also contains the posmethod. The SET and the H-SLC MAY release the secure connection.

G. When the area event trigger in the SET indicates that a position fix has to be calculated, the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the H-SLP MAY directly proceed to step M and not engage in a SUPL POS session.

H. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id and SET capabilities. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step E, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step D. If a coarse position calculated based on information received in the PINIT message is available that meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

I. If the H-SPC cannot translate the lid received in step H into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into coarse position itself.

J. This step is conditional and only occurs if step I was performed. The H-SLC calculates a coarse position based on lid and reports the result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets the required QoP, the H-SPC MAY directly proceed to step L and not engage in a SUPL POS session.

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K. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

L. Once the position calculation is complete the H-SPC sends a PRPT message to the H-SLC. PRPT contains the session-id2 and the position result if calculated in the H-SPC.

M. Once the position calculation is complete the H-SLC sends a SUPL REPORT message to the SET. The SET MAY release the secure connection to the H-SLC.
The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SPC and therefore needs to be sent to the SET.

N. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met.

O. If the area event was triggered the SET forwards the calculated position estimate to the internal SUPL Agent.

P. If the SET decides to end the triggered session the SET proceeds to step Q. Otherwise whenever the area event trigger mechanism in the SET indicates that a new position fix has to be performed, steps G to O are repeated.

Q. The SET ends the triggered session by sending a SUPL END message to the H-SLC.

R. The H-SLC informs the H-SPC about the end of the triggered session by sending a PEND message. PEND contains the session-id2.

The flow described in Figure 65 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step K is not performed for cell-id based positioning methods.
- Steps H, I and J may or may not be performed for cell-id based positioning methods.
- In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP is required to calculate a position estimate. Interaction with the H-SLP is only required for GPS assistance data update in which case steps G to M are performed.

7.3.2 Roaming with V-SLP Positioning Successful Case

SUPL Roaming where the V-SLP is involved in the position calculation.

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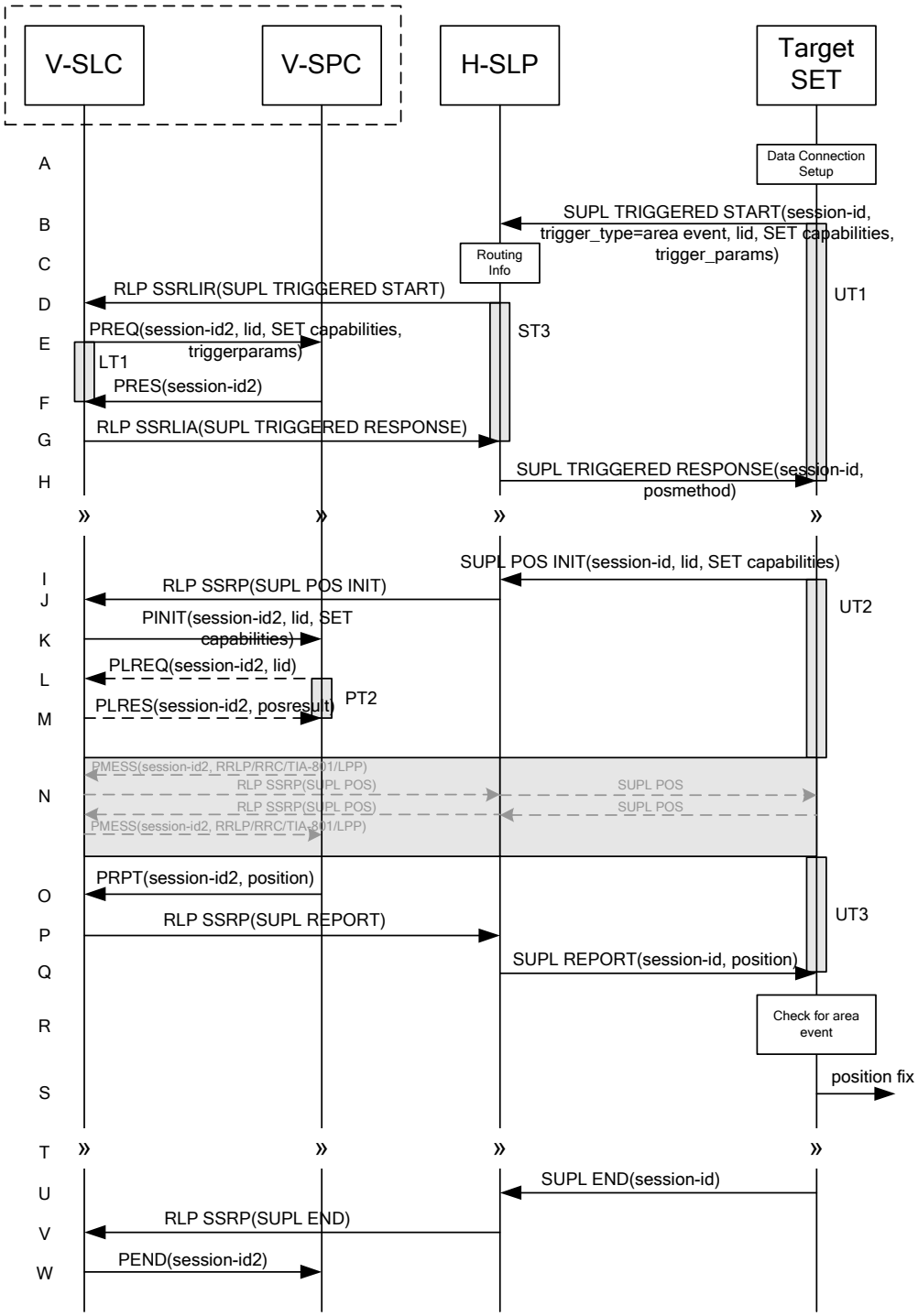

Figure 66: SET Initiated Area Event Trigger Service Roaming Successful Case – Proxy with V-SLP positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for an area event triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLP and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in

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this case area event), Location ID (lid) and area event trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLP verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. Based on the received lid or other mechanisms, the H-SLP determines the V-SLC and sends an RLP SSRLIR including the SUPL TRIGGERED START message to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. The area event trigger parameters such as area information requested by SUPL Agent for the area event triggered session MAY be included in this message by the H-SLP.

E. The V-SLC requests service from the V-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY optionally contain the QoP. The V-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

F. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

G. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the V-SLP MAY determine the posmethod. If the V-SPC included a list of supported posmethods in step F, the chosen posmethod SHALL be on this list. If required for the posmethod, the V-SLP SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The V-SLC responds with a SUPL TRIGGERED RESPONSE tunnelled over RLP in a SSRLIA message back to the H-SLP that it is capable of supporting this request. The SUPL TRIGGERED RESPONSE contains at least the sessionid and posmethod.

H. The H-SLP forwards the SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE contains the session-id but no H-SLP address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL TRIGGERED RESPONSE also contains the posmethod. The SET and the H-SLP MAY release the secure connection.

I. When the area event trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position is received in the SUPL POS INIT message that meets any required QoP, the H-SLP MAY directly proceed to step Q and not engage in a SUPL POS session.

J. The H-SLP forwards the SUPL POS INIT message to the V-SLP over the RLP tunnel in an SSRP message.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the V-SLP MAY directly proceed to step P and not engage in a SUPL POS session.

K. The V-SLC sends a PINIT message to the V-SPC including session-id2, location id and SET capabilities. The V-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the V-SPC in step F, or a different posmethod of the V-SLC's choosing, as long as it is one supported by the V-SPC. Based on the PINIT message including the SET capabilities, the V-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the V-SLC, the V-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the V-SPC shall choose any posmethod in line with the SET capabilities which was approved by the V-SLC in step E. If a coarse position

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calculated based on information received in the PINIT message is available that meets any required QoP, the V-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

L. If the V-SPC cannot translate the lid received in step K into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into coarse position itself.

M. This step is conditional and only occurs if step L was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets any required QoP, the V-SPC MAY directly proceed to step R and not engage in a SUPL POS session.

N. The SET and the V-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SPC and the V-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the V-SLC and the H-SLC using SUPL POS over RLP tunnel messages. The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages. The flow sequence PMESS – RLP SSRP(SUPL POS) – SUPL POS – SUPL POS – RLP SSRP(SUPL POS) – PMESS is conceptually shown in dotted lines.
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the V-SPC (SET-Based).

O. Once the position calculation is complete, the V-SPC sends a PRPT message to the V-SLC. PRPT contains the session-id2 and the position result if calculated in the V-SPC.

P. Once the position calculation is complete, the V-SLC sends a SUPL REPORT message in an RLP tunnel using an SSRP message to the H-SLP.
The SUPL REPORT message includes the position result if the position estimate is calculated in the V-SLP and therefore needs to be sent to the SET.

Q. The H-SLP forwards the SUPL REPORT message to the SET. The SET and the H-SLP MAY release the secure connection.
The SUPL REPORT message includes the position result if the position estimate is calculated in the V-SLP (or the H-SLP) and therefore needs to be sent to the SET.

R. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met.

S. If the area event was triggered the SET forwards the calculated position estimate to the internal SUPL Agent.

T. If the SET decides to end the triggered session the SET proceeds to step U. Otherwise whenever the area event trigger mechanism in the SET indicates that a new position fix has to be performed, steps I to S are repeated.

U. The SET ends the triggered session by sending a SUPL END message to the H-SLP.

V. The H-SLP informs the V-SLC about the end of the area event triggered session by sending a SUPL END message using an RLP SSRP tunnel message

W. The V-SLC ends the area event triggered session with the V-SPC by sending a PEND message. PEND contains the session-id2.

The flow described in Figure 66 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step N is not performed for cell-id based positioning methods.
- Steps K, L and M may or may not be performed for cell-id based positioning methods.

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- In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP/V-SLP is required to calculate a position estimate. Interaction with the H-SLP/V-SLP is only required for GPS assistance data update in which case steps I to Q are performed.

7.3.3 Roaming with H-SLP Positioning Successful Case

SUPL Roaming where the H-SLP is involved in the position calculation.

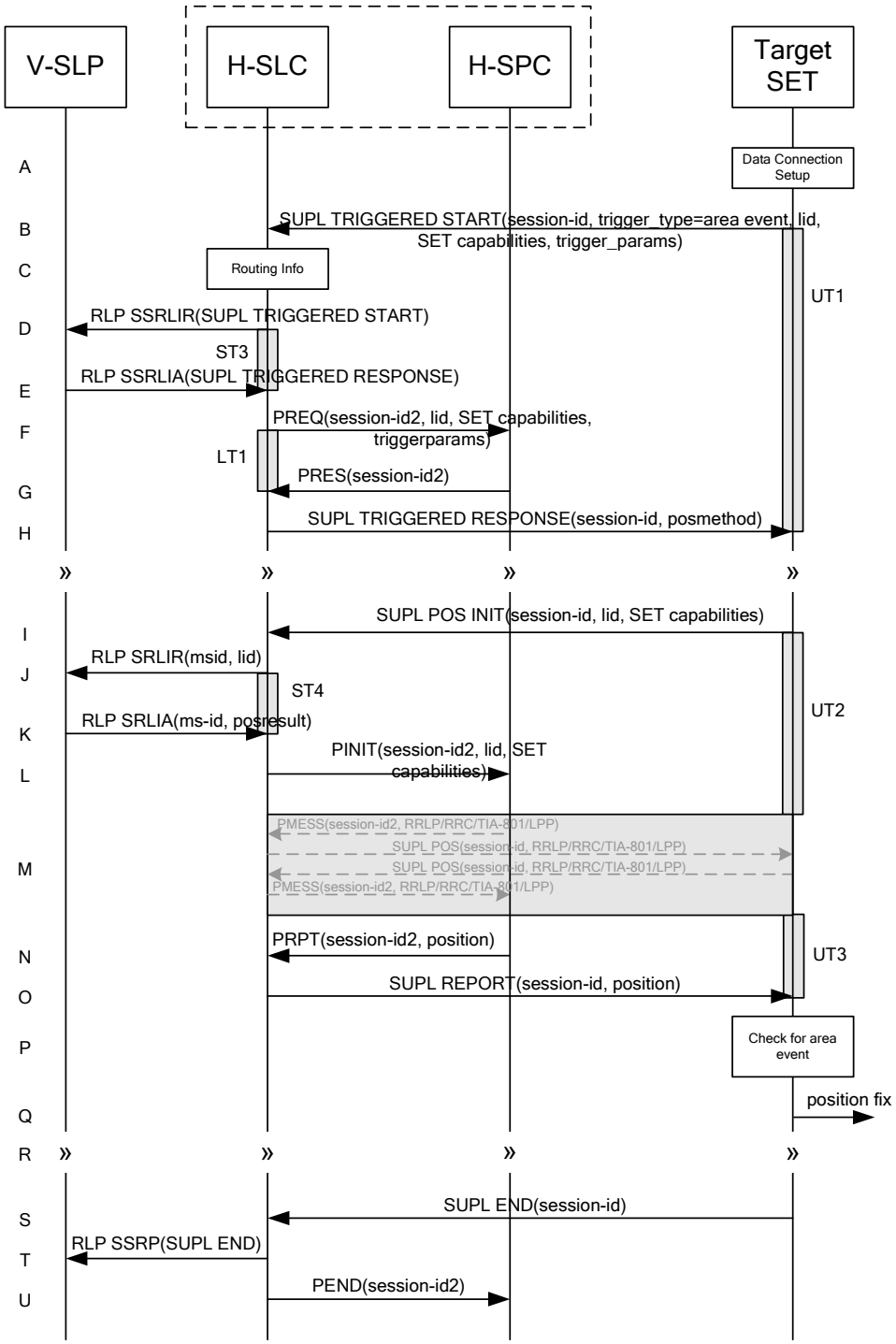

Figure 67: SET Initiated Area Event Trigger Service Roaming Successful Case – Proxy with H-SLP positioning

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NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for an area event triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case area event), Location ID (lid) and area event trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. Based on the received lid or other mechanisms, the H-SLC determines the V-SLP and sends an RLP SSRLIR including a SUPL TRIGGERED START to the V-SLP to inform the V-SLP that an area event triggered session is in the progress of being initiated with the H-SLP. The area event trigger parameters such as area information requested by SUPL Agent for the area event triggered session MAY be included in this message by the H-SLC.

E. The V-SLP acknowledges the RLP request received in step D with a SUPL TRIGGERED RESPONSE message which is carried inside an RLP SSRLIA message.

F. The H-SLC requests service from the H-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

G. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

H. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the H-SLP MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step G, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLP SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC sends a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE contains the session-id but no H-SLP address, to indicate to the SET that a new connection SHALL NOT be established. The SUPL TRIGGERED RESPONSE also contains the posmethod. The SET and the H-SLC MAY release the secure connection.

I. When the area event trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SLP. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position is received in the SUPL POS INIT message that meets any required QoP, the H-SLC MAY directly proceed to step O and not engage in a SUPL POS session.

J. To obtain a coarse position based on lid received in step I, the H-SLC sends an RLP SRLIR message to the V-SLP.

K. The V-SLP translates the received lid into a position estimate and returns the result to the H-SLC in an RLP SRLIA message.

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If the received position meets any required QoP, the H-SLC MAY directly proceed to step O and not engage in a SUPL POS session.

L. The H-SLC sends a PINIT message to the H-SPC including session-id2, location id and SET capabilities. The H-SLC MAY include a posmethod in the PINIT. This posmethod may either be the posmethod recommended by the H-SPC in step G, or a different posmethod of the H-SLC's choosing, as long as it is one supported by the H-SPC. Based on the PINIT message including the SET capabilities, the H-SPC SHALL determine the posmethod. If a posmethod has been included in the PINIT by the H-SLC, the H-SPC SHALL use that posmethod, unless it does not meet the SET capabilities. If no posmethod parameter was included in the PINIT, the H-SPC shall choose any posmethod in line with the SET capabilities which was approved by the H-SLC in step F.

M. The SET and the H-SPC exchange several successive positioning procedure messages. Thereby the positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SPC and the H-SLC using PMESS messages. PMESS includes the session-id2 and the positioning procedure payload (RRLP/RRC/TIA-801/LPP). The positioning procedure payload (RRLP/RRC/TIA-801/LPP) is transferred between the H-SLC and the SET using SUPL POS messages (the PMESS – SUPL POS – SUPL POS – PMESS message exchange is conceptually shown in dotted lines).
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance obtained from the H-SPC (SET-Based).

N. Once the position calculation is complete, the H-SPC sends a PRPT message to the H-SLC. PRPT contains the session-id2, the position result if calculated in the H-SPC and the number of the fix.

O. Once the position calculation is complete, the H-SLC sends a SUPL REPORT message to the SET.
The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SLP and therefore needs to be sent to the SET.

P. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met.

Q. If the area event was triggered the SET forwards the calculated position estimate to the internal SUPL Agent.

R. If the SET decides to end the triggered session the SET proceeds to step s. Otherwise whenever the area event trigger mechanism in the SET indicates that a new position fix has to be performed, steps I to Q are repeated.

S. The SET ends the triggered session by sending a SUPL END message to the H-SLC.

T. The H-SLP informs the V-SLP about the end of the triggered session by sending a SUPL END message in an RLP SSRP tunnel message.

U. The H-SLC informs the H-SPC about the end of the area event triggered session in a PEND message. PEND contains session-id2.

The flow described in Figure 67 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step M is not performed for cell-id based positioning methods.
- In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP/V-SLP is required to calculate a position estimate. Interaction with the H-SLP/V-SLP is only required for GPS assistance data update in which case steps I to O are performed.

7.4 SET Initiated – Non-Proxy mode

This section describes the flows for SET Initiated area event triggered services for non-proxy mode. The trigger thereby resides in the SET and the SET makes the decision if an area event occurred based on continuously repeated position determinations.

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7.4.1 Non-Roaming Successful Case

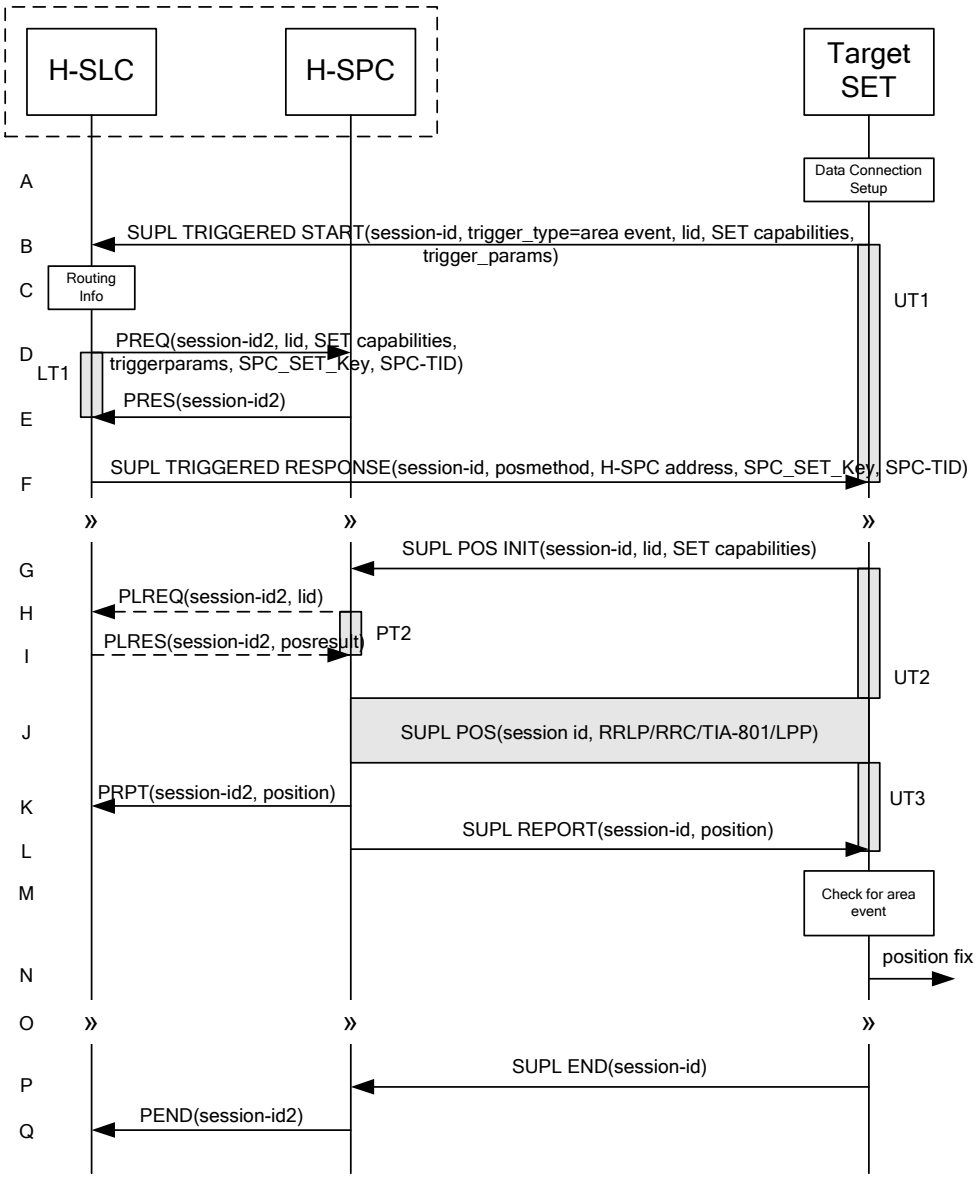

Figure 68: SET Initiated Area Event Trigger Service Non-Roaming Successful Case – Non-Proxy Mode

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for an area event triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case area event), Location ID (lid) and area event trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently not SUPL Roaming.

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NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside the scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. The H-SLC requests service from the H-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The H-SLC also creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. SPC_SET_Key and SPC-TID are forwarded to the H-SPC in the PREQ message. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

E. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

F. Consistent with the SUPL TRIGGERED START message including the SET capabilities of the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step E, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC SHALL respond with a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains session-id, posmethod, H-SPC address and SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. The SET and the H-SLP MAY release the secure connection.

G. When the area event trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.

H. If the H-SPC cannot translate the lid received in step G into a coarse position, the H-SPC sends a PLREQ message to the H-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the H-SPC can perform the translation from lid into coarse position itself.

I. This step is conditional and only occurs if step H was performed. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets any required QoP, the H-SPC MAY directly proceed to step K and not engage in a SUPL POS session.

J. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step D, the H-SPC SHALL only choose an approved method.The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance data obtained from the H-SPC (SET-Based).

K. The H-SPC may optionally inform the H-SLC about the position fix or assistance data delivery process performed in step J. To this end the H-SPC sends a PRPT message to the H-SLC. PRPT contains at least session-id2.

L. Once the position calculation is complete the H-SPC sends a SUPL REPORT message to the SET. The SET MAY release the secure connection to the H-SPC.
The SUPL REPORT message includes the position result if the position estimate is calculated in the H-SPC and therefore needs to be sent to the SET.

M. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met.

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N. If the area event was triggered the SET forwards the calculated position estimate to the internal SUPL Agent.

O. If the SET decides to end the triggered session the SET proceeds to step P. Otherwise whenever the area event trigger mechanism in the SET indicates that a new position fix has to be performed, steps G to N are repeated.

P. The SET ends the triggered session by sending a SUPL END message to the H-SPC.

Q. The H-SPC informs the H-SLC about the end of the triggered session by sending a PEND message. PEND contains the session-id2.

The flow described in Figure 68 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step J is not performed for cell-id based positioning methods.
- Steps H and I may or may not be performed for cell-id based positioning methods.
- In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP is required to calculate a position estimate. Interaction with the H-SLP is only required for GPS assistance data update in which case steps G to L are performed.

7.4.2 Roaming with V-SPC Positioning Successful Case

SUPL Roaming where the V-SPC is involved in the position calculation.

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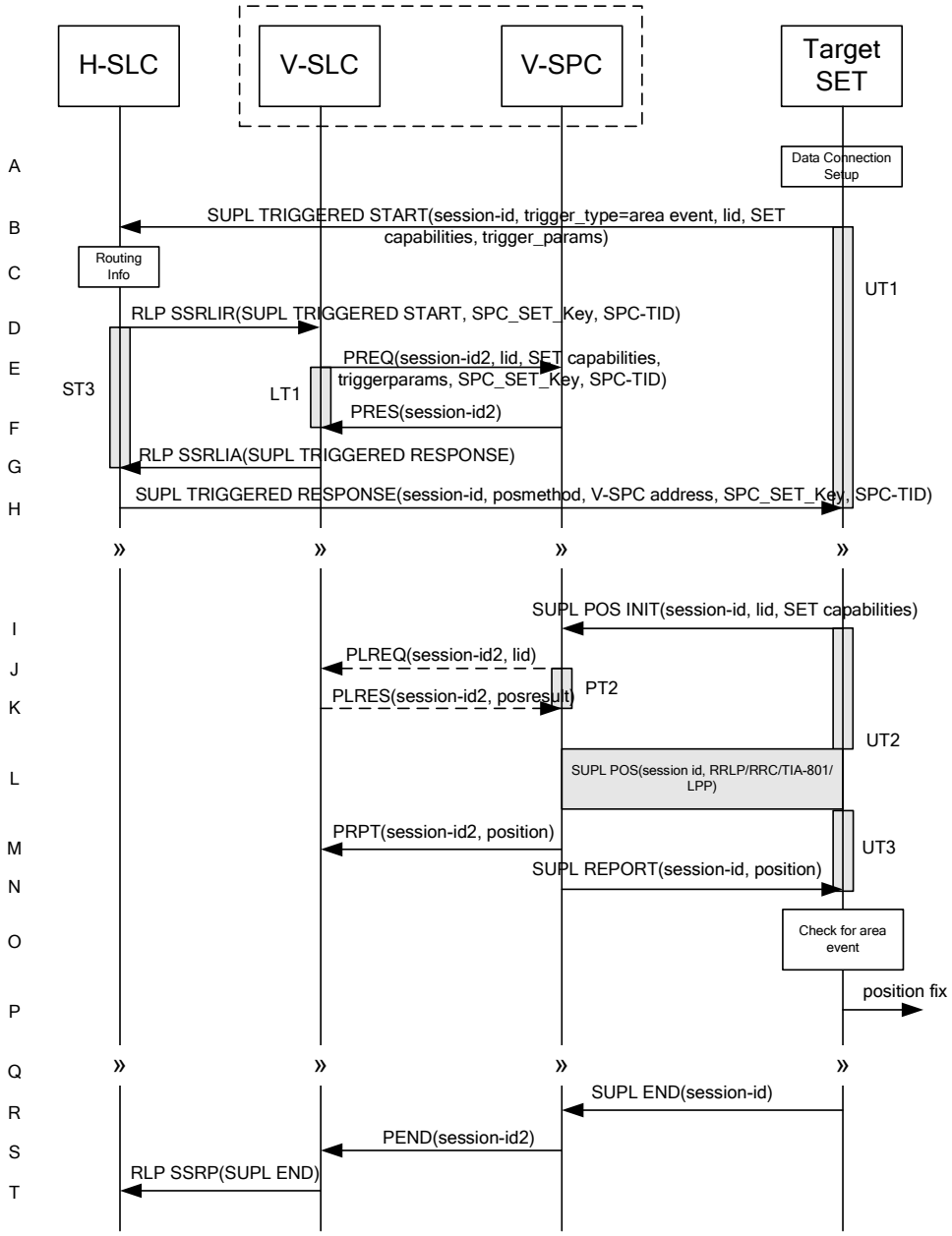

Figure 69: SET Initiated Area Event Trigger Service Roaming Successful Case – Non-Proxy with V-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for an area event triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case area event), Location ID (lid) and area event trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

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NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. Based on the received lid or other mechanisms, the H-SLC determines the V-SLC and sends an RLP SSRLIR including the SUPL TRIGGERED START message to the V-SLC to inform the V-SLC that the target SET will initiate a SUPL positioning procedure. The area event trigger parameters such as area information requested by SUPL Agent for the area event triggered session MAY be included in this message by the H-SLC. The H-SLC also creates SPC_SET_Key and SPC-TID to be used for mutual V-SPC/SET authentication. SPC_SET_Key and SPC-TID are sent to the V-SLC as part of the RLP SSRLIR message.

E. The V-SLC requests service from the V-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The PREQ MAY also optionally contain the QoP. The PREQ message also contains SPC_SET_Key and SPC-TID used for mutual V-SPC/SET authentication. The V-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the V-SPC SHALL assume that all its available positioning methods have been approved.

F. The V-SPC accepts the service request for a SUPL session from the V-SLC with a PRES message containing the session-id2. The V-SPC MAY include a preferred positioning method in the PRES. The V-SPC MAY include its supported positioning methods in the PRES.

G. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the V-SLC MAY determine the posmethod. If the V-SPC included a list of supported posmethods in step F, the chosen posmethod SHALL be on this list. If required for the posmethod, the V-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The V-SLC responds with a SUPL TRIGGERED RESPONSE tunnelled over RLP in a SSRLIA message back to the H-SLC that it is capable of supporting this request. The SUPL TRIGGERED RESPONSE contains at least the sessionid, posmethod and the V-SPC address.

H. The H-SLC sends a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains session-id, posmethod, V-SPC address and SPC_SET_Key and SPC-TID for mutual V-SPC/SET authentication. The SET and the H-SLC MAY release the secure connection.

I. When the area event trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the V-SPC. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position calculated based on information received in the SUPL POS INIT message is available (e.g. a cell-id based position fix) that meets any required QoP, the V-SPC MAY directly proceed to step M and not engage in a SUPL POS session.

J. If the V-SPC cannot translate the lid received in step I into a coarse position, the V-SPC sends a PLREQ message to the V-SLC. The PLREQ message contains the session-id2 and the lid. This step is optional and not required if the V-SPC can perform the translation from lid into coarse position itself.

K. This step is conditional and only occurs if step J was performed. The V-SLC reports the coarse position result back to the V-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets any required QoP, the V-SPC MAY directly proceed to step M and not engage in a SUPL POS session.

L. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the V-SPC SHALL determine the posmethod. If the V-SLC included its approved positioning methods in step E, the V-SPC SHALL only choose an approved method. The SET and the V-SPC exchange several successive positioning procedure messages.
The V-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance data obtained from the V-SPC (SET-Based).

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M. The V-SPC may optionally inform the V-SPC about the position fix or assistance data delivery process performed in step L. To this end the V-SPC sends a PRPT message to the V-SLC. PRPT contains at least session-id2

N. Once the position calculation is complete, the V-SPC sends a SUPL REPORT message to the SET. The SET and the H-SPC MAY release the secure connection.
The SUPL REPORT message includes the position result if the position estimate is calculated in the V-SPC and therefore needs to be sent to the SET.

O. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met.

P. If the area event was triggered the SET forwards the calculated position estimate to the internal SUPL Agent.

Q. If the SET decides to end the triggered session the SET proceeds to step R. Otherwise whenever the area event trigger mechanism in the SET indicates that a new position fix has to be performed, steps I to P are repeated.

R. The SET ends the triggered session by sending a SUPL END message to the V-SPC.

S. The V-SPC informs the V-SLC about the end of the triggered session by sending a PEND message. PEND contains the session-id2.

T. The V-SLC informs the H-SLC about the end of the triggered session by sending a SUPL END message using an RLP SSRP tunnel message to the H-SLC.

The flow described in Figure 69 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step L is not performed for cell-id based positioning methods.
- Steps J and K may or may not be performed for cell-id based positioning methods.
- In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP is required to calculate a position estimate. Interaction with the H-SLP is only required for GPS assistance data update in which case steps I to N are performed.

7.4.3 Roaming with H-SPC Positioning Successful Case

SUPL Roaming where the H-SPC is involved in the position calculation.

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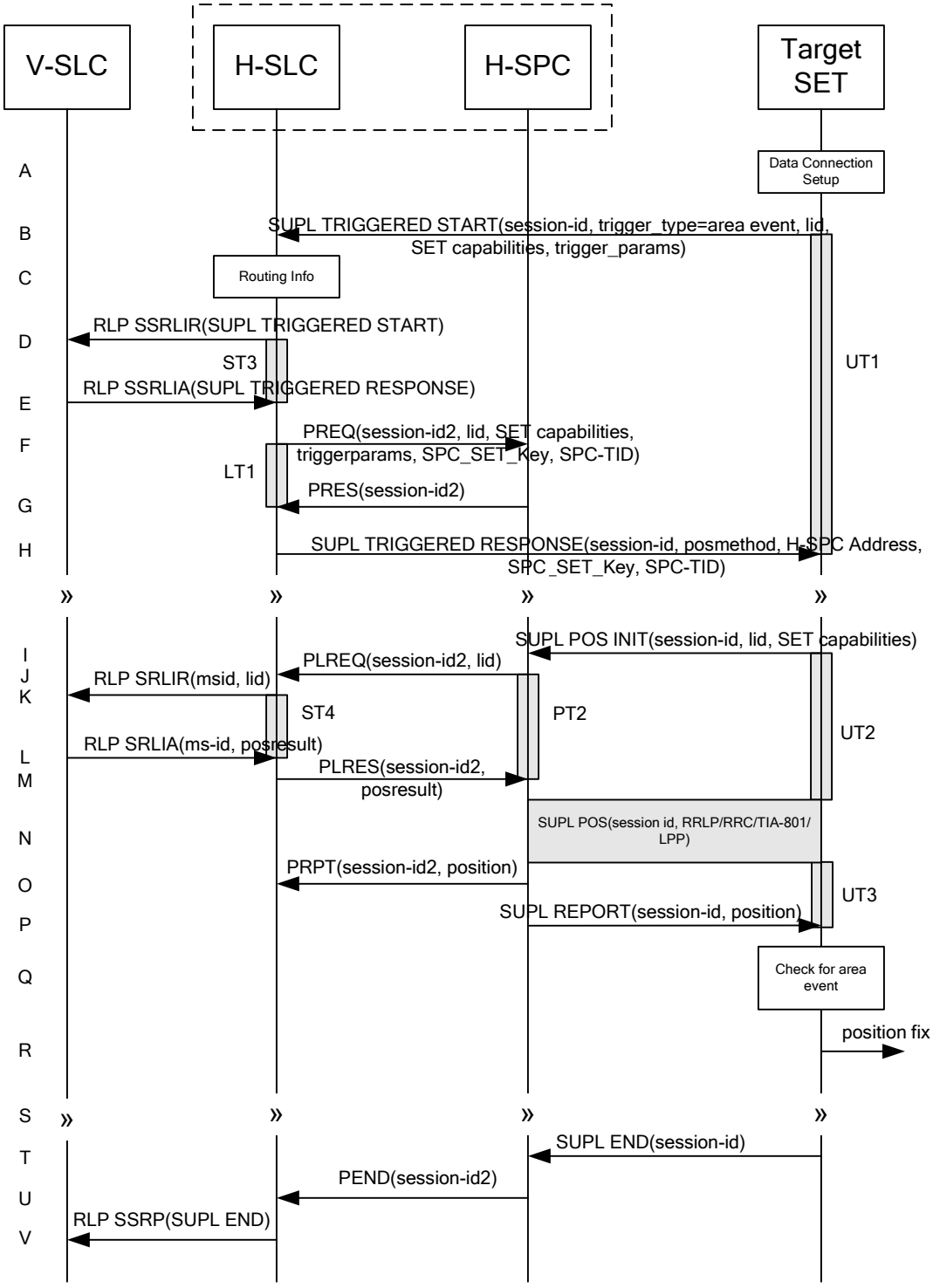

Figure 70: SET Initiated Area Event Trigger Service Roaming Successful Case – Non-Proxy with H-SPC positioning

NOTE 1: See Appendix C for timer descriptions.

A. The SUPL Agent on the SET receives a request for an area event triggered service from an application running on the SET. The SET takes apropriate action establishing or resuming a secure connection.

B. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL TRIGGERED START message to start a positioning session with the

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H-SLP. The SUPL TRIGGERED START message contains session-id, SET capabilities, trigger type indicator (in this case area event), Location ID (lid) and area event trigger parameters. The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP).

C. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0. However, there are various environment dependent mechanisms.

D. Based on the received lid or other mechanisms, the H-SLC determines the V-SLP and sends an RLP SSRLIR including a SUPL TRIGGERED START message to the V-SLC to inform the V-SLP that an area event triggered session is in the progress of being initiated with the H-SLP. The area event trigger parameters such as area information requested by SUPL Agent for the area event triggered session MAY be included in this message by the H-SLC.

E. The V-SLC acknowledges the RLP request received in step D with a SUPL TRIGGERED RESPONSE message which is carried inside an RLP SSRLIA message.

F. The H-SLC requests service from the H-SPC for an area event triggered SUPL session by sending a PREQ message containing the session-id2, the SET capabilities, the triggerparams and the lid. The H-SLC also creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication. SPC_SET_Key and SPC-TID are forwarded to the H-SPC in the PREQ message. The PREQ MAY also optionally contain the QoP. The H-SLC MAY include its approved positioning methods for this session in the PREQ. If the approved positioning methods are not included, the H-SPC SHALL assume that all its available positioning methods have been approved.

G. The H-SPC accepts the service request for a SUPL session from the H-SLC with a PRES message containing the session-id2. The H-SPC MAY include a preferred positioning method in the PRES. The H-SPC MAY include its supported positioning methods in the PRES.

H. Consistent with the SUPL TRIGGERED START message including posmethod(s) supported by the SET, the H-SLC MAY determine the posmethod. If the H-SPC included a list of supported posmethods in step G, the chosen posmethod SHALL be on this list. If required for the posmethod, the H-SLC SHALL use the supported positioning protocol (e.g., RRLP, RRC, TIA-801 or LPP) from the SUPL TRIGGERED START message. The H-SLC sends a SUPL TRIGGERED RESPONSE message to the SET. The SUPL TRIGGERED RESPONSE message contains session-id, posmethod, H-SPC address and SPC_SET_Key and SPC-TID for mutual H-SPC/SET authentication. The SET and the H-SLC MAY release the secure connection.

I. When the area event trigger in the SET indicates that a position fix has to be calculated the SET takes appropriate action establishing or resuming a secure connection. The SET then sends a SUPL POS INIT message to start a positioning session with the H-SPC. The SUPL POS INIT message contains at least session-id, SET capabilities and Location ID (lid). The SET capabilities include the supported positioning methods (e.g., SET-Assisted A-GPS, SET-Based A-GPS) and associated positioning protocols (e.g., RRLP, RRC, TIA-801 or LPP). The SET MAY optionally provide NMR specific for the radio technology being used (e.g., for GSM: TA, RXLEV). The SET MAY provide its position, if this is supported. The SET MAY include the first SUPL POS element in the SUPL POS INIT message. The SET MAY set the Requested Assistance Data element in the SUPL POS INIT.
If a position is received in the SUPL POS INIT message that meets any required QoP, the H-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

J. The H-SPC sends a PLREQ message to the H-SLC to request translation of the received lid into a coarse position. The PLREQ message contains the session-id2 and the lid.

K. To obtain a coarse position the H-SLC sends an RLP SRLIR message to the V-SLP.

L. The V-SLC translates the received lid into a position estimate and returns the result to the H-SLC in an RLP SRLIA message.

M. The H-SLC reports the coarse position result back to the H-SPC in a PLRES message. PLRES contains the session-id2 and the posresult. If the coarse position meets any required QoP, the H-SPC MAY directly proceed to step O and not engage in a SUPL POS session.

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N. Based on the SUPL POS INIT message including posmethod(s) supported by the SET the H-SPC SHALL determine the posmethod. If the H-SLC included its approved positioning methods in step F, the H-SPC SHALL only choose an approved method. The SET and the H-SPC exchange several successive positioning procedure messages.
The H-SPC calculates the position estimate based on the received positioning measurements (SET-Assisted) or the SET calculates the position estimate based on assistance data obtained from the H-SPC (SET-Based).

O. The H-SPC may optionally inform the H-SPC about the position fix or assistance data delivery process performed in step N. To this end the H-SPC sends a PRPT message to the H-SLC. PRPT contains at least session-id2.

P. Once the position calculation is complete, the H-SPC sends a SUPL REPORT message to the SET. The SET and the H-SPC MAY release the secure connection.
The SUPL REPORT message includes the position result if the position estimate is calculated in the V-SPC and therefore needs to be sent to the SET.

Q. The SET compares the calculated position estimate with the event area to check if the event trigger condition has been met.

R. If the area event was triggered the SET forwards the calculated position estimate to the internal SUPL Agent.

S. If the SET decides to end the triggered session the SET proceeds to step T. Otherwise whenever the area event trigger mechanism in the SET indicates that a new position fix has to be performed, steps I to R are repeated.

T. The SET ends the triggered session by sending a SUPL END message to the H-SPC.

U. The H-SPC informs the H-SLC about the end of the triggered session by sending a PEND message. PEND contains the session-id2.

V. The H-SLC informs the V-SLC about the end of the triggered session by sending a SUPL END message using an RLP SSRP tunnel message to the V-SLC.

The flow described in Figure 70 is applicable to all positioning methods, however, individual steps within the flows are optional:

- Step N is not performed for cell-id based positioning methods.
- Steps J, K, L and M may or may not be performed for cell-id based positioning methods.
- In A-GPS SET Based mode where no GPS assistance data is required from the network, no interaction with the H-SLP/V-SLP is required to calculate a position estimate. Interaction with the H-SLP/V-SLP is only required for GPS assistance data update in which case steps I to P are performed.

7.5 Network/SET capabilities Change for Area Event Triggered Scenarios

This procedure which is defined in [SUPL 2 ULP TS] section 5.1.14 does not have implications for ILP since no routing info mechanism (i.e. to determine the SET's serving network) is defined in SUPL 2.0 (considered out of scope for SUPL 2.0) and a change in SET capabilities does not require additional ILP messaging.

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8. Detailed Flows – SLC/SPC Heartbeat

8.1 Successful PALIVE exchange

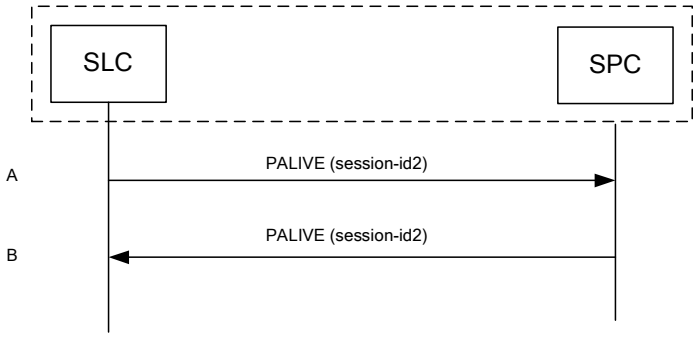

Figure 71: Successsful PALIVE exchange

NOTE 1: This callflow applies both to PALIVE exchanges between the H-SLC and H-SPC and between the V-SLC and V-SPC.

NOTE 2: The use of guard timers for the PALIVE exchange is considered implementation dependent and out of scope for ILP.

A. The SLC issues a PALIVE message to the SPC. The PALIVE message contains a session-id2 with an SLC Session ID. If a SET Session ID or SPC Session ID are included in the session-id2 parameter, they will be ignored

B. The SPC SHALL respond with a PALIVE. The PALIVE message contains at least a session-id2. The SPC MAY include an SPCStatusCode in the PALIVE message.

8.2 PALIVE Error Handling

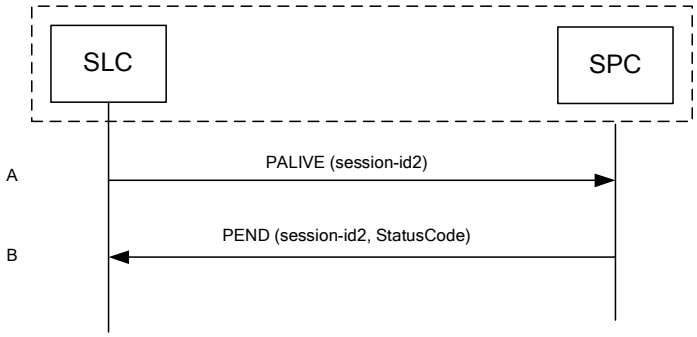

Figure 72: PALIVE Error handling

NOTE 1: This callflow covers the exception handling for the Successful PALIVE Exchange shown in 8.1. It applies it situations where the PALIVE arriving at the SPC cannot be decoded, contains a protocol error or is an unsupported version of ILP.

NOTE 2: This callflow applies both to PALIVE exchanges between the H-SLC and H-SPC and between the V-SLC and V-SPC.

NOTE 3: The use of guard timers for the PALIVE exchange is considered implementation dependent and out of scope for ILP.

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A. The SLC issues a PALIVE message to the SPC. The PALIVE message contains a session-id2 with an SLC Session ID. If a SET Session ID or SPC Session ID are included in the session-id2 parameter, they will be ignored

B. If the SPC cannot decode the incoming PALIVE message, or if it contains a protocol error or is a version of ILP that the SPC does not support, the SPC SHALL respond with a PEND with an appropriate Status Code.

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9. Security Considerations

This section describes the security considerations of ILP.

9.1 SLC-SPC Security

The connection between the SLC and SPC SHALL be secure. The specifics of which methods are used to secure the connection are beyond the scope of this document

9.2 Non-Proxy Mode Mutual Authentication Key Refresh Mechanism

The keys used for mutual authentication in non-proxy mode (SPC_SET_Key, SPC-TID, SPC_SET_Key_lifetime) require a refresh mechanism for triggered scenarios. For immediate scenarios, no refresh mechanism is required since the duration of an immediate SUPL session never exceeds the lifetime of the mutual authentication keys SPC_SET_Key and SPC-TID and each new authentication keys are generated at the beginning of each immediate SUPL session. The following sections describe a key refresh mechanism for non-roaming and roaming scenarios.

9.2.1 Mutual Authentication Key Refresh Mechanism for non roaming

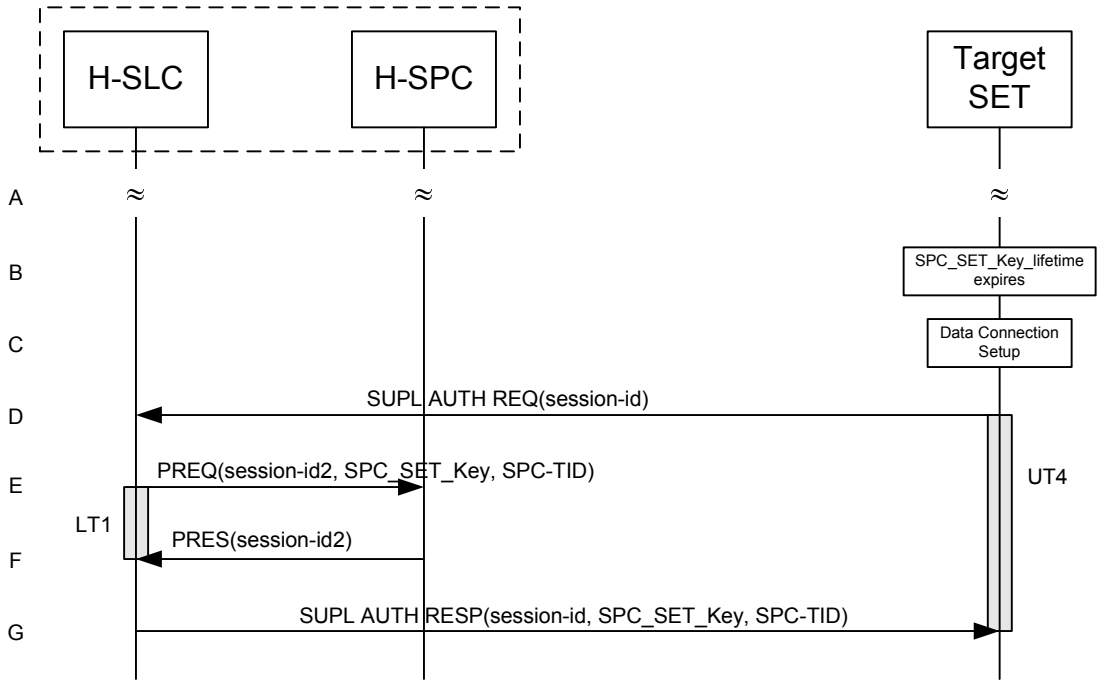

Figure 73: Mutual authentication key refresh mechanism for non roaming

NOTE 1: See Appendix C for timer descriptions.

A. The SET and the H-SLP are engaged in a non-proxy triggered SUPL session.

B. A fixed (and configurable) amount of time before SPC_SET_Key_lifetime expires, the SET requires a new SPC_SET_Key and SPC-TID to be used for mutual SET/H-SPC authentication.

C. The SET takes apropriate action establishing or resuming a secure connection.

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D. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL AUTH REQ message to the H-SLC. The SUPL AUTH REQ message contains the session-id.

E. The H-SLC creates SPC_SET_Key and SPC-TID to be used for mutual H-SPC/SET authentication and optionally also a new SPC_SET_Key_lifetime. The H-SLC forwards these keys to the H-SPC in a PREQ message. PREQ contains session-ids, SPC_SET_Key, SPC-TID and optionally SPC_SET_Key_lifetime.

F. The H-SPC confirms the receipt of the PREQ message with a PRES message.

G. The H-SLC forwards SPC_SET_Key, SPC-TID and optionally SPC_SET_Key_lifetime to the SET in a SUPL AUTH RESP message. The SET MAY release the IP connection to the H-SLC.

9.2.2 Mutual Authentication Key Refresh Mechanism for roaming with V-SLP

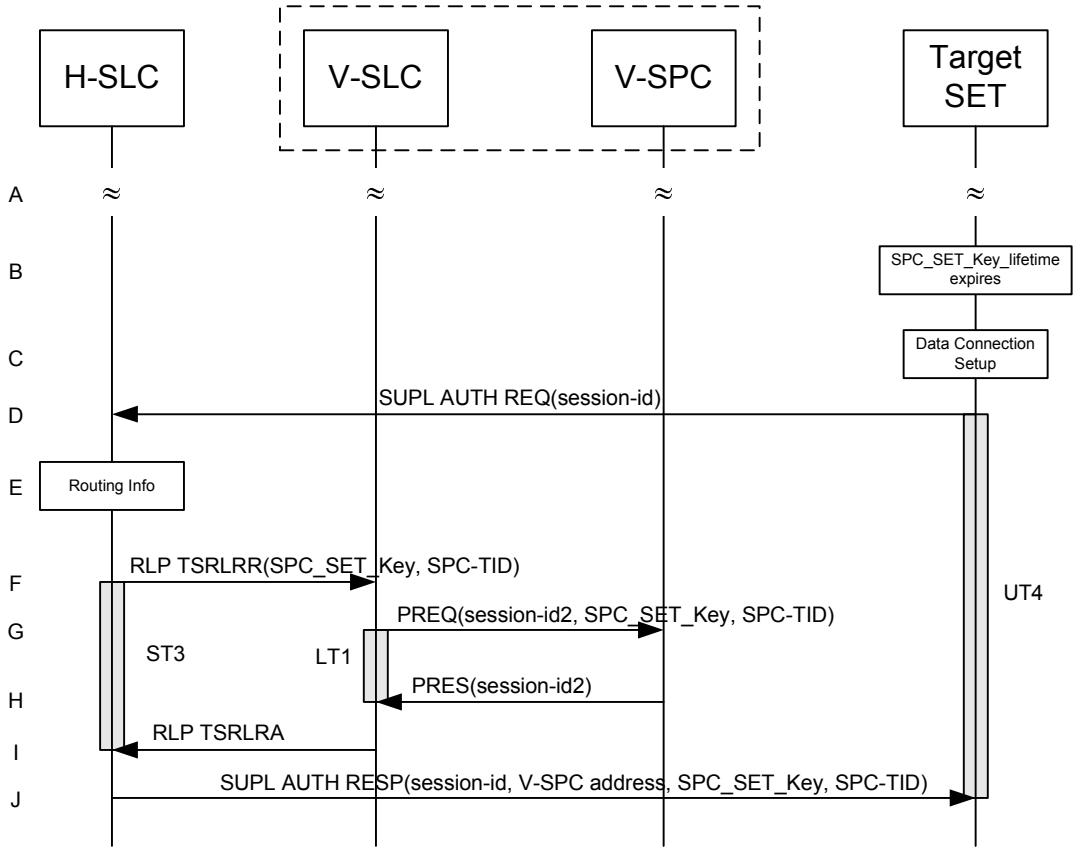

Figure 74: Mutual authentication key refresh mechanism for roaming with V-SLP

NOTE 1: See Appendix C for timer descriptions.

A. The SET and the H/V-SLP are engaged in a non-proxy triggered SUPL session.

B. A fixed (and configurable) amount of time before SPC_SET_Key_lifetime expires, the SET requires a new SPC_SET_Key and SPC-TID to be used for mutual SET/V-SPC authentication.

C. The SET takes apropriate action establishing or resuming a secure connection.

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D. The SUPL Agent on the SET uses the default address provisioned by the Home Network to establish a secure connection to the H-SLC and sends a SUPL AUTH REQ message to the H-SLC. The SUPL AUTH REQ message contains the session-id.

E. The H-SLC verifies that the target SET is currently SUPL Roaming.

NOTE 2: The specifics for determining if the SET is SUPL Roaming or not is considered outside scope of SUPL 2.0 (there are various environment dependent mechanisms).

F. The H-SLC creates SPC_SET_Key and SPC-TID to be used for mutual V-SPC/SET authentication and optionally also a new SPC_SET_Key_lifetime. The H-SLC forwards these keys to the V-SPC in a RLP SSRLIR message.

G. The V-SLC forwards SPC_SET_Key, SPC-TID and optionally SPC_SET_Key_lifetime to the V-SPC in a PREQ message.

H. The V-SPC confirms the receipt of the PREQ message with a PRES message.

I. The V-SLC responds to the H-SLC with an RLP RSRLRA message.

J. The H-SLC forwards V-SPC address, SPC_SET_Key, SPC-TID and optionally SPC_SET_Key_lifetime to the SET in a SUPL AUTH RESP message. The SET MAY release the IP connection to the H-SLC.

9.2.3 Mutual Authentication Key Refresh Mechanism for roaming with H-SLP

The key refresh mechanism for roaming with H-SLP follows the exact same flow as for non-roaming (section 9.2.1).

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10.Protocols and Interfaces

The encoding for the ILP protocol SHALL be ASN.1 [ASN.1].

The encoding is BASIC-PER, unaligned encoding [PER.1].

The transport protocol between SLC and SPC SHALL be TCP/IP.

10.1 TCP/IP

An Llp reference point MAY provide two socket ports for operation, one for encryption with TLS 1.1 [TLS] and one without.

The port numbers for ILP messages transported over TCP SHALL be as registered with IANA (Internet Assigned Numbers Authority). The port numbers are:

oma-ilp	7276/tcp	OMA Internal Location Protocol
oma-ilp-s	7277/tcp	OMA Internal Location Secure Protocol

Note: An SLC or SPC MAY choose to introduce other technologies for secure transfer. Any such technology SHALL be provided over a different port than the two mentioned above.

10.2 Llp

The function of the Llp reference point is logically separated into Positioning Control and Positioning Data .

10.2.1 Positioning Control

The Positioning Control interface is used in the establishment, maintenance and clearing of sessions between the SLC and SPC. It enables the SLC and SPC to perform Position Calculation Function.

Table 1 shows the messages of the Llp Positioning Control interface.

Message Name	Description
PREQ	The PREQ message is used by the SLC to request a SUPL session of the SPC.
PRES	The PRES message is the response to a PREQ message and sent by the SPC to the SLC.
PRPT	The PRPT message is used by the SPC to report a position estimate or an error to the SLC.
PLREQ	The PLREQ message is used by the SLC (or SPC) to request a cell-id translation into coarse position estimate from the SPC (or SLC).
PLRES	The PLRES message is used by the SPC (or SLC) to report a coarse position estimate based on cell-id translation to the SLC (or SPC).
PAUTH	The PAUTH message is used by the SLC to send SUPL authentication parameters to the SPC.
PALIVE	The PALIVE message is used by the SLC to verify the operational status of the SPC. The SLC may send the PALIVE message at any time. The SPC must then respond with a corresponding PALIVE message.
PEND	The PEND message is used by the SLC (or SPC) to inform the SPC (or SLC) about the end of a SUPL session.

Table 1: Llp Positioning Control

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10.2.2 Positioning Data

The Positioning Data interface is used to transport information used for the position calculation. This interface is used in proxy mode only.

Table 2 shows the messages of the Positioning Data interface.

Message Name	Description
PMESS	The PMESS message is bidirectional and is used to carry RRLP/RRC/TIA-801/LPP payload.
PINIT	The PINIT message is used by the SLC to initiate the positioning protocol session (RRLP/RRC/TIA-801/LPP) with the SPC.

Table 2: Llp Positioning Data

For additional requirements concerning the use of positioning protocols and position determination messages, refer to [SUPL2 ULP TS].

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11.ILP Message Definitions (Normative)

This section contains a normative description of the ILP messages. All messages in ILP contain a common part and a message specific part.

11.1 Common Part

Parameter	Presence	Description
Message Length	M	The length of the entire ILP Message in octets. Note: The first two octets of a PER encoded ILP message contains the length of the entire message. These octets are set to the Message Length when the PER encoding is complete and the entire message length is known.
Version	M	Version of the ILP protocol, in the form Major, Minor, Service Indicator
Session ID2	M	The unique Session ID2
Message Payload	M	This parameter contains one of the messages defined in ILP. Defined messages are: • PREQ • PRES • PRPT • PLREQ • PLRES • PINIT • PAUTH • PALIVE • PEND • PMESS

Table 3: Common Part

11.2 Message Specific Part

The message specific part contains further parameters that are unique for each ILP message. The following sections describe the message specific part of ILP messages.

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11.2.1 PREQ

The PREQ message is used by the SLC to request a SUPL session from the SPC.

Parameter	Presence	Values/description
SLP Mode	M	Indicates whether proxy or non-proxy mode is used.
Approved Positioning Method List	O	Defines the list of positioning technologies approved by the SLC, which can be A-GNSS SET assisted, A-GNSS SET Based, Autonomous GNSS, EOTD, OTDOA, AFLT or Enhanced Cell ID. If this list is not present, the H-SPC SHALL assume all available positioning technologies have been approved by the SLC.
Location ID	O	Describes a globally unique cell, WLAN AP or WiMAX BS identification of the most current serving cell
Multiple Location IDs	O	This parameter may contain current non-serving cell, current non-serving WLAN AP or current non-serving WiMAX BS information for the SET and/or historic serving or non-serving cell, or WLAN AP or WiMAX BS information for the SET.
Position	O	Defines the position estimate for the SET.
Trigger Parameters	CV	This parameter is only required for triggered SUPL sessions and defines the trigger parameters.
SPC_SET_Key	O	This parameter is only required for non-proxy mode for certain scenarios (not all scenarios) and is used for mutual SET - H/V-SPC authentication.
SPC-TID	O	This parameter defines the transaction ID used for mutual SET - H/V-SPC authentication. It is only used for certain scenarios (not all scenarios).
SPC_SET_Key_lifetime	O	This parameter defines the lifetime of SPC_SET_Key. This parameter is optional. If not present, a default value of 24 hours is assumed. The units are in hours and the range is from 1 to 24 hours.
QoP	O	Desired Quality of Position
SET Capabilities	O	Defines the capabilities of the SET. This parameter MUST not be used for Immediate Network Initiated scenarios but MUST be used for all other scenarios.
Notification Mode	O	This parameter indicates whether any

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		combination of notification or verification based on location is required. It is only applicable for Non-Proxy mode. If not present, the H-SPC SHALL assume notification or verification based on location is not required.

Table 4: PREQ Message

11.2.2 PRES

The PRES message is sent by the SPC in response to a PREQ message.

Parameter	Presence	Values/description
Preferred Positioning Method	O	Defines the SPC's preferred positioning method If the Preferred Positioning Method is AGNSS SET Assisted or AGNSS SET Based, the parameter GNSS Positioning Technology MUST be present to indicate the actual positioning technologies. If the Preferred Positioning Method is Autonomous GNSS, the parameter GNSS Positioning Technology MAY be present.
GNSS Positioning Technology	O	Defines the actual GNSSs allowed for AGNSS SET Assisted, AGNSS SET Based or Autonomous GNSS in the Preferred Positioning Method parameter. • GPS • Galileo • SBAS • Modernized GPS • QZSS • GLONASS Note: GPS MUST NOT be the only allowed GNSS in this parameter
Supported Positioning Method List	O	Defines the list of positioning technologies supported by the SPC.
Position	O	Defines the position estimate for the SET. This parameter is used if PREQ contained a Location ID based on which the SPC calculated a position estimate.
SPC Status Code	O	Defines the status code for error handling.

Table 5: PRES Message

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11.2.3 PRPT

The PRPT message is used by the SPC to report a position estimate. PRPT is only used for triggered services.

Parameter	Presence	Values/description
Position	O	Defines the position estimate for the SET. The position parameter may be omitted in error scenarios in which case the status code is present.
Number of fix	O	Defines the number of the fix.
Status Code	O	Defines the status code for error handling.

Table 6: PRPT Message

11.2.4 PLREQ

The PLREQ message is used by the SLC (or SPC) to request a cell-id translation into a coarse position.

Parameter	Presence	Values/description
Location ID	M	Describes a globally unique cell , WLAN AP or WiMAX BS identification of the most current serving cell.
Multiple Location IDs	O	This parameter may contain current non-serving cell, current non-serving WLAN AP or current non-serving WiMAX BS information for the SET and/or historic serving or non-serving cell, WLAN AP or WiMAX BS information for the SET according to the Supported Network Information received from the SLP.

Table 7: PLREQ Message

11.2.5 PLRES

The PLRES message is used by the SPC (or SLC) to return a coarse position based on cell-id translation request.

Parameter	Presence	Values/description
Position Results	O	Defines either a position estimate or - if no position could be calculated - a status code. Can be either one single Position Result or multiple Position Results.

Table 8: PLRES Message

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11.2.6 PINIT

The PINIT message is sent by the SLC to the SPC before the start of the positioning procedure message exchange. PINIT may optionally contain the positioning payload if the positioning protocol allows the SET to send the first message.

Parameter	Presence	Values/description
SET Capabilities	M	Defines the capabilities of the SET.
Location ID	M	Describes a globally unique cell, WLAN AP or WiMAX BS identification of the most current serving cell.Defines the cell information of the SET.
Positioning Method	O	Defines the positioning method that the SPC SHALL use. If this is not present, the SPC MAY choose any positioning method that the SLC has previously approved. If the Positioning Method is AGNSS SET Assisted or AGNSS SET Based, the parameter GNSS Positioning Technology MUST be present to indicate the actual positioning technologies. If the Positioning Method is Autonomous GNSS, the parameter GNSS Positioning Technology MAY be present.
Requested Assistance Data	O	Defines the requested GPS and GANSS assistance data. The presence of this element indicates that the SET wants to obtain specific GPS and GANSS assistance data from the SLP. The SET might use this element in any combination of A-GPS SET assisted / A-GPS SET based/A-GANSS SET assisted/A-GANSS SET based and Network initiated / SET initiated positioning. The Requested Assistance Data parameter is not applicable to TIA-801 [TIA-801].
Position	O	Defines the position of the SET.
Positioning Payload	O	If a positioning protocol that allows the SET to send the first message is used, and the SUPL POS INIT contains a positioning protocol payload, the parameter also contains that payload.
Multiple Location IDs	O	This parameter may contain current non-serving cell, current non-serving WLAN AP or current non-serving WiMAX BS information for the SET and/or historic serving or non-serving cell, WLAN AP or WiMAX BS information for the SET according to the Supported Network

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		Information received from the SLP.
UTRAN GPS Reference Time Result	O	The UTRAN GPS Reference Time Result as measured by the SET. This parameter is sent by the SET to the SLC if available and requested by the SLC in the Supported Network Information parameter (in SUPL INIT, SUPL RESPONSE or SUPL TRIGGERED RESPONSE) if the serving cell is WCDMA/TD-SCDMA and RRLP is used as the positioning protocol.
UTRAN GANSS Reference Time Result	O	The UTRAN GANSS Reference Time Result as measured by the SET. This parameter is sent by the SET to the SLC if available and requested by the SLC in the Supported Network Information parameter (in SUPL INIT, SUPL RESPONSE or SUPL TRIGGERED RESPONSE) if the serving cell is WCDMA/TD-SCDMA and RRLP is used as the positioning protocol.
GNSS Positioning Technology	CV	Defines the actual GNSSs allowed for AGNSS SET Assisted, AGNSS SET Based or Autonomous GNSS in the Positioning Method parameter. • GPS • Galileo • SBAS • Modernized GPS • QZSS • GLONASS Note: GPS MUST NOT be the only allowed GNSS in this parameter.

Table 9: PINIT Message

11.2.7 PAUTH

The PAUTH message is used by the SLC to send SUPL authentication parameter to the SPC. This message is only used in non-proxy mode.

Parameter	Presence	Values/description
SPC_SET_Key	M	This parameter is used for mutual SET - H/V-SPC authentication.
SPC-TID	M	This parameter is used for mutual SET - H/V-SPC authentication.
SPC_SET_Key_lifetime	O	This parameter defines the lifetime of SPC_SET_Key. This parameter is optional. If not present, a default value of 24 hours is assumed. The units are in hours and the range

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		is from 1 to 24 hours.

Table 10: PAUTH Message

11.2.8 PALIVE

The PALIVE message is used by the SLC to verify the operational status of the SPC and by the SPC to respond to the SLC's query.

Parameter	Presence	Values/description
SPC Status Code	CV	This parameter is only required in the response of the SPC to the SLC and defines the operational status of the SPC.

Table 11: PALIVE Message

11.2.9 PEND

The PEND message is used by the SLC (or SPC) to inform the SPC (or SLC) about the end of a SUPL session.

Parameter	Presence	Values/description
Position	O	Defines the position estimate for the SET.
Status Code	O	Defines the status code for error handling.

Table 12: PEND Message

11.2.10 PMESS

The PMESS message is used for RRLP/RRC/TIA-801/LPP payload exchange between the SET and the SPC and may contain additional information such as velocity, UTRAN GPS/GANSS Reference Time Assistance or UTRAN GPS/GANSS Reference Time Result not carried within the positioning protocol payloads.

Parameter	Presence	Values/description
Positioning Payload	M	The underlying TIA-801, RRLP, RRC or LPP element.
Velocity	O	Velocity of the SET needed to overcome the lack of this information in RRLP and RRC. Defined in [3GPP GAD]
UTRAN GPS Reference Time Assistance	O	The UTRAN GPS Reference Time Assistance is sent by the SLP to the SET if requested by the SET in the Requested Assistance Data parameter (in SUPL POS INIT) if the serving cell is WCDMA/TD-SCDMA and RRLP is used as positioning protocol. If present, this parameter is always sent from the SPC to the SLC.

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UTRAN GPS Reference Time Result	O	The UTRAN GPS Reference Time Result as measured by the SET. This parameter is sent by the SET to the SLP if available and requested by the SLP in the Supported Network Information parameter (in SUPL INIT, SUPL RESPONSE and SUPL TRIGGERED RESPONSE) if the serving cell is WCDMA/TD-SCDMA and RRLP is used as positioning protocol. If present, this parameter is always sent from the SLC to the SPC.
UTRAN GANSS Reference Time Assistance	O	The UTRAN GANSS Reference Time Assistance is sent by the SLP to the SET if requested by the SET in the Requested Assistance Data parameter (in SUPL POS INIT) if the serving cell is WCDMA/TD-SCDMA and RRLP is used as positioning protocol. If present, this parameter is always sent from the SPC to the SLC.
UTRAN GANSS Reference Time Result	O	The UTRAN GANSS Reference Time Result as measured by the SET. This parameter is sent by the SET to the SLP if available and requested by the SLP in the Supported Network Information parameter (in SUPL INIT, SUPL RESPONSE and SUPL TRIGGERED RESPONSE) if the serving cell is WCDMA/TD-SCDMA and RRLP is used as positioning protocol. If present, this parameter is always sent from the SLC to the SPC.

Table 13: PMESS Message

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12.Parameter Definitions (Normative)

This section contains descriptions of the parameters used in ILP messages.

12.1 Version

Parameter	Presence	Value/Description
Version	-	Describes the protocol version of ILP When a ILP message is received, the receiving entity SHALL determine if the Major and Minor Versions specified in the message are supported by the receiving entity. If the Major Version and Minor Versions are not supported, the exception procedure for ILP protocol error SHALL be performed. Note that there is no requirement for backwards compatibility in ILP, unlike the mechanism used in ULP.
>Maj	M	Major Version, range: (0..255), MUST be 2 for the version described in this document
>Min	M	Minor Version, range: (0..255), MUST be 0 for the version described in this document.
>Serv_ind	M	Service Indicator, range: (0..255), MUST be 0 for the version described in this document.

Table 14: Version Parameter

12.2 Session ID2

The Session ID2 SHALL be a unique value, consisting of two mandatory parts, a SLC value (SLC Session ID, see section 12.2.1) concatenated with an SPC value (SPC Session ID, see section 12.2.3). An optional SET value (SET Session ID, see section 12.2.2) MAY be included. For the SLC Session ID, the SLC SHALL reuse the values from the SLP Session ID.

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Parameter	Presence	Value/Description
SLC Session ID	M	Part of Session ID pertaining to the SLC
SET Session ID	O	Part of Session ID pertaining to the SET
SPC Session ID	M	Part of Session ID pertaining to the SPC

Table 15: Session ID2 Parameter

When sending a PREQ to the SPC, the SLC SHALL assign a value to the SLC Session ID, but the SLC SHALL not include the SPC Session ID in the message. The SPC SHALL then assign a value to the SPC Session ID when it receives the message. Any further messages SHALL contain the resultant combined Session ID for the remainder of the session.

The SLC MAY add the optional SET Session ID to the session ID2 at any time.

12.2.1 SLC Session ID

This section describes the construct of the SLP Session ID.

Parameter	Presence	Value/Description
Session ID	M	Session identifier, unique from SLC perspective. The SLC SHALL use the same value that it used in the SLP Session ID included in the ULP Session ID.
SLC ID	M	The identity of the SLC. This parameter can be of type • IPAddress o IPv4 o IPv6 • FQDN. The SLC SHALL use the same value that it used in the SLP ID included in the ULP Session ID.

Table 16: SLC Session ID Parameter

12.2.2 SET Session ID

This section describes the construct of the SET Session ID.

Parameter	Presence	Value/Description
Session ID	M	Session identifier, unique from SET perspective. This value SHALL be unique over all concurrently active ULP sessions on that particular SET. This value may be reused by the SET after the ULP session for which it is being used has ended.

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SET ID	M	SET identity value This parameter can be of type • MSISDN • MDN • MIN (encoded as per [TIA-553] • IMSI • NAI • IPAddress o IPv4 o IPv6

Table 17: SET Session ID Parameter

12.2.3 SPC Session ID

This section describes the construct of the SLP Session ID.

Parameter	Presence	Value/Description
Session ID	M	Session identifier, unique from SPC perspective. This value SHALL be unique over all concurrently active ILP sessions for that particular SPC. This value may be reused by the SP C after the ILP session for which it is being used has ended. This parameter is written into a 4-octet-string.
SPC ID	M	The identity of the SPC. This parameter can be of type • IPAddress o IPv4 o IPv6 • FQDN.

Table 18: SPC Session ID Parameter

12.3 Positioning Method

Parameter	Presence	Description
Position Method	-	Describes the positioning method: • A-GPS SET assisted only

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		• A-GPS SET based only • A-GPS SET assisted preferred (A-GPS SET based is the fallback mode) • A-GPS SET based preferred (A-GPS SET assisted is the fallback mode) • A-GNSS SET Assisted only • A-GNSS SET Based only • A-GNSS SET Assisted preferred (A-GANSS SET Based is the fallback mode) • A-GNSS SET Based preferred (A-GANSS SET Assisted is the fallback mode) • Autonomous GPS • Autonomous GNSS • AFLT • Enhanced Cell/sector • EOTD • OTDOA In case of A-GNSS SET Based, A-GNSS SET Assisted, the GNSS Positioning Technology MUST be used to specify which GNSS is to be used. For Autonomous GNSS, the GNSS Positioning Technology MAY be used to specify which GNSS is to be used..

Table 19: Positioning Method Parameter

12.4 SLP Mode

Parameter	Presence	Value/Description
SLP Mode	-	Describes the mode that the SLP uses. This parameter can be of type - Proxy mode - Non-proxy mode

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Table 20: SLP Mode Parameter

12.5 Location ID

Parameter	Presence	Values/description
Location ID	-	Defines the current serving cell, current serving WLAN AP or current serving WiMAX BS information of the SET.
>Cell Info	M	The following cell IDs are supported: • GSM Cell Info • WCDMA/TD-SCDMA Cell Info • CDMA Cell Info • HRPD Cell Info • UMB Cell Info • LTE Cell Info • WLAN AP Info • WiMAX BS Info
>Status	M	Describes whether or not the cell, WLAN AP or WiMAX BS info is: • Not Current, last known cell/AP/BS info • Current, the present cell/AP/BS info • Unknown (i.e. not known whether the cell/AP/BS id is current or not current) NOTE: The Status parameter does NOT apply to WCDMA/TD-SCDMA optional parameters (Frequency Info, Primary Scrambling Code/Cell Parameters ID and Measured Results List). Frequency Info, Primary Scrambling Code/Cell Parameters ID and Measured Results List, if present, are always considered to be correct for the current cell.

Table 21: Location ID Parameter

12.5.1 GSM Cell Info

The gsmCell parameter defines the parameter of a GSM radio cell.

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Parameter	Presence	Value/Description
Gsm Cell Info	-	GSM Cell ID
>MCC	M	Mobile Country Code, range: (0..999)
>MNC	M	Mobile Network Code, range: (0..999)
>LAC	M	Location Area Code, range: (0..65535)
>CI	M	Cell Identity, range: (0..65535)
>NMR	O	Network Measurement Report – can be present for 1 to 15 cells.
>>ARFCN	M	ARFCN, range: (0..1023)
>>BSIC	M	BSIC, range: (0..63)
>>RXLev	M	RXLEV, range: (0..63)
>TA	O	Timing Advance, range: (0..255)

Table 22: GSM Cell Info Parameter

12.5.2 WCDMA/TD-SCDMA Cell Info

The WCDMA/TD-SCDMA parameter defines the parameter of a WCDMA/TD-SCDMA radio cell.

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Parameter	Presence	Value/Description
WCDMA/TD-SCDMA Cell Info	-	WCDMA/TD-SCDMA Cell ID
>MCC	M	Mobile Country Code, range: (0..999)
>MNC	M	Mobile Network Code, range: (0..999)
>UC-ID	M	Cell Identity, range: (0..268435455). UC-ID is composed of RNC-ID and C-ID.
>Frequency Info	O	Frequency info can be: fdd: uarfcn-UL, ra nge: (0..16383) uarfcn-DL, ra nge: (0..16383) In case of fdd, uarfcn-UL is optional while uarfcn-DL is mandatory. If uarfcn-UL is not present, the default duplex distance defined for the operating frequency band shall be used [3GPP RRC]. tdd uarfcn-Nt, range: (0..16383) NOTE: Frequency Info and Primary Scrambling Code/Cell Parameters ID are always those of the current cell.
>Primary Scrambling Code	O	Primary Scrambling Code, range: (0..511) NOTE: The field applies only in the case of a WCDMA cell. NOTE: Frequency Info and Primary Scrambling Code are always those of the current cell.
>Measured Results List	O	Network Measurement Report for WCDMA/TD-SCDMA comprising both intra- and/or inter-frequency cell measurements (as per 3GPP TS 25.331).
>Cell Parameters ID	O	Cell Parameters ID, range: (0..127) NOTE: This field applies only to TD-SCDMA NOTE: Frequency info and Cell Parameters ID are always those of the current cell.
>Timing Advance	O	Timing advance NOTE**:** This field applies only to TD-SCDMA
>> TA	M	Timing advance measurement, range

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		(0..8191) For 1.28Mcps TDD, it means uplink timing advance applied by the UE (as per 5.1.14 [3GPP 25.225]) For 3.84Mcps TDD, it means absolute timing advance value to be used to avoid large delay spread at the NodeB (as per 10.3.6.95 **Error! Reference source not found.** and as per 10.3.6.95a **Error! Reference source not found.**); In such case, 256 to 8191 value is spare; For 7.68Mcps TDD, it means absolute timing advance value to be used to avoid large delay spread at the NodeB (as per 10.3.6.95 **Error! Reference source not found.** and as per 10.3.6.95a **Error! Reference source not found.**); In such case, 512 to 8191 value is spare;
>>TA Resolution	O	Measurement resolution. Supported resolutions are 0.125, 0.5 and 1 chips. If this field is missing, the resolution is 0.125 chips.
>> Chip Rate	O	UTRA-TDD chip rate. Supported chip rates are 1.28, 3.84 and 7.68 Mchips/s. If this field is missing, the rate is 1.28 Mchips/s.

Table 23: WCDMA/TD-SCDMA Cell Info Parameter

12.5.3 LTE Cell Info

The LTE Cell Info parameter defines the parameter of a LTE radio cell [3GPP LTE].

Parameter	Presence	Value/Description
LTE Cell Info	-	LTE Cell ID. Parameter definitions in [3GPP LTE].
>CellGlobalIdEUTRA	M	
>>PLMN-Identity	M	
>>>MCC	M	Mobile Country Code, range: (0..999)
>>>MNC	M	Mobile Network Code, range: (0..999)
>>CI	M	Cell Identity, length 28 bits.
>PhysCellId	M	Physical Cell ID, range: (0..503)

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>TrackingAreaCode	M	Tracking Area Code, length 16 bits
>RSRPResult	O	Reference Signal Received Power, range: (0..97)
>RSRQPResult	O	Reference Signal Received Quality, range: (0..34)
>TA	O	Timing Advance, range: (0..255) (as per [3GPP 36.321]).
>Measured Results List EUTRA	O	Network Measurement Report for LTE ([3GPP LTE]).

Table 24: LTE Cell Info

12.5.4 CDMA Cell Info

The cdmaCell parameter defines the parameter of a CDMA radio cell.

Parameter	Presence	Value/Description
Cdma Cell Info	-	CDMA Cell ID
>NID	M	Network ID, range: (0..65535)
>SID	M	System ID, range: (0..32767)
>BASEID	M	Base Station ID, range: (0..65535)
>BASELAT	M	Base Station Latitude, range: (0..4194303)
>BASELONG	M	Base Station Longitude, range: (0..8388607)
>REFPN	M	Base Station PN Number, range: (0..511) This parameter is conditional and only used for 1x in which case it is mandatory.
>WeekNumber	M	GPS Week number, range: (0..65535)
>Seconds	M	GPS Seconds, range: (0..4194303)

Table 25: CDMA Cell Info

12.5.5 HRPD Cell Info

The HRPD Cell Info parameter defines the parameter of a HRPD radio cell [3GPP2 HRPD].

Parameter	Presence	Value/Description
Hrpd Cell Info	-	HRPD Cell ID
>SECTORID	M	Sector ID, length 128 bits
>BASELAT	M	Base Station Latitude, range: (0..4194303)
>BASELONG	M	Base Station Longitude, range: (0..8388607)

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>WeekNumber	M	GPS Week number, range: (0..65535)
>Seconds	M	GPS Seconds, range: (0..4194303)

Table 26: HRPD Cell Info

12.5.6 UMB Cell Info

The UMB Cell Info parameter defines the parameter of a UMB radio cell [3GPP2 UMB].

Parameter	Presence	Value/Description
Umb Cell Info	-	UMB Cell ID
>SECTORID	M	Sector ID, length 128 bits
>MCC	M	Mobile Country Code, range: (0..999)
>MNC	M	Mobile Network Code, range: (0..999)
>BASELAT	M	Base Station Latitude, range: (0..4194303)
>BASELONG	M	Base Station Longitude, range: (0..8388607)
>WeekNumber	M	GPS Week number, range: (0..65535)
>Seconds	M	GPS Seconds, range: (0..4194303)

Table 27: UMB Cell Info

12.5.7 WLAN AP Info

The WLAN AP Info parameter defines the parameters of a WLAN access point [IEEE 802.11].

Parameter	Presence	Value/Description
WLAN AP Info	-	WLAN Access Point ID
>AP MAC Address	M	Access Point MAC Address
>AP Transmit Power	O	AP Transmit power in dBm
>AP Antenna Gain	O	AP antenna gain in dBi
>AP S/N	O	AP Signal to Noise received at the SET in dB
> Device Type	O	Options are: 802.11a device, 802.11b device and 802.11g device. Future networks are permitted.
>AP Signal Strength	O	AP signal strength received at the SET in dBm
>AP Channel/Frequency	O	AP channel/frequency of Tx/Rx
>Round Trip Delay	O	Round Trip Delay (RTD) between the SET and AP
>>RTD Value	M	Measured RTD value
>>RTD Units	M	Units for RTD value and RTD accuracy – 0.1, 1, 10, 100 or 1000 nanoseconds
>>RTD Accuracy	O	RTD standard deviation in relative units

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>SET Transmit Power	O	SET Transmit power in dBm
>SET Antenna Gain	O	SET antenna gain in dBi
>SET S/N	O	SET Signal to Noise received at the AP in dB
>SET Signal Strength	O	SET signal strength received at the AP in dBm
>AP Reported Location	O	Location of the Access Point as reported by the AP
>>Location Encoding	M	Location encoding description - LCI as per [RFC 3825] - ASN.1 as per [X.694]
>>Location Data	M	Location Data
>>>Location Accuracy	O	Location Accuracy in units of 0.1m
>>>Location Value	M	Location value in the format defined in Location Encoding

Table 28: WLAN AP Info

12.5.8 WiMAX BS Info

The WiMAX BS Info parameter defines the parameters of a WiMAX base station [IEEE 802.16-2004] and [IEEE 802.16e-2005].

Parameter	Presence	Value/Description
WiMAX BS Info	-	WiMAX Base Station Info
>BS ID	M	Base Station Identifier Bit string of fix length of 48
>RTD measurement	O	Round Trip Delay (RTD) or relative RTD measurement between the SET and the serving BS
>>Round Trip Delay	M	Round Trip Delay (RTD) between the SET and the serving BS in units of 10 ns Range (0 .. 65535)
>>Round Trip Delay Uncertainty	O	Standard deviation of the Round Trip Delay measurement in units of 10 ns Range (0 .. 1023)
>WiMAX NMR List	O	WiMAX network measurements. Repeated 1-32 times.
>> BS ID	M	Base Station for the serving and neighboring cell measurement. Bit string of fixed length of 48
>> Relative Delay	O	Relative Delay between the SET and the neighboring BS in units of 10 ns. Not applicable for the serving BS. Range (-32768..32767)
>> Relative Delay uncertainty	O	Relative Delay uncertainty in units of 10 ns. Range (0 .. 1023)
>>BS Signal Strength	O	BS signal strength received at the SET in dBm Range (0 .. 255)

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>>BS Signal Strength Uncertainty	O	Standard deviation of BS signal strength received at the SET in dB Range (0 .. 63)
>>BS Tx Power	O	BS equivalent isotropic transmit power Range (0 .. 255)
>>BS CINR	O	BS Carrier to Noise and Interference Ratio as received at the SET in dB Range (0 .. 255)
>>BS CINR Uncertainty	O	Standard deviation of BS Carrier to Noise and Interference Ratio as received at the SET in dB Range (0 .. 63)
>> BS Location	O	Location of the BS as reported by the BS
>>>Location Encoding	M	Location encoding description - LCI as per [RFC 3825] - ASN.1 as per [X.694]
>>>>Location Data	M	Location Data
>>>>>Location Accuracy	O	Location Accuracy in units of 0.1m Integer (0..4294967295)
>>>>>Location Value	M	Location value in the format defined in Location Encoding Octet string of fix length of 128

Table 29: WiMAX BS Info

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12.6 Position

Parameter	Presence	Values/description
Position	-	This parameter describes the position of the SET. The parameter also contains a timestamp and optionally the velocity.
>Timestamp	M	Time when position fix was calculated.
>Position Estimate	M	
>>Sign of latitude	M	Indicates North or South.
>>Latitude	M	Integer (0..2^{23}-1). The latitude encoded value (N) is derived from the actual latitude X in degrees (0°..90°) by this formula: $N \leq 2^{23} X /90 < N+1$
>>Longitude	M	Integer (-2^{23}.. 2^{23}-1). The longitude encoded value (N) is derived from the actual longitude X in degrees (-180°..+180°) by this formula: $N \leq 2^{24} X /360 < N+1$
>>Uncertainty ellipse (semi major, semi minor, major axis)	O	Contains the latitude/longitude uncertainty code associated with the major axis, and the uncertainty code associated with the minor axis and the orientation, in degrees, of the major axis with respect to the North. For the correspondence between the latitude/longitude uncertainty code and meters refer to [3GPP GAD] for details.
>>Confidence	O	Represents the confidence by which the position of a target entity is known to be within the shape description (i.e., uncertainty ellipse for 2D-description, uncertainty ellipsoid for 3D-description) and is expressed as a percentage. This is an integer (0..100).
>>Altitude information	O	Shall be present for a 3D position information; it shall remain absent for 2D position information.
>>>Altitude direction	M	Indicates height (above the WGS84 ellipsoid) or depth (below the WGS84 ellipsoid).
>>>Altitude	M	Provides altitude information in meters. Integer (0..2^{15}-1). Refer to [3GPP GAD] for details
>>>Altitude uncertainty	M	Contains the altitude uncertainty code. Refer to [3GPP GAD] for details
>Velocity	O	Speed and bearing values as defined by the Velocity type and as defined in [3GPP GAD]

Table 30: Position Parameter

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The definition and coding of the position estimate parameter (ellipsoid point with altitude, uncertainty ellipse and altitude uncertainty) is based on [3GPP GAD]. The Datum used for all positions are WGS-84.

12.7 Trigger Params

Parameter	Presence	Values/description
Trigger Type	M	This parameter can be of type • Periodic • Area Event
Periodic Trigger Parameters	O	Periodic Trigger Parameters: • Number of fixes • Interval between fixes • Start time

Table 31: Trigger Parameter

12.8 SPC_SET_Key

Parameter	Presence	Values/description
SPC_SET_Key	-	This parameter defines the authentication key used by the SET for H/V-SPC authentication.

Table 32: SPC_SET_Key Parameter

12.9 SPC-TID

Parameter	Presence	Values/description
SPC-TID	-	This parameter defines the transaction ID used for H/V-SPC authentication: ▪ RAND (random number) ▪ SLP FQDN (FQDN of the H-SLP).

Table 33: SPC-TID Parameter

12.10 SPC_SET_Key_lifetime

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Parameter	Presence	Values/description
SPC_SET_Key_lifetime	-	This parameter defines the lifetime of SPC_SET_Key. This parameter is optional. If not present, a default value of 24 hours is assumed. The units are in hours and the range is from 1 to 24 hours.

Table 34: SPC_SET_Key_lifetime Parameter

12.11 QoP

Parameter	Presence	Values/description
QoP	-	Describes the desired Quality of Position
>Horizontal accuracy	M	Horizontal accuracy as defined in [3GPP GAD] (section 6.2 Uncertainty)
>Vertical accuracy	O	Vertical accuracy as defined in [3GPP GAD] (section 6.4 Uncertainty Altitude)
> Maximum Location Age	O	Maximum tolerable age of position estimates used for cached position fixes. Units in seconds from 0 to 65535.
>Delay	O	Values as defined for element Response Time in 3GPP TS 44.031 [3GPP RRLP]: 2^N, N from (0..7), unit is seconds

Table 35: QoP Parameter

12.12 SPC Status Code

Parameter	Presence	Values/description
SPC Status Code	-	This parameter is only required in the response of the SPC to the SLC and defines the operational status of the SPC.
>SPC Status Code values	M	The Status Code can assume the following values: operational(0), not_operational(1), reduced_availability(2)

Table 36: Status Code Parameter

12.13 Number of Fix

Parameter	Presence	Values/description
Number of Fix	-	Defines the fix number within a triggered session.

Table 37: Number of Fix Parameter

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12.14 SET Capabilities

Parameter	Presence	Values/description
SET capabilities	-	SET capabilities (not mutually exclusive) in terms of supported positioning technologies and positioning protocols.
>Pos Technology	M	Defines the positioning technology. Zero or more of the following positioning technologies (including those listed in the optional GANSS Position Methods structure): • SET-assisted A-GPS • SET-based A-GPS • Autonomous GPS • AFLT • E-CID • E-OTD • OTDOA Note. The E-CID bit SHALL be set only when TA and/or NMR information or Pathloss information is provided within the Location ID IE.
>>GANSS Position Methods	O	Defines the supported GANSS (i.e. other than A-GPS). If included, this parameter is repeated for each supported GANSS. In addition, in the case of SBAS the parameter is repeated for each supported SBAS.
>>>GANSS ID	M	Defines the GANSS. Integer (0..15) 0: Galileo 1: SBAS 2: Modernized GPS 3: QZSS 4: GLONASS 5-15: Reserved for future use
>>>SBAS ID	CV	Present if GANSS ID indicates SBAS. Bit string interpreted as: 000: WAAS 001: EGNOS 010: MSAS 011: GAGAN
>>>GANSS Positioning Modes	M	Bitmap defining the supported modes for GNSS indicated by GANSS ID. Bit 0: SET Assisted Bit 1: SET Based Bit 2: Autonomous
>>>GANSS Signals	M	Bitmap (length 8 bits) defining the supported signals for GNSS indicated by GANSS ID. For Galileo, the bits are interpreted as :

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		Bit 0: E1 Bit 1: E5a Bit 2: E5b Bit 3: E5a+E5b Bit 4: E6 Bits 5-7: Spare For Modernized GPS, the bits are interpreted as: Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 0, 4-7: Spare For QZSS, the bits are interpreted as: Bit 0: L1 C/A Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 4-7: Spare For GLONASS, the bits are interpreted as: Bit 0: G1 Bit 1: G2 Bit 2: G3 Bits 3-7: Spare For SBAS, the bits are interpreted as: Bit 0: L1 Bits 1-7: Spare
>Pref Method	M	One of the following preferred modes: • A-GNSS SET-assisted preferred • A-GNSS SET-based preferred • No preferred mode
>Pos Protocol	M	Zero or more of the following positioning protocols (bitmap): • RRLP • RRC • TIA-801 • LPP
>>Pos Protocol Version RRLP	CV	Describes the protocol version of RRLP Positioning Protocol.
>>>Major Version Field	M	First (most significant) element of the version number for RRLP, range: (0..255)
>>> Technical Version Field	M	Second element of the version number for RRLP, range: (0..255)
>>>Editorial Version Field	M	Third (least significant) element of the version number for RRLP, range: (0..255)

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>>Pos Protocol Version RRC	CV	Describes the protocol version of RRC Positioning Protocol. It is required if RRC is identified in the Pos Protocol parameter.
>>>Major Version Field	M	First (most significant) element of the version number for RRC, range: (0..255)
>>> Technical Version Field	M	Second element of the version number, range: (0..255)
>>>Editorial Version Field	M	Third (least significant) element of the version number for RRC, range: (0..255)
>>Pos Protocol Version TIA-801	CV	Describes the protocol version of TIA-801 Positioning Protocol. It is required if TIA-801 is identified in the Pos Protocol parameter.
>>>**Supported Pos Protocol Version TIA-801**	M	Specifies a list of up to 8 different supported 3GPP2 C.S0022 versions. This parameter is required (with at least one entry in the list) if TIA-801 is identified in the Pos Protocol parameter.
>>>>Revision Number	M	Revision part of document number for the specifications of C.S0022 Functioning Protocol. Value: [0,A-Z]
>>>>Point Release Number	M	Point Release number for C.S0022, range: (0..255).
>>>> Internal Edit Level	M	Internal Edit Level for C.S0022, range: (0..255).
>>**Pos Protocol Version LPP**	CV	Describes the protocol version of LPP Positioning Protocol. It is required if LPP is identified in the Pos Protocol parameter.
>>>**Major Version Field**	M	First (most significant) element of the version number for LPP Positioning Protocol, range: (0..255)
>>>**Technical Version Field**	M	Second element of the version number for LPP Positioning Protocol, range: (0..255)
>>>**Editorial Version Field**	M	Third (least significant) element of the version number for LPP Positioning Protocol, range: (0..255)

Table 38: SET Capabilities Parameter

12.15 Requested Assistance Data

Parameter	Presence	Values/description
Requested assistance data	-	This parameter is applicable to A-GPS positioning methods only. It describes the requested A-GPS assistance data in the form of a bitmap: • Almanac indicator • UTC model

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		• Ionospheric model • DGPS corrections • Reference location • Reference time • Acquisition assistance • Real-time integrity • Navigation model Note: Reference location Bit is used for requesting Reference Location also for GANSS.
Navigation Model	CV	When the navigation model indicator is set, this field is present.
>GPS week	M	Contains the GPS week of the assistance data currently held in the SET; range is 0 to 1023
>GPS Toe	M	Contains the GPS time of Ephemeris in hours of the newest set of Ephemeris contained in the SET; range is 0 to 167
>NSAT	M	Contains the number of satellites to be considered for the current GPS assistance data request (number of satellites for which ephemeris data is available in the SET); range is 0 to 31. If the SET has no ephemeris data, this field SHALL be set to zero. If the SET has ephemeris data whose age exceeds the T-Toe limit, this field may be set to zero. If the network receives a zero value for this field, it shall ignore the GPS week and GPS Toe fields and assume that the SET has no ephemeris data
>T-Toe limit	M	Contains the Ephemeris age tolerance of the SET to the network in hours; range is 0 to 10
>Satellite information	CV	Present if NSAT > 0, repeated NSAT times
>>SatId	M	Identifies the satellite and is equal to (SV ID No-1) where SV ID No is defined in ICD-GPS-200C. Range is 0 to 63
>>IODE	M	Represents the satellite sequence number, range is 0 to 255
GANSS Requested Common Assistance Data	O	
>GANSS Reference Time	M	GANSS reference time. Boolean, "true" if requested, "false" otherwise.
>GANSS Ionospheric model	M	GANSS Ionospheric model. Boolean, "true"

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		if requested, "false" otherwise.
>GANSS Additional Ionospheric Model for Data ID='00'	M	GANSS Ionospheric model, see **Error! Reference source not found.** for further information on Data ID
>GANSS Additional Ionospheric Model for Data ID='11'	M	GANSS Ionospheric model, see **Error! Reference source not found.** for further information on Data ID
>GANSS Earth-Orientation Parameters	M	Earth-Orientation Parameters for precise coordinate transformations
GANSS Requested Generic Assistance Data	O	Generic data requested for GANSS. If included, this parameter is repeated for each GANSS the assistance data is requested. In addition, in the case of SBAS this parameter is repeated for each SBAS the assistance data is requested.
>GANSS ID	M	Defines the GANSS for which the assistance data is requested. 0: Galileo 1: SBAS 2: Modernized GPS 3: QZSS 4: GLONASS 5-15: Reserved for future use
> SBAS ID	CV	Present if GANSS ID indicates SBAS. Bit String interpreted as: 000: WAAS 001: EGNOS 010: MSAS 011: GAGAN
>GANSS Real-Time Integrity	M	Real Time integrity requested for a particular GANSS. Boolean, "true" if requested, "false" otherwise.
>DGANSS Differential Corrections	O	If present, differential corrections are requested. Bitmap (length 8 bits) defining for which signals the corrections are requested. For Galileo, the bits are interpreted as: Bit 0: E1 Bit 1: E5a Bit 2: E5b Bit 3: E6 4-7: spare For Modernized GPS, the bits are interpreted as: Bit 0: L1 C Bit 1: L2 C Bit 2: L5 Bits 3-7: Spare

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		For QZSS, the bits are interpreted as: Bit 0: L1 C/A Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 4-7: Spare For GLONASS, the bits are interpreted as: Bit 0: G1 Bit 1: G2 Bit 2: G3 Bits 3-7: Spare For SBAS, the bits are interpreted as: Bit 0: L1 Bits 1-7: Spare
>GANSS Almanac	M	GANSS Almanacs for the particular GANSS Id. Boolean, "true" if requested, "false" otherwise. If GANSS ID indicates modernized GPS or QZSS and Almanac Model ID is not included in GANSS Additional Assistance Data Choices, this bit shall be interpreted as Model-4 for modernized GPS and as Model-2 for QZSS, defined in Table A.54 of [3GPP RRLP].
>GANSS Navigation Model	O	If present, GANSS navigation models are requested
>>GANSS Week or Day	M	Week or Day number of the assistance data currently held in the SET. If GANSS ID does not indicate GLONASS this field is expressed in GANSS weeks. Range is 0 to 4095. If GANSS ID indicates GLONASS this field is expressed in days as defined in **Error! Reference source not found.**.
>>GANSS_Toe	M	Time-of-Ephemeris of the assistance data currently held in the SET, If GANSS ID does not indicate GLONASS this field is expressed in hours. Range is 0 to 167. If GANSS ID indicates GLONASS Toe is expressed in units of 15 minutes. Range then is 0 to 95 (0 to 1425 minutes).
>>T-Toe limit	M	Ephemeris age tolerance of the UE to network. If GANSS ID does not indicate GLONASS this field is expressed in hours. Range is 0 to 10. If GANSS ID indicates GLONASS Toe is expressed in units of 30 minutes. Range then is 0 to 15 (0 to 450 minutes).
>>Satellites list related data	O	Information of the satellites for which the ephemeris data is available in SET.

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>>>SatID	M	Identifies the satellite for which assistance is requested and is interpreted as in table A.10.14 in [3GPP RRLP].
>>>IOD	M	Issue of Data for SatID as defined in table A.48.2 in [3GPP RRLP].
>GANSS Time Model GNSS-GNSS	O	If present, time models to convert reference system time to GNSS system time are requested. Reference system is indicated by GANSS ID. Bitmap (length 16 bits) defining GNSS system for which GNSS the time models are requested: 0: GPS 1: Galileo 2: QZSS 3: GLONASS Bits 4-15: spare.
>GANSS Reference Measurement Information	M	Boolean value. If set to true, reference code and Doppler measurement information of satellites of a GANSS constellation are requested.
>GANSS data bits	O	Request Bit stream of GANSS
>>GANSS TOD minute	M	The reference time modulo 60 s of the first data bit of the requested data in integer seconds in GNSS specific system time of the GNSS indicated by GANSS ID.
>>Data bit assistance	M	
>>>GANSS Signal	M	Bitmap (length 8 bits) defining the supported signals for GNSS indicated by GANSS ID. For Galileo, bits are interpreted as : Bit 0: E1 Bit 1: E5a Bit 2: E5b Bit 3: E5a+E5b Bit 4: E6 Bits 5-7: Spare For Modernized GPS, the bits are interpreted as: Bit 0: L1 C Bit 1: L2 C Bit 2: L5 Bits 3-7: Spare For QZSS, the bits are interpreted as: Bit 0: L1 C/A Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 4-7: Spare For GLONASS, the bits are interpreted as: Bit 0: G1 Bit 1: G2

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		Bit 2: G3 Bits 3-7: Spare For SBAS, the bits are interpreted as: Bit 0: L1 Bits 1-7: Spare
>>>GANSS Data Bit Interval	M	This field represents the time length for which the Data Bit Assistance is requested. The Data Bit Assistance shall be relative to the time interval (GANSS TOD, GANSS TOD + Data Bit Interval). The Data Bit Interval *r*, expressed in seconds, is mapped to a binary number K with the following formula: $r = 0.1 * 2^K$ Value K=15 means that the time interval is not specified.
>>>Satellite Information	O	This parameter may be included to indicate a list of satellites (up to 64) for which the Data Bit Assistance Request is applicable
>>>>SatID	M	Identifies the satellite and is equal to (SV ID No - 1).
>GANSS UTC model	M	UTC model requested. Boolean, "true" if required, "false" otherwise. If GANSS ID indicates QZSS and UTC Model ID in GANSS Additional Assistance Data Choices is not included, this bit shall be interpreted as Model-1 as defined in Table A.55 of [3GPP RRLP].
>GANSS Additional Data Choices	O	If present, some GANSS Additional Assistance Data is requested.
>> Orbit Model ID	O	ID as defined in A.49.2 of **Error! Reference source not found.**. Missing field indicates request for the native model.
>> Clock Model ID	O	ID as defined in A.49.1 of **Error! Reference source not found.**. Missing field indicates request for the native model.
>>>UTC Model ID	O	ID as defined in A.55/A.55.17 of **Error! Reference source not found.**. Missing field indicates request for the native model.
>>Almanac Model ID	O	ID as defined in A.54 of **Error! Reference source not found.**. Missing field indicates request for the native model.
>GANSS Auxiliary Information	O	GANSS Auxiliary Information including signal availability for SVs and GLONASS frequency assignments requested.
>GANSS Extended Ephemeris	O	
>>Validity	M	Requested validity period for Extended ephemeris in steps of four hours

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> GANSS Extended Ephemeris Check	O	See [3GPP 49.031] for further information on this field.
>Begin Time	M	Begin time of the Extended ephemeris currently held by the SET
>End Time	M	End time of the Extended ephemeris currently held by the SET
GPS Extended Ephemeris	O	
>Validity Hours	M	Requested validity period for Extended ephemeris in steps of four hours
GPS Extended Ephemeris Check	O	See [3GPP 49.031] for further information on this field.
>Begin Time	M	Begin time of the Extended ephemeris currently held by the SET
>End Time	M	End time of the Extended ephemeris currently held by the SET

Table 39: Requested Assistance Data Parameter

12.16 Positioning Payload

Parameter	Presence	Values/description
Positioning payload	-	Describes the positioning payload for TIA-801 [TIA-801], RRLP [3GPP RRLP] , RRC [3GPP RRC] and LPP [3GPP LPP]. The restrictions of maximum PDU size as specified in Section 2.1 of [3GPP RRLP] (242 octets) does not apply. If the size for "rrlpPayload" exceeds 65535 bits, pseudo segmentation according to [3GPP RRLP] SHALL be used.

Table 40: Positioning Payload Parameter

12.17 Multiple Location IDs

Parameter	Presence	Values/description
Multiple Location IDs	-	This parameter contains a set of up to MaxLidSize(64) Location ID/Relative Timestamp/Serving Cell Flag data. If Relative Timestamp is present, the associated Location ID represents historical data; if Relative Timestamp is absent, the Location ID represents current data.
>Location ID	M	Describes measured globally unique cell/WLAN AP/WiMAX BS identification of the serving cell/WLAN AP/WiMAX BS or cell/WLAN AP/WiMAX BS identification from any receivable radio network. If this information is historical, the Relative Timestamp parameter must be present. If this data is current, the Relative Timestamp

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		parameter need not be present.
>Relative Timestamp	CV	Time stamp of measured location Id relative to "current Location ID" in units of 0.01 sec. Range from 0 to 65535*0.01 sec. Time stamp for current Location Id if present is 0.
>Serving Cell Flag	M	This flag indicates whether the Location ID data represents a serving cell, WLAN AP or WiMAX BS or idle (i.e. camped-on) cell or WLAN AP. If set, the Location ID information represents serving cell,WLAN AP or WiMAX BS information; if not set, the Location ID information represents idle mode information or neighbor cell ,WLAN AP or WiMAX BS information.

Table 41: Multiple Location ID Parameter

12.18 Velocity

Parameter	Presence	Values/description
Velocity	-	Describes the velocity of the SET as per [3GPP GAD]. One of the following four formats are supported: • Horizontal Velocity a. Bearing b. Horizontal speed • Horizontal and Vertical Velocity a. Vertical Direction b. Bearing c. Horizontal speed d. Vertical speed • Horizontal Velocity Uncertainty a. Bearing b. Horizontal speed c. Horizontal speed uncertainty • Horizontal and Vertical Velocity Uncertainty a. Vertical direction b. Bearing c. Horizontal speed d. Vertical speed e. Horizontal speed

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		uncertainty f. Vertical speed uncertainty

Table 42: Velocity Parameter

12.19 UTRAN GPS Reference Time Result

Parameter	Presence	Value/Description
UTRAN GPS Reference Time Result	-	The UTRAN GPS Reference Time Result parameter describes the timing relationship between GPS time and WCDMA/TD-SCDMA cell frame timing as measured by the SET. This parameter is only applicable if the SET has sent current Location ID (lid) information.
>GPS Timing of Cell Frames	M	GPS Time of Week in units of $1/16^{th}$ UMTS chip [as per 10.3.7.93 3GPP RRC]. Range: (0..37158911999999)
>Mode	M	The Mode value is either: • Primary CPICH Info for FDD [as per 10.3.6.60 3GPP RRC]. or: • Cell Parameters Id for TDD [as per 10.3.6.9 3GPP
>SFN	M	The SFN at which the SET timing of cell frames is captured. Range: (0..4095)
>GPS Reference Time Uncertainty	O	This element provides the accuracy of the provided relation between GPS and UTRAN time. If "GPS TOW" is the GPS time corresponding to the UTRAN time provided, then the true GPS time lies in the interval ["GPS TOW" – "GPS Reference Time Uncertainty", "GPS TOW" + "GPS Reference Time Uncertainty"]. The uncertainty *r*, expressed in microseconds, is mapped to a number K with the following formula: $r = C*(((1+x)^K)-1)$ with C = 0.0022 and x = 0.18. To encode any higher value of the uncertainty than that corresponding to K=127 in the formula above, or to indicate an undefined value of the "GPS TOW", the same value, K=127, shall be used. [25.331 version 7.4.0]

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Table 43: UTRAN GPS Reference Time Result

12.20 UTRAN GANSS Reference Time Result

Parameter	Presence	Value/Description
UTRAN GANSS Reference Time Result	-	The UTRAN GANSS Reference Time Result parameter describes the timing relationship between GANSS time and WCDMA/TD-SCDMA cell frame timing as measured by the SET. This parameter is only applicable if the SET has sent current Location ID (lid) information.
>GANSS Time ID	M	GANSS Time ID defines the satellite system used in UTRAN-GANSS time relation. 0: Galileo 1: QZSS 2: GLONASS Range: Enumerated(0..15) Values 3 – 15 reserved for future use.
>UE GANSS Timing of Cell Frames	M	UE GANSS timing of cell frames sub-second part of GANSS Time of Day [as per 10.3.7.93a 3GPP RRC]. Range: (0.. 86399999999750) by step of 250 ns
>Mode	M	The Mode value is either: • Primary CPICH Info for FDD [as per 10.3.6.60 3GPP RRC]. or: • Cell Parameters Id for TDD [as per 10.3.6.9 3GPP]
>SFN	M	The SFN at which the SET timing of cell frames is captured. Range: (0..4095)
>GANSS TOD Uncertainty	O	Uncertainty of the relation GANSS Time of Day/SFN [as per 10.3.7.93a 3GPP RRC]. Range (0..127): The uncertainty *r*, expressed in microseconds, is mapped to a number K, with the following formula: $r = C*(((1+x)^K)-1)$, with C = 0.0022 and x = 0.18. [as per 10.3.7.96a 3GPP RRC].

Table 44: UTRAN GANSS Reference Time Result

12.21 UTRAN GPS Reference Time Assistance

Parameter	Presence	Value/Description
UTRAN GPS Reference Time Assistance	-	The UTRAN GPS Reference Time Assistance parameter provides UTRAN to GPS timing relationship

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		assistance data for the current serving cell of the SET. This parameter is only applicable if the Location ID (lid) information is current.
> UTRAN GPS Reference Time	M	The UTRAN GPS Reference Time parameter describes the timing relationship between GPS time and WCDMA/TD-SCDMA cell frame timing [as per 10.3.7.96 3GPP RRC].
>>GPS Timing of Cell Frames	M	UTRAN GPS timing of cell frames in steps of 1 UMTS chip [as per 10.3.7.96 3GPP RRC]. Range: (0..2322431999999)
>>Mode	O	The Mode value is either: • Primary CPICH Info for FDD [as per 10.3.6.60 3GPP RRC]. or: • Cell Parameters Id for TDD [as per 10.3.6.9 3GPP RRC]
>>SFN	M	The SFN which the UTRAN GPS timing of cell frame time stamps. Range: (0..4095)
>GPS Reference Time Uncertainty	O	This element provides the accuracy of the provided relation between GPS and UTRAN time. If "GPS TOW" is the GPS time corresponding to the UTRAN time provided, then the true GPS time lies in the interval ["GPS TOW" – "GPS Reference Time Uncertainty", "GPS TOW" + "GPS Reference Time Uncertainty"]. The uncertainty *r*, expressed in microseconds, is mapped to a number K with the following formula: $r = C*(((1+x)^K)-1)$ with C = 0.0022 and x = 0.18. To encode any higher value of the uncertainty than that corresponding to K=127 in the formula above, or to indicate an undefined value of the "GPS TOW", the same value, K=127, shall be used. [25.331 version 7.4.0]
>$T_{UTRAN-GPS}$ Drift Rate	O	Drift rate of UTRAN to GPS timing [as per 10.3.7.96 3GPP RRC]. Range (enumerated): -50, -25, -15, -10, -5, -2, -1, 0, 1, 2, 5, 10, 15, 25, 50 Units: 1/256 chips per sec.

Table 45: UTRAN GPS Reference Time Assistance

12.22 UTRAN GANSS Reference Time Assistance

Parameter	Presence	Value/Description
UTRAN GANSS Reference	-	The UTRAN GANSS Reference Time

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Time Assistance		Assistance parameter provides UTRAN to GANSS timing relationship assistance data for the current serving cell of the SET. This parameter is only applicable if the Location ID (lid) information is current.
>GANSS Day	O	The number of days from the beginning of GANSS system time (mod 8192) [as per 10.3.7.96o 3GPP RRC].
>GANSS Time ID	M	GANSS Time ID defines the satellite system used in UTRAN-GANSS time relation. 0: Galileo 1: QZSS 2: GLONASS Range: Enumerated(0..15) Values 3 – 15 reserved for future use.
> UTRAN GANSS Reference Time	M	The UTRAN GANSS Reference Time parameter describes the timing relationship between GANSS time and WCDMA/TD-SCDMA cell frame timing [as per 10.3.7.96o 3GPP RRC].
>>GANSS TOD	M	GANSS time of day in seconds. Range: (0..86399)
>>UTRAN GANSS Timing of Cell Frames	O	UTRAN GANSS timing of cell frames sub-second part of GANSS Time of Day [as per 10.3.7.96o 3GPP RRC]. Range: (0.. 999999750) by step of 250 ns
>>Mode	O	The Mode value is either: • Primary CPICH Info for FDD [as per 10.3.6.60 3GPP RRC]. or: • Cell Parameters Id for TDD [as per 10.3.6.9 3GPP RRC]
>>SFN	M	The SFN which the UTRAN GANSS timing of cell frame time stamps. Range: (0..4095)
>>GANSS TOD Uncertainty	O	Uncertainty of the relation GANSS Time of Day/SFN [as per 10.3.7.96o 3GPP RRC]. Range (0..127): The uncertainty *r*, expressed in microseconds, is mapped to a number K, with the following formula: $r = C*(((1+x)^K)-1)$, with C = 0.0022 and x = 0.18. [as per 10.3.7.96a 3GPP RRC].
>$T_{UTRAN-GANSS}$ Drift Rate	O	Drift rate of UTRAN to GANSS timing [as per 10.3.7.96o 3GPP RRC]. Range (enumerated): -50, -25, -15, -

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		10, -5, -2, -1, 0, 1, 2, 5, 10, 15, 25, 50 Units: ns per sec.

Table 46: UTRAN GANSS Reference Time Assistance

12.23 GNSS Positioning Technology

Parameter	Presence	Value/Description
GNSS Positioning Technology	-	Bitmap of GNSS Positioning Technology. This bitmap indicates the GNSS used or to be used for the positioning computation. • GPS • Galileo • SBAS • Modernized GPS • QZSS • GLONASS When a Bit is set to FALSE: not used, when set to TRUE, used. Note that GPS SHALL not be the only bit set to TRUE.

Table 47: GNSS Positioning Technology

12.24 Approved Positioning Methods

Parameter	Presence	Value/Description
Positioning Technology	-	Defines the positioning technologies which the SLC has approved for the SPC. Zero or more of the following positioning technologies (bitmap and technologies listed in GANSS Position Methods structure): • SET-assisted A-GPS • SET-based A-GPS • Autonomous GPS • AFLT • E-CID • E-OTD • OTDOA
>>GANSS Position Methods	O	Defines the supported GANSS (i.e. other than A-GPS). If included, this

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		parameter is repeated for each supported GANSS
>>>GANSS ID	M	Defines the GANSS. Integer (0..15) 0: Galileo 1: SBAS 2: Modernized GPS 3: QZSS 4: GLONASS 5-15: Reserved for future use
>>>GANSS Positioning Modes	M	Bitmap defining the supported modes for GNSS indicated by GANSS ID. Bit 0: SET Assisted Bit 1: SET Based Bit 2: Autonomous
>>>GANSS Signals	M	Bitmap (length 8 bits) defining the supported signals for GNSS indicated by GANSS ID. For Galileo, the bits are interpreted as : Bit 0: E1 Bit 1: E5a Bit 2: E5b Bit 3: E5a+E5b Bit 4: E6 Bits 5-7: Spare For Modernized GPS, the bits are interpreted as: Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 0, 4-7: Spare For QZSS, the bits are interpreted as: Bit 0: L1 C/A Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 4-7: Spare For GLONASS, the bits are interpreted as: Bit 0: G1 Bit 1: G2 Bit 2: G3 Bits 3-7: Spare For SBAS, the bits are interpreted as: Bit 0: L1

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		Bits 1-7: Spare

Table 48: Approved Positioning Methods

12.25 Supported Positioning Methods

Parameter	Presence	Value/Description
Positioning Technology	-	Defines the positioning technologies which the SPC supports. Zero or more of the following positioning technologies (bitmap and technologies listed in GANSS Position Methods structure): • SET-assisted A-GPS • SET-based A-GPS • Autonomous GPS • AFLT • E-CID • E-OTD • OTDOA
>>GANSS Position Methods	O	Defines the supported GANSS (i.e. other than A-GPS). If included, this parameter is repeated for each supported GANSS
>>>GANSS ID	M	Defines the GANSS. Integer (0..15) 0: Galileo 1: SBAS 2: Modernized GPS 3: QZSS 4: GLONASS 5-15: Reserved for future use
>>>GANSS Positioning Modes	M	Bitmap defining the supported modes for GNSS indicated by GANSS ID. Bit 0: SET Assisted Bit 1: SET Based Bit 2: Autonomous
>>>GANSS Signals	M	Bitmap (length 8 bits) defining the supported signals for GNSS indicated by GANSS ID. For Galileo, the bits are interpreted as : Bit 0: E1 Bit 1: E5a Bit 2: E5b Bit 3: E5a+E5b

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		Bit 4: E6 Bits 5-7: Spare For Modernized GPS, the bits are interpreted as: Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 0, 4-7: Spare For QZSS, the bits are interpreted as: Bit 0: L1 C/A Bit 1: L1 C Bit 2: L2 C Bit 3: L5 Bits 4-7: Spare For GLONASS, the bits are interpreted as: Bit 0: G1 Bit 1: G2 Bit 2: G3 Bits 3-7: Spare For SBAS, the bits are interpreted as: Bit 0: L1 Bits 1-7: Spare

Table 49: Supported Positioning Methods

12.26 Preferred Positioning Method

Parameter	Presence	Description
Position Method	-	Describes the positioning method: • A-GPS SET assisted only • A-GPS SET based only • A-GPS SET assisted preferred (A-GPS SET based is the fallback mode) • A-GPS SET based preferred (A-GPS SET assisted is the fallback mode) • A-GNSS SET Assisted only • A-GNSS SET Based only • A-GNSS SET Assisted

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		preferred (A-GANSS SET Based is the fallback mode) • A-GNSS SET Based preferred (A-GANSS SET Assisted is the fallback mode) • Autonomous GPS • Autonomous GNSS • AFLT • Enhanced Cell/sector • EOTD • OTDOA In case of A-GNSS SET Based, A-GNSS SET Assisted, the GNSS Positioning Technology MUST be used to specify which GNSS is to be used. For Autonomous GNSS, the GNSS Positioning Technology MAY be used to specify which GNSS is to be used.

Table 50: Preferred Positioning Method

12.27 Status Code

Parameter	Presence	Values/description
Status Code	-	This parameter is only required in the context of sending a position response or to terminate a SUPL session.
> Status Code values	O	The Status Code can assume the following values: `unspecified(0), systemFailure(1), unexpectedMessage(2), protocolError(3), dataMissing(4), unexpectedDataValue(5), posMethodFailure(6), posMethodMismatch(7), posProtocolMismatch(8), targetSETnotReachable(9), versionNotSupported(10), resourceShortage(11), invalidSessionId(12), nonProxyModeNotSupported(13), proxyModeNotSupported(14), positioningNotPermitted(15), iLPTimeout(16)`

Table 51: Status Code Parameter

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13.ASN.1 Encoding of ILP messages (Normative)

This section defines the ILP messages and common elements with ASN.1 (Normative).

13.1 Common Part

```
ILP DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

IMPORTS
  Version, SessionID2
    FROM ILP-Components
  PREQ
    FROM ILP-PREQ
  PRES
    FROM ILP-PRES
  PRPT
    FROM ILP-PRPT
  PLREQ
    FROM ILP-PLREQ
  PLRES
    FROM ILP-PLRES
  PINIT
    FROM ILP-PINIT
  PAUTH
    FROM ILP-PAUTH
  PALIVE
    FROM ILP-PALIVE
  PEND
    FROM ILP-PEND
  PMESS
    FROM ILP-PMESS;

-- general ILP PDU layout;
ILP-PDU ::= SEQUENCE {
  length     INTEGER(0..65535),
  version    Version,
  sessionID2 SessionID2,
  message    IlpMessage
}

IlpMessage ::= CHOICE {
  msPREQ     PREQ,
  msPRES     PRES,
  msPRPT     PRPT,
  msPLREQ    PLREQ,
  msPLRES    PLRES,
  msPINIT    PINIT,
  msPAUTH    PAUTH,
  msPALIVE   PALIVE,
  msPEND     PEND,
  msPMESS    PMESS,
...}

END
```

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13.2 Message Specific Part

The message specific part contains further parameters that are unique for each ILP message. The following sections describe the message specific part of ILP messages.

13.2.1 PREQ

```
ILP-PREQ DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PREQ;

IMPORTS LocationId, Position, QoP, SPCSETKey, SPCTID, SPCSETKeylifetime,
MultipleLocationIds, PosTechnology, SETCapabilities
          FROM ILP-Components;

PREQ ::= SEQUENCE {
  sLPMode       SLPMode,
  approvedPosMethods      PosTechnology OPTIONAL,
  locationId              LocationId OPTIONAL,
  multipleLocationIds     MultipleLocationIds OPTIONAL,
  position                Position OPTIONAL,
  triggerParams           TriggerParams OPTIONAL,
  sPCSETKey               SPCSETKey OPTIONAL,
  sPCTID                  SPCTID OPTIONAL,
  sPCSETKeylifetime       SPCSETKeylifetime OPTIONAL,
  qoP                     QoP OPTIONAL,
  sETCapabilities         SETCapabilities OPTIONAL,
  notificationMode        NotificationMode OPTIONAL,
...}

SLPMode ::= ENUMERATED {proxy(0), nonProxy(1)}

TriggerParams ::= SEQUENCE {
  triggerType             TriggerType,
  periodicTriggerParams   PeriodicTriggerParams     OPTIONAL,
...}

TriggerType ::= ENUMERATED {
  periodic(0), areaEvent(1),
...}

PeriodicTriggerParams ::= SEQUENCE{
   numberOfFixes          INTEGER(1..8639999),
   intervalBetweenFixes   INTEGER(1..8639999),
   startTime              INTEGER(0..2678400) OPTIONAL,
...}
-- intervalBetweenFixes and startTime are in seconds.
-- numberOfFixes  * intervalBetweenFixes shall not exceed 8639999
-- (100 days in seconds) for compatibility with OMA MLP and RLP
-- startTime is in relative time in units of seconds measured from "now"
-- a value of 0 signifies "now", a value of "startTime" signifies startTime
-- seconds from "now"

NotificationMode ::= ENUMERATED {normal(0), basedOnLocation(1), ...}

END
```

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13.2.2 PRES

```
ILP-PRES DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PRES;

IMPORTS Position, SPCStatusCode, PosTechnology, PosMethod, GNSSPosTechnology
          FROM ILP-Components;

PRES ::= SEQUENCE {
  preferredPosMethod      PosMethod OPTIONAL,
  gnssPosTechnology       GNSSPosTechnology OPTIONAL,
  supportedPosMethods     PosTechnology OPTIONAL,
  position                Position OPTIONAL,
  sPCstatusCode           SPCStatusCode OPTIONAL,
...}

END
```

13.2.3 PRPT

```
ILP-PRPT DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PRPT;

IMPORTS Position, StatusCode
          FROM ILP-Components;

PRPT ::= SEQUENCE {
  position      Position,
  fixNumber     INTEGER(1.. 8639999) OPTIONAL,
  statusCode    StatusCode OPTIONAL,
...}

END
```

13.2.4 PLREQ

```
ILP-PLREQ DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PLREQ;

IMPORTS LocationId, MultipleLocationIds
          FROM ILP-Components;

PLREQ ::= SEQUENCE {
  locationId              LocationId,
  multipleLocationIds     MultipleLocationIds OPTIONAL,
...}

END
```

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13.2.5 PLRES

```
ILP-PLRES DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PLRES;

IMPORTS Position, StatusCode, maxPosSize
          FROM ILP-Components;

PLRES ::= SEQUENCE {
  positionResults          PositionResults,
...}

PositionResults ::= SEQUENCE SIZE (1..maxPosSize) OF PositionResult

PositionResult ::= CHOICE {
  position   Position,
  statusCode StatusCode,
...}

END
```

13.2.6 PINIT

```
ILP-PINIT DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PINIT;

IMPORTS
  LocationId, Position, PosMethod, MultipleLocationIds, PosPayLoad,
SETCapabilities, UTRAN-GPSReferenceTimeResult, UTRAN-GANSSReferenceTimeResult,
GNSSPosTechnology
    FROM ILP-Components;

PINIT ::= SEQUENCE {
  sETCapabilities                       SETCapabilities,
  locationId                            LocationId,
  posMethod                             PosMethod OPTIONAL,
  requestedAssistData                   RequestedAssistData OPTIONAL,
  position                              Position OPTIONAL,
  posPayLoad                            PosPayLoad OPTIONAL,
  multipleLocationIds                   MultipleLocationIds OPTIONAL,
  utran-GPSReferenceTimeResult                    UTRAN-GPSReferenceTimeResult
OPTIONAL,
  utran-GANSSReferenceTimeResult        UTRAN-GANSSReferenceTimeResult OPTIONAL,
  gnssPosTechnology                     GNSSPosTechnology OPTIONAL,
...}

RequestedAssistData ::= SEQUENCE {
  almanacRequested                      BOOLEAN,
  utcModelRequested                     BOOLEAN,
  ionosphericModelRequested             BOOLEAN,
  dgpsCorrectionsRequested              BOOLEAN,
  referenceLocationRequested            BOOLEAN, -- Note: Used also for GANSS
  referenceTimeRequested                BOOLEAN,
```

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```
  acquisitionAssistanceRequested        BOOLEAN,
  realTimeIntegrityRequested            BOOLEAN,
  navigationModelRequested              BOOLEAN,
  navigationModelData                   NavigationModel OPTIONAL,
  ganssRequestedCommonAssistanceDataList
             GanssRequestedCommonAssistanceDataList OPTIONAL,
  ganssRequestedGenericAssistanceDataList
             GanssRequestedGenericAssistanceDataList OPTIONAL,
  extendedEphemeris                     ExtendedEphemeris OPTIONAL,
  extendedEphemerisCheck                ExtendedEphCheck OPTIONAL,
...}

ExtendedEphemeris ::= SEQUENCE {
  validity   INTEGER (1..256), -- Requested validity in 4 hour steps
...}

ExtendedEphCheck ::= SEQUENCE {
  beginTime  GPSTime, -- Begin time of ephemeris extension held by SET
  endTime    GPSTime, -- End time of ephemeris extension held by SET
...}

GPSTime ::= SEQUENCE {
  gPSWeek    INTEGER (0..1023),
  gPSTOWhour INTEGER (0..167),
...}

GanssRequestedCommonAssistanceDataList ::= SEQUENCE {
  ganssReferenceTime      BOOLEAN,
  ganssIonosphericModel   BOOLEAN,
  ganssAdditionalIonosphericModelForDataID00        BOOLEAN,
  ganssAdditionalIonosphericModelForDataID11        BOOLEAN,
  ganssEarthOrientationParameters                   BOOLEAN,
...}

GanssRequestedGenericAssistanceDataList ::= SEQUENCE(SIZE(1..maxGANSS)) OF
GanssReqGenericData

GanssReqGenericData ::= SEQUENCE {
  ganssId                 INTEGER(0..15), -- coding according to parameter
definition in Section 12.14
  ganssSBASid BIT STRING(SIZE(3)) OPTIONAL, --coding according to parameter
definition in section 12.14
  ganssRealTimeIntegrity  BOOLEAN OPTIONAL,
  ganssDifferentialCorrection           DGANSS-Sig-Id-Req OPTIONAL,
  ganssAlmanac                          BOOLEAN,
  ganssNavigationModelData GanssNavigationModelData OPTIONAL,
  ganssTimeModels         BIT STRING(SIZE(16)) OPTIONAL,
  ganssReferenceMeasurementInfo         BOOLEAN,
  ganssDataBits                         GanssDataBits OPTIONAL,
  ganssUTCModel                         BOOLEAN,
 ganssAdditionalDataChoices             GanssAdditionalDataChoices OPTIONAL,
  ganssAuxiliaryInformation             BOOLEAN,
  ganssExtendedEphemeris                ExtendedEphemeris OPTIONAL,
  ganssExtendedEphemerisCheck           GanssExtendedEphCheck OPTIONAL,
...}

DGANSS-Sig-Id-Req ::= BIT STRING (SIZE(8)) -- coding according to parameter
definition in Section 12.15
```

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```
GanssNavigationModelData ::= SEQUENCE {
  ganssWeek  INTEGER(0..4095),
  ganssToe   INTEGER(0..167),
  t-toeLimit INTEGER(0..10),
  satellitesListRelatedDataList        SatellitesListRelatedDataList OPTIONAL,
...}

SatellitesListRelatedDataList ::= SEQUENCE(SIZE(0..maxGANSSSat)) OF
SatellitesListRelatedData

SatellitesListRelatedData ::= SEQUENCE {
  satId      INTEGER(0..63),
  iod        INTEGER(0..1023),
...}

maxGANSS    INTEGER ::= 16
maxGANSSSat INTEGER ::= 32

GanssDataBits ::= SEQUENCE {
  ganssTODmin     INTEGER (0..59),
  reqDataBitAssistanceList ReqDataBitAssistanceList,
...}

ReqDataBitAssistanceList ::= SEQUENCE {
  gnssSignals             GANSSSignals,
  ganssDataBitInterval    INTEGER (0..15),
  ganssDataBitSatList     SEQUENCE (SIZE(1..maxGANSSSat)) OF INTEGER (0..63)
OPTIONAL,
...}

GanssAdditionalDataChoices ::= SEQUENCE {
  orbitModelID            INTEGER(0..7) OPTIONAL,
  clockModelID            INTEGER(0..7) OPTIONAL,
  utcModelID              INTEGER(0..7) OPTIONAL,
  almanacModelID          INTEGER(0..7) OPTIONAL,
...}

GanssExtendedEphCheck ::= SEQUENCE {
  beginTime  GANSSextEphTime, -- Begin time of ephemeris extension held by SET
  endTime    GANSSextEphTime, -- End time of ephemeris extension held by SET
...}

GANSSextEphTime ::= SEQUENCE {
  gANSSday                INTEGER (0..8191),
  gANSSTODhour            INTEGER (0..23),
...}

NavigationModel ::= SEQUENCE {
  gpsWeek   INTEGER(0..1023),
  gpsToe    INTEGER(0..167),
  nSAT      INTEGER(0..31),
  toeLimit  INTEGER(0..10),
  satInfo   SatelliteInfo OPTIONAL,
...}

SatelliteInfo ::= SEQUENCE (SIZE (1..31)) OF SatelliteInfoElement
```

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```
SatelliteInfoElement ::= SEQUENCE {
  satId  INTEGER(0..63),
  iODE   INTEGER(0..255),
...}

END
```

13.2.7 PAUTH

```
ILP-PAUTH DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PAUTH;

IMPORTS SPCSETKey, SPCTID, SPCSETKeylifetime
          FROM ILP-Components;

PAUTH ::= SEQUENCE {
  sPCSETKey   SPCSETKey,
  sPCTID      SPCTID,
  sPCSETKeylifetime SPCSETKeylifetime OPTIONAL,
...}

END
```

13.2.8 PALIVE

```
ILP-PALIVE DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PALIVE;

IMPORTS SPCStatusCode
          FROM ILP-Components;

PALIVE ::= SEQUENCE {
  sPCStatusCode    SPCStatusCode OPTIONAL,
...}

END
```

13.2.9 PEND

```
ILP-PEND DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PEND;

IMPORTS Position, StatusCode
          FROM ILP-Components;

PEND ::= SEQUENCE {
  position    Position   OPTIONAL,
  statusCode  StatusCode OPTIONAL,
...}
```

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```
END
```

13.2.10 PMESS

```
ILP-PMESS DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS PMESS;

IMPORTS Velocity, PosPayLoad, UTRAN-GPSReferenceTimeResult, UTRAN-
GANSSReferenceTimeResult, UTRAN-GPSReferenceTimeAssistance, UTRAN-
GANSSReferenceTimeAssistance
          FROM ILP-Components;

PMESS ::= SEQUENCE {
  posPayLoad  PosPayLoad,
  velocity    Velocity OPTIONAL,
  utran-GPSReferenceTimeAssistance     UTRAN-GPSReferenceTimeAssistance OPTIONAL,
  utran-GPSReferenceTimeResult                  UTRAN-GPSReferenceTimeResult
OPTIONAL,
  utran-GANSSReferenceTimeAssistance   UTRAN-GANSSReferenceTimeAssistance OPTIONAL,
  utran-GANSSReferenceTimeResult       UTRAN-GANSSReferenceTimeResult OPTIONAL,
  ...}

END
```

13.3 Common Elements

```
ILP-Components DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

EXPORTS
  Version, SessionID2, LocationId, PosTechnology, Position, StatusCode,
    QoP, PosMethod, Velocity, PosPayLoad, SETCapabilities, SPCStatusCode,
SPCSETKey, SPCTID, SPCSETKeylifetime, maxPosSize, UTRAN-GPSReferenceTimeResult,
UTRAN-GANSSReferenceTimeResult, GNSSPosTechnology, UTRAN-
GPSReferenceTimeAssistance, UTRAN-GANSSReferenceTimeAssistance,
MultipleLocationIds;

-- protocol version expressed as x.y.z (e.g., 5.1.0)
Version ::= SEQUENCE {
  maj      INTEGER(0..255),
  min      INTEGER(0..255),
  servind  INTEGER(0..255)}

SessionID2 ::= SEQUENCE {
  slcSessionID                        SlcSessionID,
  setSessionID            SetSessionID OPTIONAL,
  spcSessionID            SpcSessionID OPTIONAL
  -- the semantics of OPTIONAL applies to the encoding only.
  -- The parameter itself is MANDATORY. Since the spcSessionID is allocated by the
SPC,
  -- there is no spcSessionID to be transmitted in the ILP PREQ message.
}

SetSessionID ::= SEQUENCE {
  sessionId  INTEGER(0..65535),
```

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```
  setId      SETId
}

SETId ::= CHOICE {
  msisdn     OCTET STRING(SIZE (8)),
  mdn        OCTET STRING(SIZE (8)),
  min        BIT STRING(SIZE (34)), -- coded according to TIA-553
  imsi       OCTET STRING(SIZE (8)),
  nai        IA5String(SIZE (1..1000)),
  iPAddress  IPAddress,
...}
-- msisdn, mnd and imsi are a BCD (Binary Coded Decimal) string
-- represent digits from 0 through 9,
-- two digits per octet, each digit encoded 0000 to 1001 (0 to 9)
-- bits 8765 of octet n encoding digit 2n
-- bits 4321 of octet n encoding digit 2(n-1) +1
-- not used digits in the string shall be filled with 1111

SlcSessionID ::= SEQUENCE {
  sessionID  OCTET STRING(SIZE (4)),
  slcId      NodeAddress
}

SpcSessionID ::= SEQUENCE {
  sessionID  OCTET STRING(SIZE (4)),
  spcId      NodeAddress
}

IPAddress ::= CHOICE {
  ipv4Address  OCTET STRING(SIZE (4)),
  ipv6Address  OCTET STRING(SIZE (16))
}

NodeAddress ::= CHOICE {
  iPAddress  IPAddress,
  fQDN       FQDN,
...}

FQDN ::= VisibleString(FROM ("a".."z" | "A".."Z" | "0".."9" |".-"))(SIZE (1..255))

LocationId ::= SEQUENCE {
  cellInfo  CellInfo,
  status    Status,
...}

Status ::= ENUMERATED {stale(0), current(1), unknown(2), ...}

MultipleLocationIds ::= SEQUENCE SIZE (1..maxLidSize) OF LocationIdData

LocationIdData ::= SEQUENCE {
  locationId LocationId,
  relativetimestamp   RelativeTime OPTIONAL, -- if relativetimestamp is present,
             -- then data represents historical measurement, if absent, data
represents
             -- current measurements
  servingFlag  BOOLEAN, -- if “true” measurements represent serving cell
...}
```

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```
-- status in locationId indicates whether cellInfo is current or stale relative to
timestamp

RelativeTime ::= INTEGER (0..65535) -- relative time to "current" Location Id in
multiples of 0.01sec

maxLidSize   INTEGER ::= 64


SETCapabilities ::= SEQUENCE {
  posTechnology  PosTechnology,
  prefMethod     PrefMethod,
  posProtocol    PosProtocol,
...}

PosTechnology ::= SEQUENCE {
  agpsSETassisted  BOOLEAN,
  agpsSETBased     BOOLEAN,
  autonomousGPS    BOOLEAN,
  aFLT             BOOLEAN,
  eCID             BOOLEAN,
  eOTD             BOOLEAN,
  oTDOA            BOOLEAN,
  gANSSPositionMethods  GANSSPositionMethods OPTIONAL,
...}

GANSSPositionMethods ::= SEQUENCE (SIZE(1..16)) OF GANSSPositionMethod

GANSSPositionMethod ::= SEQUENCE {
  ganssId  INTEGER(0..15), -- coding according to parameter definition in Section
12.14
  ganssSBASid                          BIT STRING(SIZE(3)) OPTIONAL, --coding
according to parameter definition in section 12.14
  gANSSPositioningMethodTypes          GANSSPositioningMethodTypes,
  gANSSSignals                         GANSSSignals,
...}

GANSSPositioningMethodTypes ::= SEQUENCE {
  setAssistedBOOLEAN,
  setBased   BOOLEAN,
  autonomous BOOLEAN,
...}

-- indicates MS support for particular GANSS signals and frequencies
-- coding according to parameter definition in Section 12.14
GANSSSignals ::= BIT STRING {
             signal1 (0),
             signal2 (1),
             signal3 (2),
             signal4 (3),
             signal5 (4),
             signal6 (5),
             signal7 (6),
             signal8 (7)} (SIZE (1..8))


PrefMethod ::= ENUMERATED {
  agnssSETAssistedPreferred, agnssSETBasedPreferred, noPreference,
```

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```
...}
-- Note: In ULP V2.0, the names of the enumerations are
-- kept the same as in ULP V1.0. ie. agps in the TS ULP actually shall be
-- interpreted as agnss. This means that agpsSETassistedPreferred and
-- agpsSETBasedPreferred in ULP V2.0 map to agnssSETAssistedPreferred and
-- agnssSETBasedPreferred in ILP.

PosProtocol ::= SEQUENCE {
  tia801  BOOLEAN,
  rrlp    BOOLEAN,
  rrc     BOOLEAN,
  lpp     BOOLEAN,
  posProtocolVersionRRLP  PosProtocolVersion3GPP OPTIONAL,
  posProtocolVersionRRC                PosProtocolVersion3GPP OPTIONAL,
  posProtocolVersionTIA801 PosProtocolVersion3GPP2 OPTIONAL,
  posProtocolVersionLPP  PosProtocolVersion3GPP OPTIONAL,
  ...}

PosProtocolVersion3GPP ::= SEQUENCE {
  majorVersionField   INTEGER(0..255),
  technicalVersionField  INTEGER(0..255),
  editorialVersionField  INTEGER(0..255),
...}

PosProtocolVersion3GPP2 ::= SEQUENCE (SIZE(1..8)) OF
Supported3GPP2PosProtocolVersion

Supported3GPP2PosProtocolVersion ::= SEQUENCE {
  revisionNumber          BIT STRING(SIZE (6)), -- the location standard revision
number the SET supports coded according to 3GPP2 C.S0022
  pointReleaseNumber      INTEGER(0..255),
  internalEditLevel       INTEGER(0..255),
...}


CellInfo ::= CHOICE {
  gsmCell    GsmCellInformation,
  wcdmaCell  WcdmaCellInformation, --WCDMA Cell Information/TD-SCDMA Cell
Information
  cdmaCell   CdmaCellInformation,
  wlanAP     WlanAPInformation,
  hrpdCell   HrpdCellInformation,
  umbCell    UmbCellInformation,
  lteCell    LteCellInformation,
  wlanAP     WlanAPInformation,
  wimaxBS    WimaxBSInformation,
...}

UTRAN-GPSReferenceTimeResult ::= SEQUENCE {
-- For ue-GPSTimingOfCell values above 37158911999999 are not
-- used in this version of the specification
-- Actual value utran-GPSTimingOfCell = (ms-part * 4294967296) + ls-part
-- used on the uplink i.e. reported by the SET to the SLP
  set-GPSTimingOfCell     SEQUENCE {
    ms-part  INTEGER (0.. 16383),
    ls-part  INTEGER (0..4294967295)},
  modeSpecificInfo        CHOICE {
    fdd      SEQUENCE {
```

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```
      referenceIdentity    PrimaryCPICH-Info},
      tdd     SEQUENCE {
        referenceIdentity  CellParametersID}
  },
  sfn                      INTEGER (0..4095),
  gpsReferenceTimeUncertainty          INTEGER (0..127) OPTIONAL,
...}

UTRAN-GANSSReferenceTimeResult ::= SEQUENCE {
  ganssTimeID INTEGER (0..15),
  set-GANSSReferenceTime   SET-GANSSReferenceTime,
...}

SET-GANSSReferenceTime ::= SEQUENCE {

-- Actual value [ns] = (ms-Part * 4294967296 + ls-Part) * 250
-- Actual values [ns] > 86399999999750 are reserved and are considered a
-- protocol error
  set-GANSSTimingOfCell    SEQUENCE {
    ms-part                INTEGER (0..80),
    ls-part                INTEGER (0..4294967295)} OPTIONAL,
  modeSpecificInfo         CHOICE {
    fdd       SEQUENCE {
      referenceIdentity    PrimaryCPICH-Info},
    tdd       SEQUENCE {
      referenceIdentity    CellParametersID}} OPTIONAL,
  sfn                      INTEGER (0..4095),
  ganss-TODUncertainty INTEGER (0..127) OPTIONAL,
...}

GNSSPosTechnology ::= SEQUENCE {
  gps         BOOLEAN,
  galileo     BOOLEAN,
  sbas        BOOLEAN,
  modernized-gps           BOOLEAN,
  qzss        BOOLEAN,
  glonass     BOOLEAN,
...}

Position ::= SEQUENCE {
  timestamp          UTCTime, -- shall include seconds and shall use UTC time.
  positionEstimate   PositionEstimate,
  velocity           Velocity OPTIONAL,
...}

PositionEstimate ::= SEQUENCE {
  latitudeSign  ENUMERATED {north, south},
  latitude      INTEGER(0..8388607),
  longitude     INTEGER(-8388608..8388607),
  uncertainty
    SEQUENCE {uncertaintySemiMajor  INTEGER(0..127),
              uncertaintySemiMinor  INTEGER(0..127),
              orientationMajorAxis  INTEGER(0..180)} OPTIONAL, -- angle in degree
between major axis and North
  confidence    INTEGER(0..100) OPTIONAL,
  altitudeInfo  AltitudeInfo OPTIONAL,
...} -- Coding as in [3GPP GAD]
```

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```
AltitudeInfo ::= SEQUENCE {
  altitudeDirection  ENUMERATED {height, depth},
  altitude           INTEGER(0..32767),
  altUncertainty     INTEGER(0..127),
...} -- based on 3GPP TS 23.032

CdmaCellInformation ::= SEQUENCE {
  refNID         INTEGER(0..65535), -- Network Id
  refSID         INTEGER(0..32767), -- System Id
  refBASEID      INTEGER(0..65535), -- Base Station Id
  refBASELAT     INTEGER(0..4194303), -- Base Station Latitude
  reBASELONG     INTEGER(0..8388607), -- Base Station Longitude
  refREFPN       INTEGER(0..511), -- Base Station PN Code
  refWeekNumber  INTEGER(0..65535), -- GPS Week Number
  refSeconds     INTEGER(0..4194303), -- GPS Seconds --
...}

GsmCellInformation ::= SEQUENCE {
  refMCC  INTEGER(0..999), -- Mobile Country Code
  refMNC  INTEGER(0..999), -- Mobile Network Code
  refLAC  INTEGER(0..65535), -- Location area code
  refCI   INTEGER(0..65535), -- Cell identity
  nMR     NMR OPTIONAL,
  tA      INTEGER(0..255) OPTIONAL, --Timing Advance
...}

WcdmaCellInformation ::= SEQUENCE {
  refMCC                 INTEGER(0..999), -- Mobile Country Code
  refMNC                 INTEGER(0..999), -- Mobile Network Code
  refUC                  INTEGER(0..268435455), -- Cell identity
  frequencyInfo          FrequencyInfo OPTIONAL,
  primaryScramblingCode  INTEGER(0..511) OPTIONAL,  -- Not applicable for TDD
  measuredResultsList    MeasuredResultsList OPTIONAL,
  cellParametersId       INTEGER(0..127) OPTIONAL, -- Not applicable for FDD
  timingAdvance          TimingAdvance OPTIONAL, -- Not applicable for FDD
...}

TimingAdvance ::= SEQUENCE {
  tA             INTEGER (0..8191),
  tAResolution    TAResolution OPTIONAL, --If missing, resolution is 0.125 chips
  chipRate       ChipRate OPTIONAL, --If missing, chip rate is 1.28 Mchip/s
...}

TAResolution ::= ENUMERATED {res1_0chip(0),res0_5chip(1),res0_125chip(2), ...} --
Corresponding to 1.0-chip, 0.5-chip and 0.125-chip resolutions, respectively

ChipRate ::= ENUMERATED {tdd128(0),tdd384(1), tdd768(2), ...} -- Corresponding to
1.28-Mchips/s, 3.84-Mchips/s and 7.68-Mchips/s chip rates, respectively

HrpdCellInformation ::= SEQUENCE {
  refSECTORID    BIT STRING(SIZE (128)) OPTIONAL, -- HRPD Sector Id
  refBASELAT     INTEGER(0..4194303), -- Base Station Latitude
  reBASELONG     INTEGER(0..8388607), -- Base Station Longitude
  refWeekNumber  INTEGER(0..65535), -- GPS Week Number
  refSeconds     INTEGER(0..4194303), -- GPS Seconds --
  ...}

UmbCellInformation ::= SEQUENCE {
```

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```
  refSECTORID             BIT STRING(SIZE (128)), -- UMB Sector Id
  refMCC     INTEGER(0..999), -- Mobile Country Code
  refMNC     INTEGER(0..999), -- Mobile Network Code
  refBASELAT              INTEGER(0..4194303), -- Base Station Latitude
  reBASELONG              INTEGER(0..8388607), -- Base Station Longitude
  refWeekNumber           INTEGER(0..65535), -- GPS Week Number
  refSeconds              INTEGER(0..4194303), -- GPS Seconds --
  ...}

-- LTE Cell info per 3GPP TS 36.331. --
-- If not otherwise stated info is related to serving cell -

LteCellInformation ::= SEQUENCE {
  cellGlobalIdEUTRA                   CellGlobalIdEUTRA,
  physCellId                          PhysCellId,
  trackingAreaCode                    TrackingAreaCode,
  rsrpResult                          RSRP-Range   OPTIONAL,
  rsrqResult                          RSRQ-Range   OPTIONAL,
  tA      INTEGER(0..255) OPTIONAL, -- Timing Advance as per 3GPP TS 36.321
  measResultListEUTRA   MeasResultListEUTRA OPTIONAL, -- Neighbour measurements
  ...}

-- Measured results of neighbours cells per 3GPP TS 36.331 --

MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultEUTRA

MeasResultEUTRA ::=       SEQUENCE {
   physCellId             PhysCellId,
   cgi-Info  SEQUENCE {
      cellGlobalId        CellGlobalIdEUTRA,
      trackingAreaCode    TrackingAreaCode
   }         OPTIONAL,
   measResult             SEQUENCE {
      rsrpResult          RSRP-Range   OPTIONAL,  -- Mapping to measured values
      rsrqResult          RSRQ-Range   OPTIONAL,  -- in 3GPP TS 36.133
      ...
   }
}

PhysCellId ::= INTEGER (0..503)

TrackingAreaCode ::= BIT STRING (SIZE (16))

CellGlobalIdEUTRA ::= SEQUENCE {
             plmn-Identity PLMN-Identity,
             cellIdentity CellIdentity,
             ...
}

PLMN-Identity ::= SEQUENCE {
   mcc       MCC          OPTIONAL,
   mnc       MNC
}

CellIdentity ::= BIT STRING (SIZE (28))

MCC ::= SEQUENCE (SIZE (3)) OF
MCC-MNC-Digit
```

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```
MNC ::= SEQUENCE (SIZE (2..3)) OF
             MCC-MNC-Digit

MCC-MNC-Digit ::= INTEGER (0..9)

RSRP-Range ::= INTEGER(0..97)
RSRQ-Range ::= INTEGER(0..34)
maxCellReport INTEGER ::= 8

WlanAPInformation ::= SEQUENCE { -- as per 802.11v
  apMACAddress       BIT STRING(SIZE (48)), -- AP MAC Address
  apTransmitPower    INTEGER(-127..128) OPTIONAL, -- AP transmit power in dbm
  apAntennaGain      INTEGER(-127..128) OPTIONAL, -- AP antenna gain in dBi
  apSignaltoNoise    INTEGER(-127..128) OPTIONAL, -- AP S/N received at SET
  apDeviceType       ENUMERATED {wlan802-11a(0), wlan802-11b(1), wlan802-11g(2),
...} OPTIONAL,
  apSignalStrength   INTEGER(-127..128) OPTIONAL, -- AP signal strength at SET
  apChannelFrequency INTEGER(0..256) OPTIONAL, -- AP channel/frequency of Tx/Rx
  apRoundTripDelay   RTD OPTIONAL, -- Round Trip Delay between SET and AP
  setTransmitPower   INTEGER(-127..128) OPTIONAL, -- SET transmit power in dBm
  setAntennaGain     INTEGER (-127..128) OPTIONAL, -- SET antenna gain in dBi
  setSignaltoNoise   INTEGER (-127..128) OPTIONAL, -- SET S/N received at AP
  setSignalStrength  INTEGER(-127..128) OPTIONAL, -- SET signal strength at AP
  apReportedLocation ReportedLocation OPTIONAL, -- AP Location reported by AP
  ...}

RTD ::= SEQUENCE { -- as per 802.11v
  rTDValue     INTEGER(0..16777216), -- measured RTD value corresponding to
  -- about 500km in units of 1/10 of nanoseconds
  rTDUnits     RTDUnits, -- units of RTD
  rTDAccuracy  INTEGER(0..255) OPTIONAL, -- RTD accuracy
  ...}

RTDUnits ::= ENUMERATED {
  microseconds(0), hundredsofnanoseconds(1), tensofnanoseconds(2), nanoseconds(3),
tenthsofnanoseconds(4), ...}

ReportedLocation ::= SEQUENCE { -- as per 802.11v
  locationEncodingDescriptor  LocationEncodingDescriptor,
  locationData        LocationData, -- location data field
  ...}

LocationEncodingDescriptor ::= ENUMERATED {
  lCI(0),aSN1(1), ...}

LocationData ::= SEQUENCE {
  locationAccuracy   INTEGER(0..4294967295) OPTIONAL,
  locationValue      OCTET STRING (SIZE(1..128)),
  ...}

WimaxBSInformation ::= SEQUENCE {
  wimaxBsID  WimaxBsID,    -- WiMax serving base station ID
  wimaxRTD   WimaxRTD      OPTIONAL, -- Round Trip Delay measurements
  wimaxNMRList             WimaxNMRList OPTIONAL, -- Network measurements
  ...}

WimaxBsID ::= SEQUENCE {
```

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```
  bsID-MSB   BIT STRING (SIZE(24)) OPTIONAL,
  bsID-LSB   BIT STRING (SIZE(24)),
...}
-- if only LSB is present, MSB is assumed to be identical to the current serving BS
or clamped on network value

WimaxRTD ::= SEQUENCE {
  rTD        INTEGER (0..65535), -- Round trip delay of serving BS in units of 10
ns
  rTDstd     INTEGER (0..1023) OPTIONAL, -- Standard deviation of round trip delay
in units of 10 ns
...}

WimaxNMRList ::= SEQUENCE  (SIZE (1..maxWimaxBSMeas)) OF WimaxNMR

WimaxNMR ::= SEQUENCE {
  wimaxBsID   WimaxBsID,   -- WiMax BS ID for the measurement
  relDelay    INTEGER (-32768..32767) OPTIONAL, -- Relative delay for this
neighbouring BSs to the serving cell in units of 10 ns
  relDelaystd  INTEGER (0..1023) OPTIONAL, -- Standard deviation of Relative delay
in units of 10 ns
  rSSI        INTEGER (0..255) OPTIONAL, -- RSSI in 0.25 dBm steps, starting from -
103.75 dBm
  rSSIstd     INTEGER (0..63) OPTIONAL, -- Standard deviation of RSSI in dB
  bSTxPower   INTEGER (0..255) OPTIONAL, -- BS transmit power in 0.25 dBm steps,
starting from -103.75 dBm
  cINR        INTEGER (0..255) OPTIONAL, -- in dB
  cINRstd     INTEGER (0..63) OPTIONAL, -- Standard deviation of CINR in dB
  bSLocation  ReportedLocation OPTIONAL, -- Reported location of the BS
...}

maxWimaxBSMeas INTEGER ::= 32


FrequencyInfo ::= SEQUENCE {
  modeSpecificInfo  CHOICE {fdd  FrequencyInfoFDD,
                            tdd  FrequencyInfoTDD,
                            ...},
  ...}

FrequencyInfoFDD ::= SEQUENCE {
  uarfcn-UL  UARFCN OPTIONAL,
  uarfcn-DL  UARFCN,
  ...}

FrequencyInfoTDD ::= SEQUENCE {uarfcn-Nt  UARFCN,
                               ...}

UARFCN ::= INTEGER(0..16383)

NMR ::= SEQUENCE (SIZE (1..15)) OF NMRelement

NMRelement ::= SEQUENCE {
  aRFCN  INTEGER(0..1023),
  bSIC   INTEGER(0..63),
  rxLev  INTEGER(0..63),
...}
```

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```
MeasuredResultsList ::= SEQUENCE (SIZE (1..maxFreq)) OF MeasuredResults

MeasuredResults ::= SEQUENCE {
  frequencyInfo            FrequencyInfo OPTIONAL,
  utra-CarrierRSSI         UTRA-CarrierRSSI OPTIONAL,
  cellMeasuredResultsList  CellMeasuredResultsList OPTIONAL}

CellMeasuredResultsList ::=
  SEQUENCE (SIZE (1..maxCellMeas)) OF CellMeasuredResults

-- SPARE: UTRA-CarrierRSSI, Max = 76
-- Values above Max are spare
UTRA-CarrierRSSI ::= INTEGER(0..127)

CellMeasuredResults ::= SEQUENCE {
  cellIdentity      INTEGER(0..268435455) OPTIONAL,
  modeSpecificInfo
    CHOICE {fdd
              SEQUENCE {primaryCPICH-Info  PrimaryCPICH-Info,
                        cpich-Ec-N0        CPICH-Ec-N0 OPTIONAL,
                        cpich-RSCP         CPICH-RSCP OPTIONAL,
                        pathloss           Pathloss OPTIONAL},
            tdd
              SEQUENCE {cellParametersID   CellParametersID,
                        proposedTGSN       TGSN OPTIONAL,
                        primaryCCPCH-RSCP  PrimaryCCPCH-RSCP OPTIONAL,
                        pathloss           Pathloss OPTIONAL,
                        timeslotISCP-List  TimeslotISCP-List OPTIONAL  --NOTE:
TimeSlotISCP measurement list cannot be interpreted without the knowledge of Cell
Info as defined in Error! Reference source not found.
}}}

CellParametersID ::= INTEGER(0..127)

TGSN ::= INTEGER(0..14)

PrimaryCCPCH-RSCP ::= INTEGER(0..127)

-- SPARE: TimeslotISCP, Max = 91
-- Values above Max are spare
TimeslotISCP ::= INTEGER(0..127)

TimeslotISCP-List ::= SEQUENCE (SIZE (1..maxTS)) OF TimeslotISCP

PrimaryCPICH-Info ::= SEQUENCE {primaryScramblingCode  INTEGER(0..511)}

-- SPARE: CPICH-Ec-No, Max = 49
-- Values above Max are spare
CPICH-Ec-N0 ::= INTEGER(0..63)

-- SPARE: CPICH- RSCP, data range from 0 to 91 and from 123 to 127.
-- Values from 92 to 122 are spare
-- the encoding of cpich-RSCP is (as per 25.331 V5.11.0)
-- cpich-RSCP = 123    CPICH RSCP <-120 dBm
-- cpich-RSCP = 124    -120 ≤ CPICH RSCP < -119 dBm
-- cpich-RSCP = 125    -119 ≤ CPICH RSCP < -118 dBm
-- cpich-RSCP = 126    -118 ≤ CPICH RSCP < -117 dBm
-- cpich-RSCP = 127    -117 ≤ CPICH RSCP < -116 dBm
```

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```
-- cpich-RSCP = 0      -116 ≤ CPICH RSCP < -115 dBm
-- cpich-RSCP = 1      -115 ≤ CPICH RSCP < -114 dBm
-- …       …      …
-- cpich-RSCP = 89     -27 ≤ CPICH RSCP < -26 dBm
-- cpich-RSCP = 90     -26 ≤ CPICH RSCP < -25 dBm
-- cpich-RSCP = 91     -25 ≤ CPICH RSCP       dBm

CPICH-RSCP ::= INTEGER(0..127)

-- SPARE: Pathloss, Max = 158
-- Values above Max are spare
Pathloss ::= INTEGER(46..173)

maxCellMeas INTEGER ::= 32

maxFreq INTEGER ::= 8

maxTS INTEGER ::= 14

UTRAN-GPSReferenceTimeAssistance ::= SEQUENCE {
  utran-GPSReferenceTime               UTRAN-GPSReferenceTime,
  gpsReferenceTimeUncertainty          INTEGER (0..127) OPTIONAL,
  utranGPSDriftRate                    UTRANGPSDriftRate         OPTIONAL}

UTRAN-GPSReferenceTime ::= SEQUENCE {
             -- For utran-GPSTimingOfCell values above 2322431999999 are not
             -- used in this version of the specification
             -- Actual value utran-GPSTimingOfCell = (ms-part * 4294967296) + ls-
part
             -- used on the downlink i.e. sent from the SLP to the SET
  utran-GPSTimingOfCell   SEQUENCE {
    ms-part  INTEGER (0..1023),
    ls-part  INTEGER (0..4294967295)
  },
  modeSpecificInfo        CHOICE {
    fdd      SEQUENCE {
      referenceIdentity   PrimaryCPICH-Info},
    tdd      SEQUENCE {
      referenceIdentity   CellParametersID}} OPTIONAL,
  sfn        INTEGER (0..4095)
}

UTRANGPSDriftRate ::= ENUMERATED {
  utran-GPSDrift0, utran-GPSDrift1, utran-GPSDrift2,
  utran-GPSDrift5, utran-GPSDrift10, utran-GPSDrift15,
  utran-GPSDrift25, utran-GPSDrift50, utran-GPSDrift-1,
  utran-GPSDrift-2, utran-GPSDrift-5, utran-GPSDrift-10,
  utran-GPSDrift-15, utran-GPSDrift-25, utran-GPSDrift-50
}

UTRAN-GANSSReferenceTimeAssistance ::= SEQUENCE {
  ganssTimeID INTEGER (0..15),
  utran-GANSSReferenceTime UTRAN-GANSSReferenceTime,
  ganssDay INTEGER (0..8191) OPTIONAL,
  utranGANSSDriftRate     UTRANGANSSDriftRate       OPTIONAL
}

UTRAN-GANSSReferenceTime ::= SEQUENCE {
```

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```
  ganssTOD INTEGER (0..86399),
  utran-GANSSTimingOfCell  INTEGER (0..3999999)      OPTIONAL,
  modeSpecificInfo         CHOICE {
    fdd      SEQUENCE {
      referenceIdentity    PrimaryCPICH-Info},
    tdd      SEQUENCE {
      referenceIdentity    CellParametersID}} OPTIONAL,
    sfn      INTEGER (0..4095),
    ganss-TODUncertainty INTEGER (0..127) OPTIONAL,
...}

UTRANGANSSDriftRate ::= ENUMERATED {
  utran-GANSSDrift0, utran-GANSSDrift1, utran-GANSSDrift2,
  utran-GANSSDrift5, utran-GANSSDrift10, utran-GANSSDrift15,
  utran-GANSSDrift25, utran-GANSSDrift50, utran-GANSSDrift-1,
  utran-GANSSDrift-2, utran-GANSSDrift-5, utran-GANSSDrift-10,
  utran-GANSSDrift-15, utran-GANSSDrift-25, utran-GANSSDrift-50}

StatusCode ::= ENUMERATED {
  unspecified(0), systemFailure(1), unexpectedMessage(2), protocolError(3),
  dataMissing(4), unexpectedDataValue(5), posMethodFailure(6),
  posMethodMismatch(7), posProtocolMismatch(8), targetSETnotReachable(9),
  versionNotSupported(10), resourceShortage(11), invalidSessionId(12),
  nonProxyModeNotSupported(13), proxyModeNotSupported(14),
  positioningNotPermitted(15), iLPTimeout(16),
 ...}

QoP ::= SEQUENCE {
  horacc     INTEGER(0..127),
  veracc     INTEGER(0..127) OPTIONAL, -- as defined in 3GPP TS 23.032 "uncertainty
altitude"—
  maxLocAge  INTEGER(0..65535) OPTIONAL,
  delay      INTEGER(0..7) OPTIONAL, -- as defined in 3GPP TS 44.031
...}

Velocity ::= CHOICE { -- velocity definition as per 23.032
  horvel           Horvel,
  horandvervel     Horandvervel,
  horveluncert     Horveluncert,
  horandveruncert  Horandveruncert,
...}

Horvel ::= SEQUENCE {
  bearing   BIT STRING(SIZE (9)),
  horspeed  BIT STRING(SIZE (16)),
...}

Horandvervel ::= SEQUENCE {
  verdirect  BIT STRING(SIZE (1)),
  bearing    BIT STRING(SIZE (9)),
  horspeed   BIT STRING(SIZE (16)),
  verspeed   BIT STRING(SIZE (8)),
...}

Horveluncert ::= SEQUENCE {
  bearing      BIT STRING(SIZE (9)),
  horspeed     BIT STRING(SIZE (16)),
  uncertspeed  BIT STRING(SIZE (8)),
```

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```
...}

Horandveruncert ::= SEQUENCE {
  verdirect       BIT STRING(SIZE (1)),
  bearing         BIT STRING(SIZE (9)),
  horspeed        BIT STRING(SIZE (16)),
  verspeed        BIT STRING(SIZE (8)),
  horuncertspeed  BIT STRING(SIZE (8)),
  veruncertspeed  BIT STRING(SIZE (8)),
...}

PosMethod ::= ENUMERATED {
  agpsSETassisted(0), agpsSETbased(1), agpsSETassistedpref(2),
  agpsSETbasedpref(3), autonomousGPS(4), aFLT(5), eCID(6), eOTD(7), oTDOA(8),
agnssSETassisted(9), agnssSETbased(10), agnssSETassistedpref(11),
agnssSETbasedpref(12), autonomousGNSS(13),
...}

SPCSETKey ::= BIT STRING(SIZE (128))

SPCTID ::= SEQUENCE {
  rAND       BIT STRING(SIZE (128)),
  slpFQDN    FQDN,
...}

SPCSETKeylifetime ::= INTEGER (1..24) -- units in hours


PosPayLoad ::= CHOICE {
  tia801payload  OCTET STRING(SIZE (1..8192)),
  rrcPayload     OCTET STRING(SIZE (1..8192)),
  rrlpPayload    OCTET STRING(SIZE (1..8192)),
  llpPayload     OCTET STRING(SIZE (1..8192)),
...}

SPCStatusCode ::= ENUMERATED {operational(0), not_operational(1),
reduced_availability(2),
 ...}

maxPosSize INTEGER ::= 1024

END
```

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Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version

A.2 Draft/Candidate Version 2.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-TS-ILP-V2_0	8 Sep 2006	All	Incorporated the following agreed CRs: OMA-LOC-2006-0223 OMA-LOC-2006-0224 OMA-LOC-2006-0225 OMA-LOC-2006-0226 OMA-LOC-2006-0227 OMA-LOC-2006-0228 OMA-LOC-2006-0229 OMA-LOC-2006-0230 OMA-LOC-2006-0231 OMA-LOC-2006-0232 OMA-LOC-2006-0233 OMA-LOC-2006-0234 OMA-LOC-2006-0235R01 OMA-LOC-2006-0236R01 OMA-LOC-2006-0237R01 OMA-LOC-2006-0238R01 OMA-LOC-2006-0239R01 OMA-LOC-2006-0240R01 OMA-LOC-2006-0241 OMA-LOC-2006-0242 OMA-LOC-2006-0243 OMA-LOC-2006-0244 OMA-LOC-2006-0245 OMA-LOC-2006-0246 OMA-LOC-2006-0267
	29 Sep 2006	Change History	List of CRs incorporated in the previous version added
	23 Oct 2006	All	Incorporated the following agreed CRs: OMA-LOC-2006-0320R01 OMA-LOC-2006-0321R01 OMA-LOC-2006-0322R01 OMA-LOC-2006-0323R01 OMA-LOC-2006-0324R01 OMA-LOC-2006-0325 Editorial cleanup to fix links in the references section and to sort them in ascending alphanumeric order.
	24 Oct 2006	8.2	OMA-LOC-2006-0332

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Document Identifier	Date	Sections	Description
	17 Nov 2006	All	OMA-LOC-2006-0363 OMA-LOC-2006-0364 OMA-LOC-2006-0365 OMA-LOC-2006-0366 OMA-LOC-2006-0367 OMA-LOC-2006-0368 OMA-LOC-2006-0373 OMA-LOC-2006-0376 OMA-LOC-2006-0377 OMA-LOC-2006-0378 OMA-LOC-2006-0379
	19 Dec 2006	All	OMA-LOC-2006-0428R01 OMA-LOC-2006-0429 OMA-LOC-2006-0430 OMA-LOC-2006-0431
	18 Jan 2007	Section 6	OMA-LOC-2007-0008
	10 Feb 2007	All	OMA-LOC-2007-0016R01 OMA-LOC-2007-0017 OMA-LOC-2007-0037 OMA-LOC-2007-0051R02
	25 May 2007	All	OMA-LOC-2007-0158 OMA-LOC-2007-0164 OMA-LOC-2007-0143 OMA-LOC-2007-0145 OMA-LOC-2007-0151 OMA-LOC-2007-0156R01 OMA-LOC-2007-0153 OMA-LOC-2007-0155
	15 Jun 2007	All	OMA-LOC-2007-0171R01 OMA-LOC-2007-0203R02 OMA-LOC-2007-0202 OMA-LOC-2007-0179 OMA-LOC-2007-0180
	31 Jul 2007	All	OMA-LOC-2007-0219 OMA-LOC-2007-0220 OMA-LOC-2007-0221 OMA-LOC-2007-0222 OMA-LOC-2007-0226 OMA-LOC-2007-0226
	4 Sep 2007	All	OMA-LOC-2007-0235 OMA-LOC-2007-0236R02 OMA-LOC-2007-0248 OMA-LOC-2007-0249R01 OMA-LOC-2007-0280 OMA-LOC-2007-0281R01 OMA-LOC-2007-0284 OMA-LOC-2007-0311 OMA-LOC-2007-0288 OMA-LOC-2007-0307
	14 Sep 2007	Section 8	OMA-LOC-2007-0322

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Document Identifier	Date	Sections	Description
	28 Sep 2007	All	OMA-LOC-2007-0328 OMA-LOC-2007-0329R01 OMA-LOC-2007-0330 OMA-LOC-2007-0331R01 OMA-LOC-2007-0336 OMA-LOC-2007-0337R01 OMA-LOC-2007-0338 OMA-LOC-2007-0343R01 OMA-LOC-2007-0344R01 OMA-LOC-2007-0347
	08 Oct 2007	All	Editorial clean-up prior to Consistency Review
	20 Dec 2007	5.2.4, 5.2.5, 5.2.6, 5.3.4, 5.3.5, 5.4.4, 5.4.5, 5.5.4, 5.5.5, 8, 10.1, 11.2.1, 13.2.1	OMA-LOC-2007-0426 OMA-LOC-2007-0427 OMA-LOC-2007-0428
	7 May 2008	All	Updated after Consistency Review. Made consistent with TS ULP changes up to OMA-TS-ULP-V2_0-20080429. Included CRs: OMA-LOC-2008-0231 OMA-LOC-2008-0233 OMA-LOC-2008-0234 OMA-LOC-2008-0245
	21 May 2008	All	Updated after internal consistency review. Made consistent with TS ULP changes up to OMA-TS-ULP-V2_0-20080522-D.
	22 May 2007	Various	Updated after further review comments.
Candidate version: OMA-TS-ILP -V2_0	27 Jun 2008	n/a	Status changed to Candidate by TP TP ref#: OMA-TP-2008-0251-INP_SUPL_V2.0_ERP_for_Candidate_Approval
Draft version: OMA-TS-ILP-V2_0	19 Mar 2009	Various	Updated to reflect changes introduced to TS ULP and TS ILP in the following CRs: OMA-LOC-2008-0382R01 OMA-LOC-2008-0383R01 OMA-LOC-2008-0412R01 OMA-LOC-2008-0414R02 OMA-LOC-2008-0432R01 OMA-LOC-2008-0438R02 OMA-LOC-2008-0516 OMA-LOC-2008-0501 OMA-LOC-2008-0491R01 OMA-LOC-2009-0012 OMA-LOC-2009-0010 OMA-LOC-2008-0529R01 OMA-LOC-2008-0498R05 OMA-LOC-2009-0046R01 OMA-LOC-2009-0053R01 OMA-LOC-2009-0054

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Document Identifier	Date	Sections	Description
Draft version: OMA-TS-ILP-V2_0	18 May 2009	11.2.1, 112.6	OMA-LOC-2008-0174
Draft version: OMA-TS-ILP-V2_0	11 Nov 2009	Various	OMA-LOC-2009-250R01 OMA-LOC-2009-270 OMA-LOC-2009-271
Draft version: OMA-TS-ILP-V2_0	16 Nov 2009	Various	OMA-LOC-2009-301 OMA-LOC-2009-302 OMA-LOC-2009-306R01 OMA-LOC-2009-308R03
Candidate version: OMA-TS-ILP-V2_0	08 Dec 2009	n/a	Status changed to Candidate by TP TP ref#: OMA-TP-2009-0538R02-INP_SUPL_2.0_ERP_for_Candidate_re_approval

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Appendix B. Static Conformance Requirements (Normative)

The notation used in this appendix is specified in [IOPPROC].

B.1 SCR for SLC

B.1.1 SLC Procedures

SLC procedures follow SCR of [SUPL2 ULP TS].

B.1.2 ILP Protocol Interface

Item	Function	Reference	Status	Requirement
ILP-B-SLC-001	ILP encoding	ILP 10	M	
ILP-B-SLC-002	ILP transport	ILP 10	M	
ILP-B-SLC-003	Support of TCP/IP port number	ILP 10	M	

B.1.3 ILP Messages

Item	Function	Reference	Status	Requirement
ILP-C-SLC-001	Support of PREQ	ILP 11	M	
ILP-C-SLC-002	Support of PRES	ILP 11	M	
ILP-C-SLC-003	Support of PRPT	ILP 11	M	
ILP-C-SLC-004	Support of PLREQ	ILP 11	M	
ILP-C-SLC-005	Support of PLRES	ILP 11	M	
ILP-C-SLC-006	Support of PINIT	ILP 11	O	
ILP-C-SLC-007	Support of PMESS	ILP 11	O	
ILP-C-SLC-008	Support of PAUTH	ILP 11	O	
ILP-C-SLC-009	Support of PALIVE	ILP 11	M	
ILP-C-SLC-010	Support of PEND	ILP 11	M	

B.1.4 Support of Parameters for Optional Functions

Item	Function	Reference	Status	Requirement
ILP-D-SLC-0001	Support of locationId parameter in PREQ	ILP 12	O	
ILP-D-SLC-0002	Support of position parameter in PREQ	ILP 12	O	
ILP-D-SLC-0003	Support of triggerParams parameter in PREQ	ILP 12	O	
ILP-D-SLC-0004	Support of multipleLocationIds parameter in PREQ	ILP 12	O	
ILP-D-SLC-0005	Support of sPCSETKey parameter in PREQ	ILP 12	O	
ILP-D-SLC-0006	Support of sPCTID parameter in PREQ	ILP 12	O	
ILP-D-SLC-0007	Support of sPCSETKeylifetime parameter in PREQ	ILP 12	O	
ILP-D-SLC-0008	Support of qoP parameter in	ILP 12	O	

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Item	Function	Reference	Status	Requirement
	PREQ			
ILP-D-SLC-0009	Support of sETCapabilities parameter in PREQ	ILP 12	O	
ILP-D-SLC-0010	Support of preferredPosMethod parameter in PRES	ILP 12	O	
ILP-D-SLC-0011	Support of gnssPosTechnology parameter in PRES	ILP 12	O	
ILP-D-SLC-0012	Support of supportedPosMethods parameter in PRES	ILP 12	O	
ILP-D-SLC-0013	Support of position parameter in PRES	ILP 12	O	
ILP-D-SLC-0014	Support of sPCStatusCode parameter in PRES	ILP 12	O	
ILP-D-SLC-0015	Support of fixNumber parameter in PRPT	ILP 12	O	
ILP-D-SLC-0016	Support of statusCode parameter in PRPT	ILP 12	O	
ILP-D-SLC-0017	Support of multipleLocationIds parameter in PLREQ	ILP 12	O	
ILP-D-SLC-0018	Support of posMethod parameter in PINIT	ILP 12	O	
ILP-D-SLC-0019	Support of requestedAssistData parameter in PINIT	ILP 12	O	
ILP-D-SLC-0020	Support of position parameter in PINIT	ILP 12	O	
ILP-D-SLC-0021	Support of posPayLoad parameter in PINIT	ILP 12	O	
ILP-D-SLC-0022	Support of multipleLocationIds parameter in PINIT	ILP 12	O	
ILP-D-SLC-0023	Support of utran-GPSReferenceTimeResult parameter in PINIT	ILP 12	O	
ILP-D-SLC-0024	Support of utran-GANSSReferenceTimeResult parameter in PINIT	ILP 12	O	
ILP-D-SLC-0025	Support of gnssPosTechnology parameter in PINIT	ILP 12	O	
ILP-D-SLC-0026	Support of sPCSETKeylifetime parameter in PAUTH	ILP 12	O	
ILP-D-SLC-0027	Support of sPCStatusCode parameter in PALIVE	ILP 12	O	
ILP-D-SLC-0028	Support of position parameter in PEND	ILP 12	O	
ILP-D-SLC-0029	Support of statusCode parameter in PEND	ILP 12	O	
ILP-D-SLC-0030	Support of velocity parameter in PMESS	ILP 12	O	
ILP-D-SLC-0031	Support of utran-GPSReferenceTimeAssistance parameter in PMESS	ILP 12	O	

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Item	Function	Reference	Status	Requirement
ILP-D-SLC-0032	Support of utran-GPSReferenceTimeResult parameter in PMESS	ILP 12	O	
ILP-D-SLC-0033	Support of utran-GANSSReferenceTimeAssistance parameter in PMESS	ILP 12	O	
ILP-D-SLC-0034	Support of utran-GANSSReferenceTimeResult parameter in PMESS	ILP 12	O	

B.2 SCR for SPC

B.2.1 SPC Procedures

SPC procedures follow SCR of [SUPL2 ULP TS].

B.2.2 ILP Protocol Interface

Item	Function	Reference	Status	Requirement
ILP-B-SPC-001	ILP encoding	ILP 10	M	
ILP-B-SPC-002	ILP transport	ILP 10	M	
ILP-B-SPC-003	Support of TCP/IP port number	ILP 10	M	

B.2.3 ILP Messages

Item	Function	Reference	Status	Requirement
ILP-C-SPC-001	Support of PREQ	ILP 11	M	
ILP-C-SPC-002	Support of PRES	ILP 11	M	
ILP-C-SPC-003	Support of PRPT	ILP 11	M	
ILP-C-SPC-004	Support of PLREQ	ILP 11	M	
ILP-C-SPC-005	Support of PLRES	ILP 11	M	
ILP-C-SPC-006	Support of PINIT	ILP 11	O	
ILP-C-SPC-007	Support of PMESS	ILP 11	O	
ILP-C-SPC-008	Support of PAUTH	ILP 11	O	
ILP-C-SPC-009	Support of PALIVE	ILP 11	M	
ILP-C-SPC-010	Support of PEND	ILP 11	M	

B.2.4 Support of Parameters for Optional Functions

Item	Function	Reference	Status	Requirement
ILP-D-SPC-0001	Support of locationId parameter in PREQ	ILP 12	O	
ILP-D-SPC-0002	Support of position parameter in PREQ	ILP 12	O	
ILP-D-SPC-0003	Support of triggerParams parameter in PREQ	ILP 12	O	
ILP-D-SPC-0004	Support of	ILP 12	O	

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Item	Function	Reference	Status	Requirement
	multipleLocationIds parameter in PREQ			
ILP-D-SPC-0005	Support of sPCSETKey parameter in PREQ	ILP 12	O	
ILP-D-SPC-0006	Support of sPCTID parameter in PREQ	ILP 12	O	
ILP-D-SPC-0007	Support of sPCSETKeylifetime parameter in PREQ	ILP 12	O	
ILP-D-SPC-0008	Support of qoP parameter in PREQ	ILP 12	O	
ILP-D-SPC-0009	Support of sETCapabilities parameter in PREQ	ILP 12	O	
ILP-D-SPC-0010	Support of preferredPosMethod parameter in PRES	ILP 12	O	
ILP-D-SPC-0011	Support of gnssPosTechnology parameter in PRES	ILP 12	O	
ILP-D-SPC-0012	Support of supportedPosMethods parameter in PRES	ILP 12	O	
ILP-D-SPC-0013	Support of position parameter in PRES	ILP 12	O	
ILP-D-SPC-0014	Support of sPCStatusCode parameter in PRES	ILP 12	O	
ILP-D-SPC-0015	Support of fixNumber parameter in PRPT	ILP 12	O	
ILP-D-SPC-0016	Support of statusCode parameter in PRPT	ILP 12	O	
ILP-D-SPC-0017	Support of multipleLocationIds parameter in PLREQ	ILP 12	O	
ILP-D-SPC-0018	Support of posMethod parameter in PINIT	ILP 12	O	
ILP-D-SPC-0019	Support of requestedAssistData parameter in PINIT	ILP 12	O	
ILP-D-SPC-0020	Support of position parameter in PINIT	ILP 12	O	
ILP-D-SPC-0021	Support of posPayLoad parameter in PINIT	ILP 12	O	
ILP-D-SPC-0022	Support of multipleLocationIds parameter in PINIT	ILP 12	O	
ILP-D-SPC-0023	Support of utran-GPSReferenceTimeResult parameter in PINIT	ILP 12	O	
ILP-D-SPC-0024	Support of utran-GANSSReferenceTimeR	ILP 12	O	

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Item	Function	Reference	Status	Requirement
	esult parameter in PINIT			
ILP-D-SPC-0025	Support of gnssPosTechnology parameter in PINIT	ILP 12	O	
ILP-D-SPC-0026	Support of sPCSETKeylifetime parameter in PAUTH	ILP 12	O	
ILP-D-SPC-0027	Support of sPCStatusCode parameter in PALIVE	ILP 12	O	
ILP-D-SPC-0028	Support of position parameter in PEND	ILP 12	O	
ILP-D-SPC-0029	Support of statusCode parameter in PEND	ILP 12	O	
ILP-D-SPC-0030	Support of velocity parameter in PMESS	ILP 12	O	
ILP-D-SPC-0031	Support of utran-GPSReferenceTimeAssistance parameter in PMESS	ILP 12	O	
ILP-D-SPC-0032	Support of utran-GPSReferenceTimeResult parameter in PMESS	ILP 12	O	
ILP-D-SPC-0033	Support of utran-GANSSReferenceTimeAssistance parameter in PMESS	ILP 12	O	
ILP-D-SPC-0034	Support of utran-GANSSReferenceTimeResult parameter in PMESS	ILP 12	O	

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Appendix C. Timer Tables

This Section defines the ILP relevant timers. Note that default timer value is informative. As a reference, ULP timers are shown in Appendix C.2.

C.1 ILP Timers

Table 52: SLC Timer Values

Timer	Default value	Description	Actions on expiration
LT1	5 sec.	From sending of PREQ to receipt of PRES (successful case) or PEND (error case).	The SLC sends a PEND message to the SPC including a Status Code.
LT2	5 sec.	This timer is only applicable to triggered scenarios. From sending of PLREQ to receipt of PLRES (successful case) or PEND (error case). If PLRES is received after LT2 has expired (and no PEND was sent) and before a new PLREQ has been sent, the SLC SHALL ignore the PLRES. If a new PLREQ is received, the SPC SHALL clear any and all outstanding PLRES it might have stored for delivery and only respond to the latest PLREQ.	Periodic Trigger scenarios: the SLC ignores timer expiration N times consecutively (N configurable) and then sends PEND including Status Code to the SPC. Area Event Triggered scenarios: the SLC sends PEND including Status Code to the SPC.

Table 53: SLC Timer Values

Timer	Default value	Description	Actions on expiration
PT1	For Network Initiated scenarios: For proxy mode non-roaming: PT1 = 11 sec + (optionally) response time in QoP. For proxy mode roaming with V-SLP: PT1 = ST1 + 10 sec. For proxy mode roaming with H-SLP: PT1 = ST2 + ST4 + 10 sec. For non-proxy mode: PT 1 = UT4 + 10 sec. For SET Initiated scenarios: For proxy mode: PT1 = ST1 + 10 sec. For non-proxy mode: PT1 = 11 sec + (optionally) response	This timer is only applicable to immediate scenarios. From sending of PRES to receipt of PINIT (proxy mode) or SUPL POS INIT (non proxy mode) for the successful case or receipt of PEND for the error case.	The SPC sends a PEND message to the SLC including a Status Code.

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Timer	Default value	Description	Actions on expiration
	time in QoP.		
PT2	5 sec.	From sending of PLREQ to receipt of PLRES (successful case) and PEND (error case). If PLRES is received after PT2 has expired (and no PEND was sent) and before a new PLREQ has been sent, the SPC SHALL ignore the PLRES. If a new PLREQ is received, the SLC SHALL clear any and all outstanding PLRES it might have stored for delivery and only respond to the latest PLREQ.	For immediate scenarios: the SPC MAY either continue or send a PEND message to the SLC. For triggered periodic scenarios: the SPC continues the flow N times consecutively (N configurable) and MAY then decide to either send PEND to the SLC or to continue the flow. For triggered area event scenarios: the SPC MAY continue the flow or send PEND to the SLC.

Table 54: SPC Timer Values

C.2 ULP Timers

This section lists all the timer values used by ULP [SUPL2 ULP TS].

Table 55: SET Timer Values

Timer	Default value (sec.)	Description	Actions on expiration
UT1	11	For immediate applications, from sending of SUPL START to receipt of SUPL RESPONSE or SUPL END. In trigger positioning, from sending of SUPL TRIGGERED START to receipt of SUPL TRIGGERED RESPONSE or SUPL END.	The SET sends SUPL END to the SLP. The SET clears all session resources at the SET.
UT2	11	From sending of SUPL POS INIT to receipt of first SUPL POS message or receipt of SUPL END message. UT2 is not needed if the SUPL POS INIT message contains the first SUPL POS element. For cell id based scenarios, the UT2 will be reset by the SUPL END message. The SUPL END message is sent from the SLP to the SET after the SET sent a SUPL POS INIT message containing the lid to the SLP.	For immediate applications the SET sends SUPL END to the SLP and clears all session resources. For triggered applications, the SET skips the SUPL POS session and continues the triggered session.
UT3	10	From sending of the last SUPL POS message to receipt of SUPL END, SUPL REPORT or SUPL NOTIFY. In cases where there is no SUPL POS message sent from SET, timer UT3 is not used.	For immediate applications, the SET sends SUPL END to the SLP and clears all session resources. For triggered applications, the SET continues the triggered session.
UT4	10	Only applicable to non-proxy mode. From sending of SUPL AUTH REQ to receipt of SUPL AUTH RESP message.	The SET sends SUPL END to the SLP. The SET clears all session resources.
UT5	10	Only applicable to “notification based on location” scenarios. From sending of SUPL NOTIFY RESPONSE to receipt of SUPL END.	The SET sends SUPL END to the SLP. The SET clears all session resources.
UT6	10	Only applicable to “notification based on location” in non-proxy mode scenarios. From sending of SUPL REPORT to receipt of SUPL	The SET sends SUPL END to the SLP. The SET clears all session resources.

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Timer	Default value (sec.)	Description	Actions on expiration
		NOTIFY or SUPL END.	
UT7	10	Only applicable to triggered scenarios. From sending of SUPL TRIGGERED STOP to receipt of SUPL END.	The SET sends SUPL END to the SLP. The SET clears all session resources.

Table 56: SET Timer Values

Table 57: SLP Timer Values

Timer	Default value (sec.)	Description	Actions on expiration
ST1	Proxy: 10 Non-proxy: 50+ (optionally) response time in QoP	For proxy mode: from sending of SUPL RESPONSE to receipt of SUPL POS INIT. For non-proxy mode: from sending of SUPL RESPONSE to receipt of the notification (internal communication between SPC and SLC) that SUPL END has been sent to the SET.	For proxy: Send SUPL END to SET Clear session resources at SLP For non-proxy: Internal communication is used to send SUPL END to SET Clear session resources at SLC/SLP
ST2	Proxy: 10 Non-proxy: 50+ (optionally) response time in QoP	For proxy mode: from sending of SUPL INIT to receipt of SUPL POS INIT. For non-proxy mode: from sending SUPL INIT to (a) receipt of notification (internal communication between SPC and SLC) that SUPL POS INIT has been received or (b) receipt of RLP-SSRP(SUPL END) from V-SLP.	For non-roaming scenario: Send MLP-SLIA to SUPL agent For roaming scenario: Send RLP-SRLIA to R-SLP For proxy: Clear session resources at SLP For non-proxy: Clear session resources at SLC
ST3	10	From sending of RLP-SSRLIR(SUPL START) to receipt of RLP-SSRLIA(SUPL RESPONSE)	For network initiated scenario: Send RLP-SRLIA to R-SLP Clear session resources at SLP For SET initiated scenario: Send SUPL END to SET Clear session resources at SLP
ST4	10	From sending of RLP-SSRLIR(msid, lid) to receipt of RLP-SSRLIA(msid, posresult)	For network initiated scenario: Send SUPL END to SET Send RLP-SRLIA to R-SLP Clear session resources at SLP For SET initiated scenario: Send SUPL END to SET Clear session resources at SLP
ST5	10	Only applicable to “notification based on location” scenarios. From sending SUPL NOTIFY to receipt of SUPL NOTIFY	Send SUPL END to SET. Clear session resources at SLP.

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Timer	Default value (sec.)	Description	Actions on expiration
		RESPONSE.	

Table 58: SLP Timer Values

Table 59 RLP Timer Values

Timer	Default value (sec.)	Description	Actions on expiration
RT1	21+ (optionally) response time in QoP	From sending of RLP SRLIR(msid, client-id, QoP) to receipt of RLP SSRLIA(posresult).	Send MLP SLIA(posresult) to the SUPL Agent.

Table 60 RLP Timer Values

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