Enabler Test Specification for LPPe V1.0

Candidate Version 1.0 – 29 Aug 2017

Open Mobile Alliance

OMA-ETS-LPPe-V1_0-20170829-C

Contents

1. Scope

This document describes in detail available test cases for LPP Extensions Release V1.0, OMA-TS-LPPe-V1_0

URL:http://www.openmobilealliance.org/

The test cases are split in two categories, conformance and interoperability test cases.

The conformance test cases are aimed at verifying the adherence to normative requirements described in the technical specifications. In this current version of this document, the conformance test cases cover the requirements of the initial deployments of LPPe only. Future deployments may require additional conformance test cases.

The interoperability test cases are aimed at verifying that implementations of the specifications work satisfactory.

2. References

2.1 Normative References

[3GPP-RRC] 3GPP TS 36.331 Radio Resource Control (RRC), Protocol specification. http://www.3gpp.org

[3GPP-LPP] 3GPP TS 36.355 LTE Positioning Protocol, http://www.3gpp.org

[3GPP-37571-5] 3GPP TS 37.571-5 UE conformance specification for UE positioning Part 5: Test scenarios and assistance data, http://www.3gpp.org

[LPPe-TS] OMA LPP Extensions Technical Specification v1.0, Open Mobile Alliance™, OMA-TS-LPPe-V1_0, http://www.openmobilealliance.org

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

[SUPL-ETS] Enabler Test Specification for SUPL V2.0.3, OMA-ETS-SUPL-V2_0_3, http://www.openmobilealliance.org

[ULP2-TS] UserPlane for Location Protocol v2.0, Open Mobile Alliance™, OMA-TS-ULP-V2_0, URL:http://www.openmobilealliance.org/

[ULP3-TS] UserPlane for Location Protocol v3.0, Open Mobile Alliance™, OMA-TS-ULP-V3_0, URL:http://www.openmobilealliance.org/

2.2 Informative References

[OMADICT] "Dictionary for OMA Specifications", Version 2.9, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_9, URL:http://www.openmobilealliance.org/

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 [RFC2119].

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

The following numbering scheme is used:

xxx-y.z-con-number where:

xxx	Name of enabler, e.g. MMS or Browsing
y.z	Version of enabler release, e.g. 1.2 or 1.2.1
’con’	Indicating this test is a conformance test case
number	Leap number for the test case

Or

xxx-y.z-int-number where:

xxx	Name of enabler, e.g. MMS or Browsing
y.z	Version of enabler release, e.g. 1.2 or 1.2.1
’int’	Indicating this test is a interoperability test case
number	Leap number for the test case

3.2 Definitions

3.3 Abbreviations

3GPP	Third Generation Partnership Project
BLE	Bluetooth Low Energy
GNSS	Global Navigation Satellite System
LPP	3GPP TS 36.355 LTE Positioning Protocol [3GPP-LPP]
LPPe	OMA LPP Extensions [LPPe-TS]
LTE	Long Term Evolution
OMA	Open Mobile Alliance
SET	SUPL Enabled Terminal
SLP	SUPL Location Platform
SUPL	Secure User Plane Location [ULP2-TS] [ULP3-TS]
UE	User Equipment
WLAN	Wireless Local Area Network

4. Introduction

The purpose of this document is to provide test cases for LPP Extensions Enabler Release 1.0 [LPPe-TS].

The implementation of some features is optional for the Clients and/or the Servers in the LPPe Enabler. The tests associated with these optional features are marked as "(Includes Optional Features)" in the test specification.

The successful testing of LPPe requires an LPPe Client and an LPPe Server. LPPe messages need to be encapsulated in 3GPP LPP messages [3GPP-LPP]. To run an LPPe test scenario, either a Control Plane [3GPP – LPP] or a User Plane (OMA SUPL 2.0 - [ULP2-TS]) implementation is required.

4.1 Running Test Cases

Some Test Cases are made up of multiple Tests (e.g. Test 1, Test 2 …). These Tests are independent of each other and are only grouped together for convenience. These Tests may or may not all be relevant to a particular UE or SET or SLP and applicabilities are given separately for each Test.

These Tests may be referred to by adding "-1", or "-2" etc. after the Test number, e.g. LPPe-1.0-con-008-1, LPPe-1.0-con-008-2 etc.

Some Test Cases are made up of multiple Cases (e.g. Case 1, Case 2…). These Cases are all part of the one Test Case and should all be run as part of the Test Case. In particular, to pass the complete Test Case the UE or SET or SLP must pass every Case.

NOTE: Some SETs/UEs might require to establish an E911 call in order to perform the required measurements. These SETs/UEs should indicate this requirement with the *ixit_emergency_call_required* set to yes.

4.2 LPP and LPPe Scenarios

Some Test Cases in this document require that a Location Session is run. For these sessions suitable scenarios and possibly also Assistance Data are required. Suitable scenarios and Assistance Data for A-GNSS, OTDOA and ECID are defined in the Enabler Test Specification for SUPL V2.0 [SUPL-ETS], Sections 4.4 to 4.6. Suitable scenarios and Assistance Data for WLAN and BLE are defined in [3GPP-37571-5] section 9.1.1 and 10.1.1.

5. LPPe Conformance Test Cases

5.1 Client Conformance: Normal Mode

5.1.1 Basic Functionality

5.1.1.1 LPPe-1.0-con-001- Verification of the LPP EPDU-ID and LPPe message header

Test Case Id	LPPe-1.0-con-001
Test Object	Client
Test Case Description	To verify correct setting of the LPP EPDU-ID and the LPPe message header
Specification Reference	LPPe TS 5.1, 6.2.2
SCR Reference	LPPe-MSG-C-001-M
Tool	LPPe Client Conformance Test Tool
Test code	Validated test code for this test case
Preconditions	LPPe Client supporting LPPe version 1.0 with compatibility level 0
Test Procedure	1. Start an LPP/LPPe Session 2. If the LPPe Client does not immediately send an LPP/LPPe Provide Capabilities message (according to ixit_immediate_provideCapabilities_message_sent) then send an LPP/LPPe Request Capabilities message with: • LPPe-CommonIEsRequestCapabilities: all IEs set to request all capabilities 3. The LPPe Client sends a LPP/LPPe Provide Capabilities message with: • the EPDU-ID in the LPP message set to 1. • in the LPPe message header: o LPPeCompatibilityLevel set to 0 o majorVersion set to 1 o minorVersion set to 0 o LPPeMode set to normal 4. End the LPP/LPPe session
Pass-Criteria	1. At step 3 the LPPe client shall set: • the EPDU-ID in the LPP message to 1 and in the LPPe message header: • LPPeCompatibilityLevel set to 0 • majorVersion set to 1 • minorVersion set to 0 • LPPeMode set to normal

5.1.1.2 LPPe-1.0-con-004- Basic LPPe support (Capabilities)

Test Case Id	LPPe-1.0-con-004
Test Object	LPPe Client
Test Case Description	Verify the LPPe Client correctly supports LPPe Request/Provide Capabilities
Specification Reference	LPPe TS 6.2.2, 6.3.1, 6.3.2 Test 1: LPPe TS 6.5.1.9, 6.5.1.10, 6.5.1.11 Test 2: LPPe TS 6.5.2.7, 6.5.2.8 Test 3: LPPe TS 6.5.3.7, 6.5.3.8 Test 4: LPPe TS 6.5.4.7, 6.5.4.8 Test 5: LPPe TS 6.5.5.7, 6.5.5.8 Test 6: LPPe TS 6.5.6.6, 6.5.6.7

	Test 7: LPPe TS 6.5.7.7, 6.5.7.8 Test 8: LPPe TS 6.5.8.7, 6.5.8.8 Test 9: LPPe TS 6.5.9.4, 6.5.9.5 Test 10: LPPe TS 6.5.10.9, 6.5.10.10, 6.5.10.11 Test 11: LPPe TS 6.5.11.9, 6.5.11.10, 6.5.11.11
SCR Reference	LPPe-MSG-C-003-M LPPe-MSG-C-004-M
Tool	LPPe Client Conformance Test Tool
Test code	Validated test code for this test case
Preconditions	LPPe Client supporting LPPe version 1.0 with compatibility level 0 ics: Test 1: ics_Agnss Test 2 ics_Otdoa Test 3: ics_Eotd Test 4: ics_Otdoa_Utra Test 5: ics_Ecid_Lte Test 6: ics_Ecid_Gsm Test 7: ics_Ecid_Utra Test 8: ics_Wlan_Ap Test 9: ics_Ecid_Wimax Test 10: ics_Sensor Test 11a: ics_Srn_Bluetooth Test 11b: ics_Srn_Bluetooth_Low_Energy Test 11c: ics_Srn_Near_Field_Communications Test 11d: ics_Srn_Oma_Mobile_Codes Test 11e: ics_Srn_Other
Test Procedure	Editors note: These subtest might be combined into one after further analysis Test 1: AGNSS (FFS) Test 2: OTDOA (FFS) Test 3: EOTD (FFS) Test 4: OTDOA UTRA (FFS) Test 5: ECID LTE (FFS) Test 6: ECID GSM (FFS) Test 7: ECID UTRA (FFS) Test 8: WLAN AP Test 9: ECID WIMAX (FFS) Test 10: Sensor Test 11a: SRN for SRN Technology: Bluetooth (FFS) Test 11b: SRN for SRN Technology: Bluetooth Low Energy Test 11c: SRN for SRN Technology: Near Field Communications (FFS) Test 11d: SRN for SRN Technology: OMA Mobile Codes (FFS) Test 11e: SRN for SRN Technology: Other (FFS) 1. Start an LPP/LPPe session 2. If the LPPe Client does not immediately send an LPP/LPPe Provide Capabilities message (according to ixit_immediate_provideCapabilities_message_sent) then send an LPP/LPPe Request Capabilities message with: • LPPe-CommonIEsRequestCapabilities: all IEs set to request all capabilities • Test 1: LPPe-AGNSS-RequestCapabilities: all IEs set to request all capabilities • Test 2: LPPe-OTDOA-RequestCapabilities: all IEs set to request all

	capabilities • Test 3: LPPe-EOTD-RequestCapabilities: all IEs set to request all capabilities • Test 4: LPPe-OTDOA-UTRA-RequestCapabilities: all IEs set to request all capabilities • Test 5: LPPe-ECID-LTE-RequestCapabilities: all IEs set to request all capabilities • Test 6: LPPe-ECID-GSM-RequestCapabilities: all IEs set to request all capabilities • Test 7: LPPe-ECID-UTRA-RequestCapabilities: all IEs set to request all capabilities • Test 8: LPPe-WLAN-AP-RequestCapabilities: all IEs set to request all capabilities • Test 9: LPPe-ECID-WiMax-RequestCapabilities: all IEs set to request all capabilities • Test 10: LPPe-Sensor-RequestCapabilities: all IEs set to request all capabilities • Test 11: LPPe-SRN-RequestCapabilities: all IEs set to request all capabilities 3. The LPPe Client sends an LPP/LPPe Provide Capabilities message with all the relevant IEs of the following fields of LPPe-ProvideCapabilities, depending on the features supported by the Client as shown by the relevant Client Provide Capabilities ics in Appendix B: Note that in the case that the LPPe Client immediately sends an LPP/LPPe Provide Capabilities message after step 1 (according to ixit_immediate_provideCapabilities_message_sent) then more than just the relevant fields of LPPe-ProvideCapabilities listed below may be sent. • LPPe-CommonIEsProvideCapabilities • Test 1: LPPe-AGNSS-ProvideCapabilities • Test 2: LPPe-OTDOA-ProvideCapabilities • Test 3: LPPe-EOTD-ProvideCapabilities • Test 4: LPPe-OTDOA-UTRA-ProvideCapabilities • Test 5: LPPe-ECID-LTE-ProvideCapabilities • Test 6: LPPe-ECID-GSM-ProvideCapabilities • Test 7: LPPe-ECID-UTRA-ProvideCapabilities • Test 8: LPPe-WLAN-AP-ProvideCapabilities • Test 9: LPPe-ECID-WiMax-ProvideCapabilities • Test 10: LPPe-Sensor-ProvideCapabilities • Test 11: LPPe-SRN-ProvideCapabilities 4. End the LPP/LPPe session 5. Repeat steps 1 to 4 for each subtest supported by the Client
Pass-Criteria	At step 3 the Client shall send an LPP/LPPe Provide Capabilities message with the correct LPPe Client capabilities for the features supported by the Client according to relevant Client Provide Capabilities ics in Appendix B.

5.1.1.3 LPPe-1.0-con-005- Basic LPPe support (Assistance Data) (Includes Optional Features)

Test Case Id	LPPe-1.0-con-005
Test Object	LPPe Client
Test Case Description	Verification of the message extension for LPPe Request/Provide Assistance Data
Specification Reference	LPPe TS 6.2.2

SCR Reference	LPPe-MSG-C-005-O LPPe-MSG-C-006-O
Tool	LPPe Client Conformance Test Tool
Test code	Validated test code for this test case
Preconditions	LPPe Client supporting LPPe version 1.0 with compatibility level 0
Test Procedure	FFS
Pass-Criteria	FFS

5.1.1.4 LPPe-1.0-con-006- Basic LPPe support (Location Information)

Test Case Id	LPPe-1.0-con-006
Test Object	LPPe Client
Test Case Description	Verification of the message extension for LPPe Request/Provide Location Information
Specification Reference	LPPe TS 6.2.2, 6.3.5, 6.3.6 Test 1: LPPe TS 6.5.1.5, 6.5.1.6, 6.5.1.7, 6.5.1.8 Test 2: LPPe TS 6.5.2.4, 6.5.2.5, 6.5.2.6 Test 3: LPPe TS 6.5.3.5, 6.5.3.6 Test 4: LPPe TS 6.5.4.4, 6.5.4.5, 6.5.4.6 Test 5: LPPe TS 6.5.5.4, 6.5.5.5, 6.5.5.6 Test 6: LPPe TS 6.5.6.4, 6.5.6.5 Test 7: LPPe TS 6.5.7.4, 6.5.7.5, 6.5.7.6 Test 8: LPPe TS 6.5.8.4, 6.5.8.5, 6.5.8.6 Test 9: LPPe TS 6.5.9.2, 6.5.9.3 Test 10: LPPe TS 6.5.10.5, 6.5.10.6, 6.5.10.7, 6.5.10.8 Test 11: LPPe TS 6.5.11.5, 6.5.11.6, 6.5.11.7, 6.5.11.8
SCR Reference	LPPe-MSG-C-007-M LPPe-MSG-C-008-M
Tool	LPPe Client Conformance Test Tool
Test code	Validated test code for this test case
Preconditions	LPPe Client supporting LPPe version 1.0 with compatibility level 0 ics: Test 1: ics_Agnss Test 2 ics_Otdoa Test 3: ics_Eotd Test 4: ics_Otdoa_Utra Test 5: ics_Ecid_Lte Test 6: ics_Ecid_Gsm Test 7: ics_Ecid_Utra Test 8: ics_Wlan_Ap Test 9: ics_Ecid_Wimax Test 10: ics_Sensor Test 11a: ics_Srn_Bluetooth Test 11b: ics_Srn_Bluetooth_Low_Energy Test 11c: ics_Srn_Near_Field_Communications Test 11d: ics_Srn_Oma_Mobile_Codes Test 11e: ics_Srn_Other
Test Procedure	Test 1: AGNSS (FFS) Test 2: OTDOA (FFS) Test 3: EOTD (FFS)

	Test 4: OTDOA UTRA (FFS) Test 5: ECID LTE (FFS) Test 6: ECID GSM (FFS) Test 7: ECID UTRA (FFS) Test 8: WLAN AP Test 9: ECID WIMAX (FFS) Test 10: Sensor Test 11a: SRN for SRN Technology: Bluetooth (FFS) Test 11b: SRN for SRN Technology: Bluetooth Low Energy Test 11c: SRN for SRN Technology: Near Field Communications (FFS) Test 11d: SRN for SRN Technology: OMA Mobile Codes (FFS) Test 11e: SRN for SRN Technology: Other (FFS) 1. Start an LPP/LPPe session 2. If the LPPe Client does not immediately send an LPP/LPPe Provide Capabilities message (according to ixit_immediate_provideCapabilities_message_sent) then send an LPP/LPPe Request Capabilities message with: o LPPe-CommonIEsRequestCapabilities: all IEs set to request all capabilities 3. The LPPe Client sends an LPP/LPPe Provide Capabilities message. 4. Send an LPP/LPPe Request Location Information message with: Editor's note: we may need to provide more detailed information here - FFS • LPPe-CommonIEsRequestLocationInformation: all IEs set to request all Location Information • Test 1: LPPe-AGNSS-RequestLocationInformation: IEs set to request the following Location Information: o FFS • Test 2: LPPe-OTDOA-RequestLocationInformation: IEs set to request the following Location Information: o FFS • Test 3: LPPe-EOTD-RequestLocationInformation: IEs set to request the followingLocation Information: o FFS • Test 4: LPPe-OTDOA-UTRA-RequestLocationInformation: IEs set to request the following Location Information: o FFS • Test 5: LPPe-ECID-LTE-RequestLocationInformation: IEs set to request the following Location Information: o FFS • Test 6: LPPe-ECID-GSM-RequestLocationInformation: IEs set to request the following Location Information: o FFS • Test 7: LPPe-ECID-UTRA-RequestLocationInformation: IEs set to request the following Location Information: o FFS • Test 8: LPPe-WLAN-AP-RequestLocationInformation: all IEs set to request all Location Information • Test 9: LPPe-ECID-WiMax-RequestLocationInformation: IEs set to request request the following Location Information: o FFS • Test 10: LPPe-Sensor-RequestLocationInformation: all IEs set to request request all Location Information • Test 11a: LPPe-SRN-RequestLocationInformation for SRN Technology: Bluetooth: IEs set to request the following Location

	Information: ○ FFS • Test 11b: LPPe-SRN-RequestLocationInformation for SRN Technology: Bluetooth Low Energy: IEs set to request all Location Information • Test 11c: LPPe-SRN-RequestLocationInformation for SRN Technology: Near Field Communications: IEs set to request the following Location Information: ○ FFS • Test 11d: LPPe-SRN-RequestLocationInformation for SRN Technology: OMA Mobile Codes: IEs set to request the following Location Information ○ FFS • Test 11e: LPPe-SRN-RequestLocationInformation for SRN Technology: Other: IEs set to request the following Location Information: ○ FFS 5. The LPPe Client sends an LPP/LPPe Provide Location Information message with all the relevant IEs of the following fields of LPPe-ProvideLocationInformation, depending on the features supported by the Client as shown by the relevant Client Provide Location Information ics in Appendix B: Editor's note: we may want to provide more detailed information here - FFS • LPPe-CommonIEsProvideLocationInformation: ○ According to the relevant ics • Test 1: LPPe-AGNSS-ProvideLocationInformation: ○ FFS • Test 2: LPPe-OTDOA-ProvideLocationInformation: ○ FFS • Test 3: LPPe-EOTD-ProvideLocationInformation: ○ FFS • Test 4: LPPe-OTDOA-UTRA-ProvideLocationInformation: ○ FFS • Test 5: LPPe-ECID-LTE-ProvideLocationInformation: ○ FFS • Test 6: LPPe-ECID-GSM-ProvideLocationInformation: ○ FFS • Test 7: LPPe-ECID-UTRA-ProvideLocationInformation: ○ FFS • Test 8: LPPe-WLAN-AP-ProvideLocationInformation: ○ According to the relevant ics • Test 9: LPPe-ECID-WiMax-ProvideLocationInformation: ○ FFS • Test 10: LPPe-Sensor-ProvideLocationInformation: ○ According to the relevant ics • Test 11a: LPPe-SRN-ProvideLocationInformation for SRN

	Technology: Bluetooth: o FFS • Test 11b: LPPe-SRN-ProvideLocationInformation for SRN Technology: Bluetooth Low Energy: o According to the relevant ics • Test 11c: LPPe-SRN-ProvideLocationInformation for SRN Technology: Near Field Communications: o FFS • Test 11d: LPPe-SRN-ProvideLocationInformation for SRN Technology: OMA Mobile Codes: o FFS • Test 11e: LPPe-SRN-ProvideLocationInformation for SRN Technology: Other: o FFS 6. End the LPP/LPPe session 7. Repeat steps 1 to 6 for each subtest supported by the Client
Pass-Criteria	1. At step 5, the Client shall return an LPP/LPPe Provide Location Information message with the correct LPPe Client location information for the features supported by the Client according to the relevant Client Provide Location Information ics in Appendix B.

5.1.1.5 LPPe-1.0-con-007- Basic LPPe support (Error) (Includes Optional Features)

Test Case Id	LPPe-1.0-con-007
Test Object	LPPe Client
Test Case Description	Verification of the message extension for LPPe Error
Specification Reference	LPPe TS 6.2.2, 6.3.8 Test 1: LPPe TS 6.5.1.12 Test 2: LPPe TS 6.5.2.9 Test 3: LPPe TS 6.5.3.9 Test 4: LPPe TS 6.5.4.9 Test 5: LPPe TS 6.5.5.9 Test 6: LPPe TS 6.5.6.8 Test 7: LPPe TS 6.5.7.9 Test 8: LPPe TS 6.5.8.9 Test 9: LPPe TS 6.5.9.6 Test 10: LPPe TS 6.5.10.12 Test 11: LPPe TS 6.5.11.12
SCR Reference	LPPe-MSG-C-009-O
Tool	LPPe Client Conformance Test Tool
Test code	Validated test code for this test case
Preconditions	FFS
Test Procedure	FFS
Pass-Criteria	FFS

5.1.1.6 LPPe-1.0-con-008- Basic LPPe support (Abort) (Includes Optional Features)

Test Case Id	LPPe-1.0-con-008
Test Object	LPPe Client
Test Case Description	Verification of the message extension for LPPe Abort

Specification Reference	LPPe TS 6.2.2
SCR Reference	LPPe-MSG-C-010-O
Tool	LPPe Client Conformance Test Tool
Test code	Validated test code for this test case
Preconditions	LPPe Client supporting LPPe version 1.0 with compatibility level 0
Test Procedure	FFS
Pass-Criteria	FFS

5.1.2 LPP/LPPe Interworking

TBD

5.1.3 LPPe Cross Version Compatibility

5.1.3.1 LPPe-1.0-con-031-Compatible Versions: Higher Version

Test Case not applicable to LPPe Version 1.0.

5.1.3.2 LPPe-1.0-con-032-Compatible Versions: Lower Version

Test Case not applicable to LPPe Version 1.0.

5.1.3.3 LPPe-1.0-con-033-Correct support: LPPe V2.0 and V1.0

Test Case not applicable to LPPe Version 1.0.

5.1.3.4 LPPe-1.0-con-035-Unsupported Version: higher version

Test Case Id	LPPe-1.0-con-035
Test Object	LPPe Client
Test Case Description	Verifies LPPe client correctly handles unsupported higher version
Specification Reference	LPPe TS 4.2
SCR Reference	LPPe-MSG-C-002-M
Tool	LPPe Client Conformance Test Tool
Test code	Validated test code for this test case
Preconditions	LPPe Client supporting LPPe version 1.0 with compatibility level 0
Test Procedure	FFS
Pass-Criteria	FFS

5.1.3.5 LPPe-1.0-con-037- Unsupported Compatibility Level

Test Case Id	LPPe-1.0-con-037
Test Object	LPPe Client
Test Case Description	Verifies LPPe client correctly handles unsupported Compatibility Level
Specification Reference	LPPe TS 4.2
SCR Reference	LPPe-MSG-C-002-M
Tool	LPPe Client Conformance Test Tool
Test code	Validated test code for this test case
Preconditions	LPPe Client supporting LPPe version 1.0 with compatibility level 0
Test Procedure	FFS
Pass-Criteria	FFS

6. LPPe Interoperability Test Cases

6.1 LPPe-1.0-int-001 - Client reject based on the compatibility level

Test Case Id	LPPe-1.0-int-001
Test Object	LPPe Server and LPPe Client
Test Case Description	To test the compatibility level adaptation in the beginning of the LPPe session
Specification Reference	LPPe TS chapter 4.2
SCR Reference	LPPe-MSG-C-002-M LPPe-MSG-S-002-M
ETR Reference	LPPe mandatory test requirement with Feature Key ADAPT
Tool	Protocol analyser to monitor signalling between LPPe Client and LPPe Server. If a protocol analyser is not available log files in Client and Server can be used instead.
Test code	-
Preconditions	• Equipment: o LPPe Client supporting LPPe version 1.0 with compatibility level 0 o LPPe Server supporting LPPe version 2.0 with compatibility level 1 o Open connection between the client and the server, which connection can be used to carry LPPe messages
Test Procedure	LPPe Server sends the LPPe Client any LPPe message (not Error or Abort) allowed for the server to send in Normal mode with the version indication 2.0 and compatibility level 1.
Pass-Criteria	LPPe Client responds with LPPe Error message indicating version 1.0 and compatibility level 0. OR No response is received at all.

6.2 LPPe-1.0-int-002 - Server reject based on the compatibility level

Test Case Id	LPPe-1.0-int-002
Test Object	To test the compatibility level adaptation in the beginning of the LPPe session
Test Case Description	To test the version adaptation
Specification Reference	LPPe TS chapter 4.2
SCR Reference	LPPe-MSG-C-002-M LPPe-MSG-S-002-M
ETR Reference	LPPe mandatory test requirement with Feature Key ADAPT
Tool	Protocol analyser to monitor signalling between LPPe Client and LPPe Server. If a protocol analyser is not available log files in Client and Server can be used instead.
Test code	-

Preconditions	• Equipment: o LPPe Server supporting LPPe version 1.0 with compatibility level 0 o LPPe Client supporting LPPe version 2.0 with compatibility level 1 o Open connection between the client and the server, which connection can be used to carry LPPe messages
Test Procedure	LPPe Client sends the LPPe Server any LPPe message (not Error or Abort) message allowed for the Client to send with the version indication 2.0 and compatibility level 1.
Pass-Criteria	LPPe Server responds with LPPe Error message indicating version 1.0 and compatibility level 0. OR No response is received at all.

6.3 LPPe-1.0-int-003 - Client version support

Test Case Id	LPPe-1.0-int-003
Test Object	LPPe Server and LPPe Client
Test Case Description	To test the version adaptation
Specification Reference	LPPe TS chapter 4.2
SCR Reference	LPPe-MSG-C-002-M LPPe-MSG-S-002-M
ETR Reference	LPPe mandatory test requirement with Feature Key ADAPT
Tool	Protocol analyser to monitor signalling between LPPe Client and LPPe Server. If a protocol analyser is not available log files in Client and Server can be used instead.
Test code	-
Preconditions	• Equipment: o LPPe Server supporting LPPe version 1.0 with compatibility level 0 o LPPe Client supporting LPPe versions 1.0 and 2.0 both with compatibility level 0 o Open connection between the client and the server, which connection can be used to carry LPPe messages
Test Procedure	Test 1: LPPe Server sends the LPPe Client any LPPe message (not Error or Abort) allowed for the LPPe Server to send in the Normal mode with the version indication 1.0 and compatibility level 0. Test 2: LPPe Client sends the LPPe Client any LPPe message (not Error or Abort) allowed for the LPPe Client to send in the Normal mode with the version indication 2.0 and compatibility level 0.
Pass-Criteria	Test 1: LPPe Client responds with the corresponding LPPe message indicating version 1.0 and compatibility level 0. OR LPPe Client responds with the corresponding LPPe message indicating version 2.0 and compatibility level 0. Test 2: LPPe Server responds with the corresponding LPPe message indicating version 1.0 and compatibility level 0.

6.4 LPPe-1.0-int-004 - Server version support

Test Case Id	LPPe-1.0-int-004
Test Object	LPPe Server and LPPe Client
Test Case Description	To test the version adaptation
Specification Reference	LPPe TS chapter 4.2
SCR Reference	LPPe-MSG-C-002-M LPPe-MSG-S-002-M
ETR Reference	LPPe mandatory test requirement with Feature Key ADAPT
Tool	Protocol analyser to monitor signalling between LPPe Client and LPPe Server. If a protocol analyser is not available log files in Client and Server can be used instead.
Test code	-
Preconditions	• Equipment: o LPPe Client supporting LPPe version 1.0 with compatibility level 0 o LPPe Server supporting LPPe versions 1.0 and 2.0 both with compatibility level 0 o Open connection between the client and the server, which connection can be used to carry LPPe messages
Test Procedure	Test 1: LPPe Client sends the LPPe Server any LPPe message (not Error or Abort) allowed for the LPPe Client to send in the Normal mode with the version indication 1.0 and compatibility level 0. Test 2: LPPe Server sends the LPPe Client any LPPe message (not Error or Abort) allowed for the LPPe Server to send in the Normal mode with the version indication 2.0 and compatibility level 0.
Pass-Criteria	Test 1: LPPe Server responds with the corresponding LPPe message indicating version 1.0 and compatibility level 0. OR LPPe Server responds with the corresponding LPPe message indicating version 2.0 and compatibility level 0. Test 2: LPPe Client responds with the corresponding LPPe message indicating version 1.0 and compatibility level 0.

6.5 LPPe-1.0-int-013 – Short Range Nodes (Includes Optional Features)

Test Case Id	LPPe-1.0-int-013
Test Object	LPPe Server and LPPe Client
Test Case Description	To test UE-assisted Short Range Node positioning with Bluetooth
Specification Reference	LPPe TS chapter 6.5.11
SCR Reference	LPPe-LOC-C-030-O, LPPe-LOC-S-030-O
ETR Reference	LPPe optional test requirement with Feature Key SRN
Tool	Protocol analyser to monitor signalling between LPPe Client and LPPe Server. If a protocol analyser is not available log files in Client and Server can be used instead.
Test code	-

Preconditions	• Equipment: o LPPe Client supporting LPPe version 1.0 with compatibility level 0 and Bluetooth support o LPPe Server supporting LPPe version 1.0 with compatibility level 0 and Bluetooth support o Open connection between the client and the server, which connection can be used to carry LPPe messages o Bluetooth transmitters
Test Procedure	o LPPe Server requests from LPPe Client Bluetooth Short Range Node measurements o LPPe Client observes its Bluetooth environment and provides the observations to the LPPe Server
Pass-Criteria	LPPe Client correctly provides its Bluetooth observations to the LPPe Server

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 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-ETS-LPPe-V1_0	15 Dec 2010	all	Baseline ETS document
	10 Feb 2011	6	OMA-IOP-MEC-2011-0003-CR_New_LPPe_Short_Range_Node_test_cases.doc
	10 Feb 2017	all	Incorporated CR: OMA-IOP-2017-0018R03-CR_LPPe_addition_of_new_test_cases
	13 Feb 2017	n/a	Fixed the print error.
	31 Mar 2017	1, 2.1, 3.3, 4, 5.1, B.2, B.3	Incorporated CRs: OMA-IOP-2017-0024R01-CR_LPPe_compatibility_tests OMA-IOP-2017-0025R01-CR_LPPe_ETS_tidy_up OMA-IOP-2017-0027R02-CR_LPPe_ETS_revise_Introduction OMA-IOP-2017-0028-CR_LPPe_ETS_merge_con_001_003 OMA-IOP-2017-0029R01-CR_LPPe_ETS_add_missing_subtests OMA-IOP-2017-0030-CR_LPPe_ETS_Normal_Mode OMA-IOP-2017-0031R01-CR_LPPe_ETS_Update_Capabilities_test OMA-IOP-2017-0033R01-CR_LPPe_ETS_Adding_ics OMA-IOP-2017-0036-CR_LPPe_ETS_revise_Scope
	05 Apr 2017	1, 2.1, 3.3, 4, 5.1.1.1-5.1.1.6, 5.1.3.4, 5.1.3.6, 5.2, B.2, B.3.1.1, B.4	Incorporated CR: OMA-IOP-2017-0039-CR_LPPe_ETS_tidy_up_and_way_forward
	04 May 2017	4, 5.1.1.1, 5.1.1.5, 5.1.1.7-5.1.1.11, 6.5-6.12	Incorporated CRs: OMA-IOP-2017-0046-CR_LPPe_1.0_ETS_clean_up OMA-IOP-2017-0050-CR_LPPe_ETS_revise_con_001
	24 May 2017	5.1.1.3, 5.1.1.4, 5.1.1.5, 5.1.1.6, B.3.1.2, B.3.1.3	Incorporated CRs: OMA-IOP-2017-0061R01-CR_LPPe_ETS_optional_features OMA-IOP-2017-0064-CR_LPPe_ETS_update_srn_ics OMA-IOP-2017-0065-CR_LPPe_ETS_revise_con_006
	22 Aug 2017	4.2, 4.3, 5.1.1.2, 5.1.1.4	Incorporated CR: OMA-IOP-2017-0069-CR_LPPe_ETS_tidy_up
Candidate Version OMA-ETS-LPPe-V1_0	29 Aug 2017	n/a	Status changed to Candidate by TP TP ref # OMA-TP-2017-0032-INP_LPPe-V1_0_ETS_for_1st_Candidate_Approval

Appendix B. Conformance Test Case applicability

B.1 Introduction

This section shall help implementers of the LPPe Enabler to select appropriate Conformance test cases that are applicable to the features implemented.

This appendix lists all test cases testing only mandatory features, ICS (Implementation Conformance Specification), IXIT (Implementation eXtra Information) and a mapping from ICS/IXIT to applicable test cases as defined by the Open Mobile Alliance.

B.2 Test Cases testing only mandatory features

These Conformance test cases are independent from any applicability, are testing only mandatory SCRs and SHALL be run with every implementation.

Test Case
LPPe-1.0-con-001- Verification of the LPP EPDU-ID and LPPe message header

B.3 Applicability

B.3.1 Client ICS

B.3.1.1 Client general ICS

ICS	*Description*	**SCR Reference(s)**	**Supported** *(yes/no)*
ics_Agnss	AGNSS supported in LPPe		
ics_Otdoa	OTDOA supported in LPPe		
ics_Eotd	EOTD supported in LPPe		
ics_Otdoa_Utra	OTDOA UTRA supported in LPPe		
ics_Ecid_Lte	ECID LTE supported in LPPe		
ics_Ecid_Gsm	ECID GSM supported in LPPe		
ics_Ecid_Utra	ECID UTRA supported in LPPe		
ics_Wlan_Ap	WLAN AP supported in LPPe		
ics_Ecid_Wimax	ECID WIMAX supported in LPPe		
ics_Sensor	Sensor supported in LPPe		
ics_Srn_Bluetooth	SRN Technology: Bluetooth supported in LPPe		
ics_Srn_Bluetooth_Low_Energy	SRN Technology: Bluetooth Low Energy supported in LPPe		
ics_Srn_Near_Field_Communications	SRN Technology: Near Field Communications supported in LPPe		
ics_Srn_Oma_Mobile_Codes	SRN Technology: OMA Mobile Codes supported in LPPe		
ics_Srn_Other	SRN Technology: Other supported in LPPe		

B.3.1.2 Client Provide Capabilities ICS

LPPe Provide Capabilities IE	*ICS*	*Description*	**SCR Reference(s)**	**Supported** *(yes/no/value(s))*
LPPe-commonIEs	ics_iP-Address-Capabilities	iP-Address-Capabilities		
	ics_assistanceContainerSupport	assistanceContainerSupport		
	ics_locationInformationContainerSupport	locationInformationContainerSupport		
	ics_relativeLocationChange-Capabilities	relativeLocationChange-Capabilities		
	ics_highAccuracyFormatCapabilities	highAccuracyFormatCapabilities		
	ics_segmentedAssistanceData-ProvideCapabs	segmentedAssistanceData-ProvideCapabs		
	ics_referencePointCapabilities	referencePointCapabilities		
	ics_scheduledLocation-Capabilities	scheduledLocation-Capabilities		
	ics_accessCapabilities	accessCapabilities		
	ics_segmentedLocationInformation-ProvideCapabs	segmentedLocationInformation-ProvideCapabs		
LPPe-agnss	FFS			
LPPe-otdoa	FFS			
LPPe-eotd	FFS			
LPPe-otdoa-utra	FFS			
LPPe-ecid-lte	FFS			
LPPe-ecid-gsm	FFS			
LPPe-ecid-utra	FFS			

LPPe-wlan-ap	ics_wlan-ecid-MeasSupported	wlan-ecid-MeasSupported		
	ics_wlan-types-Supported	wlan-types-Supported		
	ics_ap-Capability	ap-Capability		
	ics_wlan-ap-ADSupported	wlan-ap-ADSupported		
	ics_additional-wlan-ecid-MeasSupported	additional-wlan-ecid-MeasSupported		
	ics_apMACAddress	apMACAddress		
	ics_apTypes	apTypes		
LPPe-ecid-wimax	FFS			
LPPe-sensor	ics_motionStateSupport	motionStateSupport		
	ics_secondarySupport	secondarySupport		
	ics_atmosphericPressureADSupport	atmosphericPressureADSupport		
	ics_atmosphericPressureSupport	atmosphericPressureSupport		
LPPe-srn: SRN-Technologies: bt	FFS			
LPPe-srn: SRN-Technologies: btle	ics_supportedMeasurements	supportedMeasurements		
	ics_supportedAssistanceData	supportedAssistanceData		
	ics_historicMeasurementsSupported	historicMeasurementsSupported		
LPPe-srn: SRN-Technologies: nfc	FFS			
LPPe-srn: SRN-Technologies: mobileCode	FFS			

LPPe-srn: SRN-Technologies: other	FFS			

B.3.1.3 Client Provide Location Information ICS

Editor's note: it may be possible to use some of the ics in the table above to avoid duplication - FFS

LPPe Provide Location Infomation IE	*ICS*	*Description*	**SCR Reference(s)**	**Supported** *(yes/no/value(s))*
LPPe-commonIEs	ics_ highAccuracy3Dposition	highAccuracy3Dposition		
	ics_ localPosition	localPosition		
	ics_ highAccuracy3Dvelocity	highAccuracy3Dvelocity		
	ics_ iP-Address-List	iP-Address-List		
	ics_ locationInformationContainer	locationInformationContainer		
	ics_ providePeriodicLocInfoWithUpdate	providePeriodicLocInfoWithUpdate		
	ics_ relativeLocationChangeList	relativeLocationChangeList		
	ics_ scheduledLocation	scheduledLocation		
	ics_ accessTypes	accessTypes		
	ics_ segmentedLITransfer	segmentedLITransfer		
	ics_locationInformationTimeStamp	locationInformationTimeStamp		
	ics_locationSource	locationSource		
LPPe-agnss	FFS			
LPPe-otdoa	FFS			
LPPe-eotd	FFS			
LPPe-otdoa-utra	FFS			

LPPe-ecid-lte	FFS			
LPPe-ecid-gsm	FFS			
LPPe-ecid-utra	FFS			
LPPe-wlan-ap	ics_wlan-ecid-MeasSupported	wlan-AP-CombinedLocationInformation		
	ics_wlan-types-Supported	wlan-AP-Error		
LPPe-ecid-wimax	FFS			
LPPe-sensor	ics_ motionStateList	motionStateList		
	ics_ sensorError	sensorError		
	ics_ atmosphericPressure	atmosphericPressure		
LPPe-srn: SRN-Technologies: bt	FFS			
LPPe-srn: SRN-Technologies: btle	ics_srnMeasurementList	srnMeasurementList		
	ics_ srnError	srnError		
LPPe-srn: SRN-Technologies: nfc	FFS			
LPPe-srn: SRN-Technologies: mobileCode	FFS			
LPPe-srn: SRN-Technologies: other	FFS			

B.3.2 Client IXIT

IXIT	*Description*	**Unit** **<(Range of values)>**	**Value**
ixit_immediate_provideCapabilities_message_sent	Client immediately sends an LPP/LPPe Provide Capabilities message when the LPP/LPPe session is started. Note this may depend on the type of session used.	- (Yes/No)	
ixit_emergency_call_required	Emergency call required to be in progress for an Emergency Services Location Request	- (Yes/No)	

B.3.3 Server ICS

ICS	*Description*	**SCR Reference(s)**	**Supported** *(yes/no)*

B.3.4 Server IXIT

IXIT	*Description*	**Unit** **<(Range of values)>**	**Value**

B.4 ICS to test case mapping

According to the ICS described above the applicable test cases can be derived from the following table.

Applicability	Test Cases
ics_Agnss	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 1: AGNSS LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 1: AGNSS
ics_Otdoa	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 2: OTDOA LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 2: OTDOA
ics_Eotd	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 3: EOTD LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 3: EOTD
ics_Otdoa_Utra	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 4: OTDOA UTRA LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 4: OTDOA UTRA
ics_Ecid_Lte	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 5: ECID LTE LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 5: ECID LTE
ics_Ecid_Gsm	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 6: ECID GSM LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 6: ECID GSM
ics_Ecid_Utra	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 7: ECID UTRA LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 7: ECID UTRA
ics_Wlan_Ap	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 8: WLAN AP LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 8: WLAN AP
ics_Ecid_Wimax	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 9: ECID WIMAX LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 9: ECID WIMAX
ics_Sensor	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 10: Sensor LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 10: Sensor
ics_Srn_Bluetooth	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 11a: SRN for SRN

	Technology: Bluetooth LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 11a: SRN for SRN Technology: Bluetooth
ics_Srn_Bluetooth_Low_Energy	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 11b: SRN for SRN Technology: Bluetooth Low Energy LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 11b: SRN for SRN Technology: Bluetooth Low Energy
ics_Srn_Near_Field_Communications	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 11c: SRN for SRN Technology: Near Field Communications LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 11c: SRN for SRN Technology: Near Field Communications
ics_Srn_Oma_Mobile_Codes	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 11d: SRN for SRN Technology: OMA Mobile Codes LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 11d: SRN for SRN Technology: OMA Mobile Codes
ics_Srn_Other	LPPe-1.0-con-004- Basic LPPe support (Capabilities) Test 11e: SRN for SRN Technology: Other LPPe-1.0-con-006- Basic LPPe support (Location Information) Test 11e: SRN for SRN Technology: Other