Lightweight M2M – Connectivity Management Object (LwM2M Object – ConnMgmt)

Approved Version 1.0 – 14 Mar 2017

Open Mobile Alliance

OMA-TS-LWM2M_ConnMgmt-V1_0-20170314-A

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1. Scope

This document defines a set of Objects to be used in conjunction with the Lightweight M2M enabler in order to manage connectivity at the device.

2. References

2.1 Normative References

[3GPP-TS_23.203] 3GPP TS 23.203 " Policy and charging control architecture"
URL:http://www.3gpp.org

[3GPP-TS_23.401] 3GPP TS "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access"
URL:http://www.3gpp.org

[3GPP-TS_23.682] 3GPP TS "Architecture enhancements to facilitate communications with packet data networks and applications"
URL:http://www.3gpp.org

[3GPP-TS_24.008] 3GPP TS "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3"
URL:http://www.3gpp.org

[3GPP-TS_24.301] 3GPP TS "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3"
URL:http://www.3gpp.org

[3GPP-TS_27.060] 3GPP TS "Packet domain; Mobile Station (MS) supporting Packet Switched services"
URL:http://www.3gpp.org

[3GPP-TS_31.102] 3GPP TS "Characteristics of the Universal Subscriber Identity Module (USIM) application"
URL:http://www.3gpp.org

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

2.2 Informative References

[3GPP-TS_21.905] 3GPP TS "3GPP Vocabulary", URL:http://www.3gpp.org

[OMADICT] "Dictionary for OMA Specifications", 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” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

LTE	WB-E-UTRAN as defined in [3GPP-TS_23.401].
NB-IoT	NarrowBand IoT is a subset of E-UTRAN.

See also [3GPP-TS_21.905] for 3GPP-specific definitions.

3.3 Abbreviations

APN	Access Point Name
CS	Circuit switched
OMA	Open Mobile Alliance
PDN	Packet data network
PS	Packet switched
RSCP	Received Signal Code Power
RSRP	Reference Signal Received Power
RSSI	Received Signal Strength Indicator

See also [3GPP-TS_21.905] for 3GPP-specific abbreviations.

4. Introduction

This specification enables remote configuration of connectivity parameters in M2M devices.

4.1 Version 1.0

V1.0 of the specification covers:

(1) WAN connectivity for 3GPP or 3GPP2 bearers (GPRS, EDGE, UMTS, LTE, NB-IoT, SMS)

(2) LAN connectivity for WLAN

5. LwM2M Object: Cellular network connectivity

This object specifies resources to enable a device to connect to a 3GPP or 3GPP2 bearer, including GPRS/EDGE, UMTS, LTE, NB-IoT, SMS. For cellular connectivity, this object focuses on Packet Switched (PS) connectivity and doesn't aim to provide comprehensive Circuit Switched (CS) connectivity management.

Object definition

Name	Object ID	Instances	Mandatory	Object URN
Cellular connectivity	10	Single	Optional	urn:oma:lwm2m:oma:10

Resource definitions

ID	Name	Oper-ations	Instances	Mandatory	Type	Range	Units	Description
11	Activated Profile Names	R	Multiple	Mandatory	Objlnk			Links to instances of the "APN connection profile" object representing every APN connection profile that has an activated connection to a PDN.
0	SMSC address	RW	Single	Optional	String			E.164 address of SMSC. Applicable for 3GPP2 networks where SMSC is not available from a smart card, or for 3GPP/3GPP2 networks to provide the application with a customer specific SMSC. The application decides how to use this parameter, e.g. precedence over UICC based SMSC address.
1	Disable radio period	RW	Single	Optional	Integer	0-65535	minutes	Time period for which the device shall disconnect from cellular radio (PS detach, CS detach if applicable). Can be used to handle network overload situations. As soon the server writes a value which is >0 the device SHALL disconnect. When the period has elapsed the device MAY reconnect. The value is a positive integer (0 to 65535), duration can be from 1 minute to 65535 minutes (approximately 45 days)
2	Module activation code	RW	Single	Optional	String			Configurable in case the application needs to issue a code (e.g. via AT command) to activate the module. e.g. "*98".
3	Vendor specific extensions	R	Single	Optional	Objlnk			Links to a vendor specific object.

4	PSM Timer (1)	RW	Single	Optional	Integer	10min-992 days	s	Power saving mode (PSM) timer as defined in [3GPP-TS_23.682]. PSM Timer = Extended T3412. Max interval between periodic TAU if there is no other transmission from the device. During most of this time the device is considered as unreachable and can therefore go into a deep sleep mode while keeping the PDN connection(s) active.
5	Active Timer (1)	RW	Single	Optional	Integer	2sec-31 min	s	Active timer = T3324 as defined in [3GPP-TS_24.008]. The time the UE has to remain reachable after transitioning to idle state in case there is pending data from the NW to send out. At the end of T3324 UE can go into a deep sleep mode while keeping the PDN connection(s) active.
6	Serving PLMN Rate control	R	Single	Optional	Integer			Only for when using Signalling Radio Bearers (c.f. Data over NAS), it indicates the maximum the number of allowed uplink PDU transmissions per 6 minute interval aggregated across all PDN connections. See [3GPP-TS_23.401], octet 3 to 4 of the Serving PLMN rate control IE.
7	eDRX parameters for Iu mode (1)	RW	Single	Optional	Opaque	8 bits		Extended DRX parameters (Paging Time Window and eDRX value) for Iu mode which the UE can request from the network. This resource is encoded as octet 3 in [3GPP-TS_24.008, clause 10.5.5.32].
8	eDRX parameters for WB-S1 mode (1)	RW	Single	Optional	Opaque	8 bits		Extended DRX parameters (Paging Time Window and eDRX value) for WB-S1 mode which the UE can request from the network. This resource is encoded as octet 3 in [3GPP-TS_24.008, clause 10.5.5.32].
9	eDRX parameters for NB-S1 mode (1)	RW	Single	Optional	Opaque	8 bits		Extended DRX parameters (Paging Time Window and eDRX value) for NB-S1 mode which the UE can request from the network. This resource is encoded as octet 3 in [3GPP-TS_24.008, clause 10.5.5.32].
10	eDRX parameters for A/Gb mode (1)	RW	Single	Optional	Opaque	8 bits		Extended DRX parameters (Paging Time Window and eDRX value) for A/Gb mode which the UE can request from the network. This resource is encoded as octet 3 in [3GPP-TS_24.008, clause 10.5.5.32].

Notes:

(1) This parameter is controlled by the 3GPP network. A LwM2M server may write a suggested value to this resource. As soon a LwM2M server changes the current value the device then suggests the new value to the network upon the next practical opportunity e.g. by inclusion of the requested value in an Attach or TAU request. In case the network confirms the suggested value then the device shall apply that value. In case the network provides a different value then the value provided by the network shall be applied by the device and the resource value shall be set to that value.
The LwM2M server may use the observe function to be notified upon any changes of PSM or Active timer. By using the observe function the LwM2M server will get notified in case the value suggested by the LwM2M server is not accepted by the network, or, if the value is changed by the network for any reason (e.g., if the device moves into new tracking areas there is no guarantee that the above values remain the same and are not altered by the network).

6. LwM2M Object: APN connection profile

Description

This object specifies resources to enable a device to connect to an APN.

Object definition

Name	Object ID	Instances	Mandatory	Object URN
APN connection profile	11	Multiple	Optional	urn:oma:lwm2m:oma:11

Resource definitions

ID	Name	Oper-ations	Instances	Mandatory	Type	Range	Units	Description
0	Profile name	RW	Single	Mandatory	String			Human-readable identifier. Multiple connection profiles can share the same APN value but e.g. have different credentials.
1	APN	RW	Single	Optional	String			Presented to network during connection to PDN e.g. 'internet.15.234'. This resource is not included in case 'Auto select APN by device' resource has the value TRUE. If the APN resource is present but contains an empty string, then the device shall not provide an APN in the connection request (invoking default APN procedures in the network).
2	Auto select APN by device	RW	Single	Optional	Boolean			If this resource is present for a connection profile, it enables the device to choose an APN according to a device specific algorithm. It provides a fall-back mechanism e.g. for some MVNO SIMs the configured APN may not work. Resource not included in case the 'APN' resource is specified.
3	Enable status	RW	Single	Optional	Boolean			True: connection is activated False: connection is de-activated. Allows the profile to be remotely activated or deactivated.
4	Authentication Type	RW	Single	Mandatory	Integer			Enumerated type: 0: PAP 1: CHAP 2: PAP or CHAP 3: None
5	User Name	RW	Single	Optional	String			Used with e.g. PAP.
6	Secret	RW	Single	Optional	String			Used with e.g. PAP.

7	Reconnect Schedule	RW	Single	Optional	String			Comma separated list of retry delay values in seconds to be used in case of unsuccessful connection establishment attempts. e.g. “10,60,600,3600,86400”
8	Validity (MCC, MNC)	RW	Multiple	Optional	String			Coma separated mobile country code, then mobile network code – for which this APN is valid.
9	Connection establishment time (1)	R	Multiple	Optional	Time			UTC time of connection request. See note (1)
10	Connection establishment result (1)	R	Multiple	Optional	Integer			0 = accepted 1 = rejected
11	Connection establishment reject cause (1)	R	Multiple	Optional	Integer	0-111		Reject cause, see [3GPP-TS_24.008, 3GPP-TS_24.301]
12	Connection end time (1)	R	Multiple	Optional	Time			UTC time of connection end.
13	TotalBytesSent	R	Single	Optional	Integer			Rolling counter for total number of bytes sent via this interface since last device reset.
23	TotalPacketsSent	R	Single	Optional	Integer			Rolling counter for total number of packets sent via this interface since last device reset.
14	TotalBytesReceived	R	Single	Optional	Integer			Rolling counter for total number of bytes received via this interface since last device reset.
15	IP address (2)	RW	Multiple	Optional	String			May be IPv4 or IPv6 address.
16	Prefix length(2)	RW	Multiple	Optional	String			Associated with IPv6 address.
17	Subnet mask (2)	RW	Multiple	Optional	String			Subnet mask.
18	Gateway (2)	RW	Multiple	Optional	String			Gateway.
19	Primary DNS address (2)	RW	Multiple	Optional	String			Primary DNS address.
20	Secondary DNS address (2)	RW	Multiple	Optional	String			Secondary DNS address.
21	QCI (3)	R	Single	Optional	Integer	1-9		For LTE and NB-IoT only QCI=Quality of service Class Identifier This resource enables the LwM2M server to signal the LwM2M client which QCI it shall request from the network. See [3GPP-TS_23.203, and 3GPP-TS_24.301] for a description of QCI values. See note (3).
22	Vendor specific extensions	R	Single	Optional	Objlnk			Links to a vendor specific object.
24	PDN Type	RW	Single	Optional	Integer			0=Non-IP 1=IPv4 2=IPv6 3=IPv4v6

25	APN Rate Control	R	Single	Optional	Integer			Determines the number of allowed uplink PDU transmissions per time interval per APN. Rate Control information is part of the Protocol Configuration Options (PCO) according to [3GPP-TS_24.008 and 3GPP-TS_27.060]

Notes:

(1) For each activated PDP context request, the device may store at least one value of ‘Connection establishment time’, ‘connection establishment result’, ‘Connection end time’ and if activation is unsuccessful then a ‘connection establishment reject cause’. It is a device decision how many instances to keep.

(2) These resources are used in case IP related parameters are defined statically, and are also set with the IP related parameters in case of dynamic IP address assignment. The normal use case would be to have one IPv4 and one IPv6 address which have each associated a prefix length (IPv6 only), a subnet mask, a gateway, and a primary and secondary DNS address.

(3) For LTE a higher QoS may be established by setting up an additional bearer (“dedicated bearer”) in addition to the default bearer which is established to the default APN. A dedicated bearer which is set up by the network on request by the device containing a requested QCI value can either be established to the same APN as the default bearer or to another APN. The QoS of a dedicated bearer may be modified on request by the device. The association of QoS values and APNs for a subscriber is stored in the network and checked during the establishment of a bearer.

7. LwM2M Object: WLAN connectivity

Description

This object specifies resources to enable a device to connect to a WLAN bearer.

Object definition

Name	Object ID	Instances	Mandatory	Object URN
WLAN connectivity	12	Multiple	Optional	urn:oma:lwm2m:oma:12

Resource definitions

ID	Name	Oper-ations	Instances	Mandatory	Type	Range	Units	Description
0	Interface name	RW	Single	Mandatory	String			Human-readable identifier eg. wlan0
1	Enable	RW	Single	Mandatory	Boolean			0: Disabled 1: Enabled Enable / Disable interface When disabled radio must also be disabled
2	Radio Enabled	RW	Single	Optional	Integer			0: Disabled 1: 2.4 GHz 2: 5 GHz 3: 0.9 GHz 4: 3.7 GHz 5: 45 GHz 6: 60 GHz
3	Status	R	Single	Mandatory	Integer			0: Disabled 1: UP (OK) 2: Error
4	BSSID	R	Single	Mandatory	String	12 bytes		The MAC address of the interface, in hexadecimal form.
5	SSID	RW	Single	Mandatory	String	1-32 Bytes		The Service Set Identifier for this interface.
6	Broadcast SSID	RW	Single	Optional	Boolean			0: Do not broadcast SSID 1: Broadcast SSID
7	Beacon Enabled	RW	Single	Optional	Boolean			0: Do not broadcast beacons 1: Broadcast beacons
8	Mode	RW	Single	Mandatory	Integer			0: Access Point 1: Client (Station) 2: Bridge 3: Repeater
9	Channel	RW	Single	Mandatory	Integer	0-255		The current radio channel in use by this interface.

10	Auto Channel	RW	Single	Optional	Boolean			0: Disabled 1: Enabled
11	Supported Channels	RW	Multiple	Optional	Integer			Array of supported radio channels.
12	Channels In Use	RW	Multiple	Optional	Integer			Array of channels which the access point has determined are 'in use'. Including any channels in-use by access point itself.
13	Regulatory Domain	RW	Single	Optional	String	3 Bytes		802.11d Regulatory Domain String. First two octets are ISO/IEC 3166-1 two-character country code. The third octet is either " " (all environments), "O" (outside) or "I" (inside).
14	Standard	RW	Single	Mandatory	Integer			0: 802.11a 1: 802.11b 2: 802.11bg 3: 802.11g 4: 802.11n 5: 802.11bgn 6: 802.11ac 7: 802.11ah
15	Authentication Mode	RW	Single	Mandatory	Integer			0: None (Open) 1: PSK 2: EAP 3: EAP+PSK 4: EAPSIM
16	Encryption Mode	RW	Single	Optional	Integer			0: AES (WPA2) 1: TKIP (WPA) 2: WEP (1)
17	WPA Pre Shared Key	W	Single	Optional	String	64 Bytes		WPA/WPA2 Key expressed as a hex string. Write – Only.
18	WPA Key Phrase	W	Single	Optional	String	1-64 Bytes		WPA/WPA2 Key Phrase. Write Only.
19	WEP Encryption Type	RW	Single	Optional	Integer			0: None 1: 40-bit 2: 104-bit
20	WEP Key Index	RW	Single	Optional	Integer	[1:4]		Index of the default WEP key.
21	WEP Key Phrase	W	Single	Optional	String	1-64 Bytes		WPA/WPA2 Key Phrase. Write Only.
22	WEP Key 1	W	Single	Optional	String	10 or 26 Bytes		WEP Key 1 expressed as a hexadecimal string. 10 Bytes for a 40 Bit key 26 Bytes for a 104 Bit key
23	WEP Key 2	W	Single	Optional	String	10 or 26 Bytes		WEP Key 2 expressed as a hexadecimal string. 10 Bytes for a 40 Bit key 26 Bytes for a 104 Bit key

24	WEP Key 3	W	Single	Optional	String	10 or 26 Bytes		WEP Key 3 expressed as a hexadecimal string. 10 Bytes for a 40 Bit key 26 Bytes for a 104 Bit key
25	WEP Key 4	W	Single	Optional	String	10 or 26 Bytes		WEP Key 4 expressed as a hexadecimal string. 10 Bytes for a 40 Bit key 26 Bytes for a 104 Bit key
26	RADIUS Server	RW	Single	Optional	String	1-256 Bytes		RADIUS Authentication Server Address
27	RADIUS Server Port	RW	Single	Optional	Integer			RADIUS Authentication Server Port Number
28	RADIUS Secret	W	Single	Optional	String	1-256 Bytes		RADIUS Shared Secret
29	WMM Supported	R	Single	Optional	Boolean			0: WMM NOT Supported 1: WMM Wupported
30	WMM Enabled	RW	Single	Optional	Boolean			0: Disabled 1: Enabled
31	MAC Control Enabled	RW	Single	Optional	Boolean			0: Any Client MAC Address accepted 1: Client MAC address must exist in MACAddressList
32	MAC Address List	RW	Multiple	Optional	String	12 Bytes		Array of allowed client MAC addresses, in hexadecimal form.
33	Total Bytes Sent	R	Single	Optional	Integer			Total number of bytes sent via this interface
34	Total Bytes Received	R	Single	Optional	Integer			Total number of bytes received via this interface
35	Total Packets Sent	R	Single	Optional	Integer			Total packets sent via this interface
36	Total Packets Received	R	Single	Optional	Integer			Total packets received via this interface
37	Transmit Errors	R	Single	Optional	Integer			Total number of packets which could not be transmitted because of errors.
38	Receive Errors	R	Single	Optional	Integer			Total number of packets received with errors which prevented those packets from being delivered.
39	Unicast Packets Sent	R	Single	Optional	Integer			Count of Unicast Packets Sent
40	Unicast Packets Received	R	Single	Optional	Integer			Count of Unicast Packets Received
41	Multicast Packets Sent	R	Single	Optional	Integer			Count of Multicast Packets Sent
42	Multicast Packets Received	R	Single	Optional	Integer			Count of Multicast Packets Received
43	Broadcast Packets Sent	R	Single	Optional	Integer			Count of Broadcast Packets Sent
44	Broadcast Packets Received	R	Single	Optional	Integer			Count of Broadcast Packets Received
45	Discard Packets Sent	R	Single	Optional	Integer			Count of valid outbound packets intentionally discarded without transmission, for example a packet may be discarded to manage buffer space.
46	Discard Packets Received	R	Single	Optional	Integer			Count of valid packets received and intentionally discarded without delivery to the system, for example a packet may be discarded to manage buffer space.

47	Unknown Packets Received	R	Single	Optional	Integer			Count of Unknown Packets Received
48	Vendor specific extensions	R	Single	Optional	Objlnk			Links to a vendor specific object.

Notes:

(1) WEP is supported by this object for legacy devices. All encryption parameter resources are optional e.g. a Wifi Alliance “HotSpot 2.0” device would not support WEP related resources.

8. LwM2M Object: Bearer selection

Description

This object specifies resources to enable a device to choose a PLMN/network on which to attach/register and what type of bearer to then connect.

This object allows via remote bearer and network configuration to overwrite automatic network and bearer selection e.g. as supported by the UICC. An equivalent example for overwriting automatic selection is a user doing manual network and bearer selection on a smart phone.

Object definition

Name	Object ID	Instances	Mandatory	Object URN
Bearer selection	13	Single	Optional	urn:oma:lwm2m:oma:13

Resource definitions

ID	Name	Oper-ations	Instances	Mandatory	Type	Range	Units	Description
0	Preferred Communications Bearer	RW	Multiple	Optional	Integer	8-bit		Used in network selection and, if applicable, in subsequent mobility management procedures: 0: auto connect 1: 3GPP PS preferred 2: 3GPP PS GSM (GPRS) preferred (including EC-GSM-IoT) 3: 3GPP PS UMTS preferred 4: 3GPP PS LTE preferred 5: 1xEV-DO preferred (1) 6: 3GPP CS preferred (1) 7: WLAN preferred 8: Ethernet preferred (1) 9: DSL preferred (1) 10: Bluetooth preferred (1) 11: WIMAX preferred (1) 12: 3GPP PS LTE with CIoT EPS optimisations, User Plane preferred (2) 13: 3GPP PS LTE with CIoT EPS optimisations, Control Plane preferred (2)14: 3GPP PS NB-IoT Control Plane optimisations preferred (2) 15: 3GPP PS NB-IoT User Plane optimisations preferred (2) 16-100: Reserved for future use The Preferred Communications Bearer resource specifies the preferred

								communications bearer that the LwM2M Client is requested to use for connecting to the LwM2M Server. If multiple preferred communications bearers are specified, the priority order is reflected by the resource instance order. E.g. the bearer which appears first in the list of resource instances is to have higher priority over the rest of available bearers. The LwM2M Client SHOULD use the preferred bearers with higher priority first if they are available. If none of indicated preferred bearers is available, the LwM2M Client SHOULD wait until one of them becomes available.
1	Acceptable RSSI (GSM)	RW	Single	Optional	Integer			Provides guide to the application when performing manual network selection.
2	Acceptable RSCP (UMTS)	RW	Single	Optional	Integer			Provides guide to the application when performing manual network selection.
3	Acceptable RSRP (LTE)	RW	Single	Optional	Integer			Provides guide to the application when performing manual network selection.
10	Acceptable RSRP (NB-IoT)	RW	Single	Optional	Integer			Provides guide to the application when performing manual network selection.
4	Acceptable RSSI (1xEV-DO)	RW	Single	Optional	Integer			Provides guide to the application when performing manual network selection.
5	Cell lock list	RW	Single	Optional	String			Comma separated list of allowed Global Cell Identities.
6	Operator list	RW	Single	Optional	String			Comma separated list of MCC+MNC of operators, in priority order. Resource “operator list mode” indicates how to process this list.
7	Operator list mode	RW	Single	Optional	Boolean			Indicates whether resource “operator list” represents the allowed operator list (white list), or, the preferred operator list. 0=preferred 1=allowed
8	List of available PLMNs	R	Single	Optional	String			Allows server to see results of network scan (e.g. result of AT+COPS=?)
9	Vendor specific extensions	R	Single	Optional	Objlnk			Links to a vendor specific object.
11	Higher Priority PLMN Search Timer	RW	Single	Optional	Integer			Interval between periodic searches for higher priority PLMNs of the same country when camped on a visited PLMN, i.e. roaming scenario; based on SIM configuration, EFHPPLMN [3GPP-TS_31.102, section 4.2.6]
12	Attach without PDN connection	RW	Single	Optional	Boolean			0=attach with PDN connection 1=attach without PDN connection

Notes:

(1) Remote management of this communications bearer via LwM2M is currently not supported.

(2) See [3GPP-TS_23.401, section 4.3.5.10] for the Preferred Network Behaviour indication used by the UE to inform the network about its capabilities and preferences.

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
OMA-TS-LWM2M_ConnMgmt-V1_0-20170314-A	14 Mar 2017	Status changed to Approved by TP TP Ref # OMA-TP-2017-0019-INP_LWM2M_CONNMGMT-V1_0_RRP_for_Final_Approval

Appendix B. Example objects and resources for LwM2M client

Object name	Object ID	Object Instance ID
Cellular network connectivity	10	-
APN connection profile	11	0
APN connection profile	11	1
WLAN connectivity	12	0
Network selection	13	-

Table 1: Object Instances of the Example

Resource Name	Resource ID	Resource Instance ID	Value	Notes
Activated Profile Names	4000	0	11:0	Only profile „Operator1 internet“ is active.
SMSC address	0		+61415011501	
Module activation code	2		*98	Application will prefix this to first AT command to module for activatin of module.

Table 2: Cellular Network Connectivity Object

Resource Name	Resource ID	Resource Instance ID	Value	Notes
Profile name	0		Operator1 internet	
APN	1		Internet.15.234	
Enable status	3		True	
Authentication Type	4		0	PAP
User Name	5		Internet	
Secret	6		Internet	
Reconnect Schedule	7		10,60,600,3600,86400	
Connection establishment time	9	0	1416924000	25 Nov 2014, 1400 UTC
Connection establishment result	10	0	1	Establishment request was rejected
Connection establishment reject cause	11	0	15	Reason: PLMN not allowed
Connection establishment time	12	0	1416924010	
Connection establishment time	9	1	1416924020	Subsequent establishment started 10 seconds after previous attempt failed (according to Reconnect schedule)
Connection establishment result	10	1	0	
Connection end time	12	1	1416931200	25 Nov 2014, 1600 UTC
Total Bytes Send	13		1288490188	1.2Gbyte sent since last reset

Total Bytes Received	14		1572864	1.5Mbyte received since last reset
IP address	15	0	192.168.0.100	IPv4 address
IP address	15	1	0:0:0:0:0:ffff:c0a8:64	IPv6 address
Subnet mask	17		255.255.255.0	
Gateway	18		192.168.0.1	
Primary DNS address	19		192.168.0.1	
QCI	21		6	QCI 6 represents priority 6, 300ms packet delay budget, 10^{-6} packet error loss rate.

Table 3: APN Connection Profile Object [0]

Resource Name	Resource ID	Resource Instance ID	Value	Notes
Profile name	0		specific_country network	
Auto select APN by device	2		true	
Enable status	3		false	
Validity (MCC, MNC)	8	0	604,0	This APN is applicable for networks in a specific country only.
Validity (MCC, MNC)	8	1	604,1	

Table 4: APN Connection Profile Object [1]

Resource Name	Resource ID	Resource Instance ID	Value	Notes
Interface name	0		omawlan	
Enable	1		0	currently disabled
Radio Enabled	2		0	currently disabled
Status	3		0	currently disabled
BSSID	4		50:7E:5D:31:67:78	
SSID	5		oma	
Mode	8		1	client
Channel	9		8	
Standard	14		4	802.11n
Authentication Mode	15		4	EAPSIM
Encryption Mode	16		0	AES (WPA2)
WPA Key Phrase	18		omakeyphrase	

Table 5: WLAN Connectivity Object

Resource Name	Resource ID	Resource Instance ID	Value	Notes
Preferred Communications Bearer	0	0	4	LTE preferred
Preferred Communications Bearer	0	1	3	UMTS preferred
Preferred Communications Bearer	0	2	2	GSM preferred
Acceptable RSCP (UMTS)	2		20	
Acceptable RSRP (LTE)	3		30	

Table 6: Bearer Selection Object