



MIoT Test Cases
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1	Introduction	5
1.1	Overview	5
1.2	Scope	5
1.3	Definitions	5
1.4	Abbreviations	8
1.5	References	9
2	Basic Operation	11
2.1	Cell Selection	11
2.1.1	CAT-M1 Device Cell Selection Procedure - CLP.23_2.1.1_TC_001	11
2.1.2	CAT-NB1 Device Cell Selection Procedure - CLP.23_2.1.2_TC_001	11
2.2	Registration (Attach/Detach)	12
2.2.1	CAT-M1 Device Attach Procedure with Control Plane CloT EPS Optimazation - CLP.23_2.2.1_TC_001	12
2.2.2	CAT-M1 Device Attach Procedure with User Plane CloT EPS Optimization - CLP.23_2.2.2_TC_001	12
2.2.3	CAT-M1 Device Attach Procedure with CloT EPS Optimizations (EMM Registered without PDN Connection) - CLP.23_2.2.3_TC_001	13
2.2.4	CAT-M1 Device Detach Procedure - CLP.23_2.2.4_TC_001	14
2.2.5	CAT-NB1 device Attach Procedure with Control Plane CloT EPS Optimizations CLP.23_2.2.5_TC_001	14
2.2.6	CAT-NB1 Device Attach Procedure with User Plane CloT EPS Optimization CLP.23_2.2.6_TC_001	15
2.2.7	CAT-NB1 Device Attach Procedure with CloT EPS Optimizations (EMM Registered without PDN Connection) CLP.23_2.2.7_TC_001	16
2.2.8	CAT-NB1 Device Attach Procedure with CloT EPS Optimizations (SMS transfer without Combined Attach) CLP.23_2.2.8_TC_001	17
2.2.9	CAT-NB1 Device Detach Procedure CLP.23_2.2.9_TC_001	17
2.3	Device Capabilities	18
2.3.1	CAT-M1 Device Capability Transfer / Success - RRC Level - CLP.23_2.3.1_TC_001	18
2.3.2	CAT-M1 Device Capability Transfer / Success - NAS Level - CLP.23_2.3.2_TC_001	18
2.3.3	CAT-NB1 device Capability Transfer / Success - RRC Level CLP.23_2.3.3_TC_001	18
2.3.4	CAT-NB1 device Capability Transfer / Success - NAS Level CLP.23_2.3.4_TC_001	19
2.4	Data Transfer and Throughput	19
2.4.1	CAT M1 Data Transfer and Throughput with Control Plane CloT EPS Optimizations - CLP.23_2.4.1_TC_001	19
2.4.2	CAT-M1 Data Transfer and Throughput with User Plane CloT EPS Optimizations - CLP.23_2.4.2_TC_001	20
2.4.3	CAT-NB1 Device Data Transfer and Throughput with Control Plane CloT EPS Optimizations CLP.23_2.4.3_TC_001	20
2.4.4	CAT-NB1 Device Data Transfer and Throughput with User Plane CloT EPS Optimizations CLP.23_2.4.4_TC_001	21

2.5	Mobility	21
2.5.1	CAT-M1 Device Cell Reselection Procedure - CLP.23_2.5.1_TC_001	21
2.5.2	CAT-M1 Device Handover Procedure with CloT EPS Optimization - CLP.23_2.5.2_TC_001	22
2.5.3	CAT-NB1 device Intra-Frequency Cell Reselection CLP.23_2.5.3_TC_001	22
2.5.4	CAT-NB1 device Inter-Frequencies Cell Reselection CLP.23_2.5.4_TC_001	23
2.5.5	CAT-NB1 device Cell Redirection CLP.23_2.5.5_TC_001	23
2.6	Suspend/Resume	24
2.6.1	CAT-M1 Device Suspend Procedure with User Plane CloT EPS Optimizations - CLP.23_2.6.1_TC_001	24
2.6.2	CAT-M1 Device Resume Procedure with User Plane CloT EPS Optimizations - TS23_2.6.2_TC_001	24
2.6.3	CAT-NB1 device Suspend Procedure with User Plane CloT EPS Optimizations CLP.23_2.6.3_TC_001	25
2.6.4	CAT-NB1 device Resume Procedure with User Plane CloT EPS Optimizations CLP.23_2.6.4_TC_001	25
3	Enhanced Coverage	26
3.1	Random Access	26
3.1.1	NPRACH configuration in Random Access - CLP.23_3.1.1_TC_001	26
3.1.2	PRACH configuration in Random Access - CLP.23_3.1.2_TC_001	26
3.2	Data Transfer and Throughput	27
3.2.1	Data Transfer and Throughput of CAT-NB1 UE with Control Plane CloT EPS Optimizations - CLP.23_3.2.1_TC_001	27
3.2.2	Data Transfer and Throughput of CAT-NB1 UE with User Plane CloT EPS Optimizations - CLP.23_3.2.2_TC_001	27
3.2.3	Data Transfer and Throughput of CAT-M1 UE - CLP.23_3.2.3_TC_001	28
4	Power Test Cases	28
4.1	PSM Operation	29
4.1.1	PSM Request and Activation - CLP.23_4.1.1_TC_001	29
4.1.2	MT Data in PSM State - CLP.23_4.1.2_TC_001	30
4.1.3	MO Data in PSM State - CLP.23_4.1.3_TC_001	30
4.1.4	Periodic Tracking/Routing Area Update - CLP.23_4.1.4_TC_001	31
4.1.5	Reduced Current Drain in PSM- CLP.23_4.1.5_TC_001	31
4.1.6	Periodic Tracking Area Update, T3412 - CLP.23_4.1.6_TC_001	32
4.2	I-eDRX Operation	33
4.2.1	eDRX Request and Activation - CLP.23_4.2.1_TC_001	33
5	Service Layer (oneM2M)	34
6	USIM/eUICC OTA	34
7	USIM Toolkit	34
8	Antenna Performance	34
9	Device Management (LwM2M)	34
10	Mapping of Test Cases to Requirements	35
Annex A	Document Management	40

A.1 Document History	40
A.2 Other Information	40

1 Introduction

1.1 Overview

This document provides the test cases that may be carried out for LPWA (Low Power Wide Area) Mobile IoT modules and devices that are to be deployed on early adopter networks prior to PTCRB and GCF certification being available in mid-2017.

1.2 Scope

This document defines all test cases for Accreditation of LPWA MIoT modules and devices that are to be deployed in mobile networks that support LPWA modules and devices, prior to the PTCRB and GCF certification process being in place. This scope excludes any type or form of Certification as this is outside the remit of the document.

These test cases shall be executed against the requirements document as identified within the MIoT Requirements document CLP22 v1.0 which reflects the specifications as identified in the 3GPP R13 Specifications published in June 2016.

This document does not replicate any test cases that are currently defined within the GSMA Device Connection Efficiency Test Book TS.35 [9]. Any test cases in this respect will be agreed between the respective MNO's and their Vendors and is outside the scope of this document.

It should be noted that the test cases listed within this document are those that are deemed as a priority by the MNOs (Mobile Network Operators) for accreditation of MIoT devices onto their networks. However, the final subset of test cases to be executed will be the subject of discussion and agreement with the MNO and its Manufacturers in respect of the various features and functionality, that may be available on the respective network infrastructure and MIoT devices being deployed at the time of testing.

1.3 Definitions

The key words "SHALL", "SHOULD" and "MAY", within this document are to be interpreted as described in RFC 2119 [19], an abstract of which is included within the table below.

Term	Description
MUST	This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute requirement of the specification.
SHOULD	This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
MAY	This word, or the adjective "OPTIONAL", mean that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option MUST be

Term	Description
	prepared to be interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.)

Term	Description
Actor	Physical entity (person, company or organisation) that can assume a Role in the functional architecture. It is possible for an Actor to assume multiple Roles in the same functional architecture.
Connectivity Parameters	A set of data (for example SMSC address) required by the eUICC to open a communication channel (for example SMS, HTTPS) on a dedicated network.
Customer	A paying party, in particular a legally responsible juridical person or entity.
Device	Equipment into which an Embedded UICC and a communication module are inserted during assembly. Examples include Utility meter, car and camera.
Disabled (Profile)	The state of a Profile where all files and applications (for example NAA) present in the Profile are not selectable over the eUICC-Terminal interface.
Embedded UICC (eUICC)	A UICC which is not easily accessible or replaceable, is not intended to be removed or replaced in the Device, and enables the secure changing of Profiles.
Enabled (Profile)	The state of a Profile when its files and/or applications (for example, NAA) are selectable over the UICC-Terminal interface.
eUICC Manufacturer	Supplier of the eUICCs and resident software (for example firmware and operating system).
International Mobile Subscriber Identity	Unique identifier owned and issued by Mobile operators to (U) SIM applications to enable Devices to attach to a network and use services.
MlOT Device	A Mobile IoT (MlOT) Device is a generic term to indicate one of the following 3GPP standard technologies for LPWA: CAT-M1, CAT-NB1 and EC-GSM-IoT.
Mobile Network Operator	An entity providing access capability and communication services to its Customers through a mobile network infrastructure.
3GPP module	A communications module complying to one or more of the 3GPP communication technologies such as 2G, 3G, EC-GSM-IoT, CAT-NB1 or CAT-M1, this includes all necessary eUICC or UICC components. Can also be called User Equipment or UE.

Network Access Application	An application residing on a UICC which provides authorisation to access a network for example a USIM application.
Profile	Combination of a file structure, data and applications to be provisioned onto, or present on, an eUICC and which allows, when enabled, the access to a specific mobile network infrastructure.
Profile Component	A Profile Component is an element of the Profile and may be one of the following: An element of the file system like an MF, EF or DF An Application, including NAA and Security Domain POL1 MNO-SD.
Roles	Roles are representing a logical grouping of functions.
SIM	Subscriber Identity Module; a physical entity that contains keys and ID required to authenticate a user on a mobile network. "SIM" is commonly used to refer to the physical entity that is technically called the UICC (see UICC definition below). This document generally uses "SIM" to refer to the physical entity
Subscriber	An entity (associated with one or more users) that is engaged in a Subscription with a Telecommunication Service Provider. The Subscriber is allowed to subscribe and unsubscribe to services, to register a user or a list of users authorised to use those services, and also to set the limits relative to the use that associated users make of those services.
Subscription	Describes the commercial relationship between the Subscriber and the Telecommunication Service Provider.
Subscription Manager Data Preparation	Role that prepares the Profiles and manages the secure download and installation of these Profiles onto the eUICC.
Subscription Manager Secure Routing	Role that securely performs functions of Platform Management commands and the transport of Profile Management commands.
UICC	Universal Integrated Circuit Card; the physical entity that contains as a minimum the SIM/USIM application
USIM	An application that runs on the UICC and provides authentication functions similar to those provided by the SIM in pre-3G systems
Telecommunication Service Provider	The organization through which the Subscriber obtains PLMN telecommunication services. This is usually the network operator or possibly a separate body.

1.4 Abbreviations

Term	Description
3GPP	3rd Generation Partnership Project
BGA	Ball Grid Array
CAT-NB1	Category Narrow Band 1
CAT-M1	Category M1
C-DRX	Connected mode DRX
CIoT	Cellular Internet of Things
dB	Decibel
dBm	Decibel-referenced to 1 milliwatt
DFN	Dual Flat No lead package
DRX	Discontinuous Reception
DL	Downlink
E-DRX	Extended DRX
ETSI	European Telecommunications Standards Institute
EC-GSM-IoT	Extended Coverage GSM Internet of Things
EDGE	Enhanced Data Rates for GSM Evolution
eDRX	Extended Discontinuous Receive
EGPRS	Enhanced General packet radio service
eUICC	Embedded Universal Integrated Circuit Card
FDD	Frequency Division Duplexing
GERAN	GSM EDGE Radio Access Network
GPRS	General Packet Radio Service
GMSK	Gaussian minimum shift keying
GSM	Global System for Mobile Communications
GSMA	GSM Association
I-DRX	Idle mode DRX
IoT	Internet of Things
IMEI	International Mobile Station Equipment Identity
IP	Internet Protocol
IPSec	Internet Protocol Security
LoRa	Long Range
LPUC	Low Power Use Case
LPWA	Low Power Wide Area
LTE	Long-Term Evolution
LTE eMTC	Long-Term Evolution Enhanced Machine Type Communications
LTE MTC	Long-Term Evolution Machine Type Communications
M2M	Machine-to-machine

Term	Description
MCL	Maximum Coupling Loss
MFF2	M2M Form Factor 2
MHz	Mega Hertz
MNO	Mobile Network Operator
MS	Mobile Station
MTC	Machine Type Communications
NB-IoT	Narrow Band Internet of Things
OFDMA	Orthogonal Frequency-Division Multiple Access
OTA	Over The Air
PLMN	Public Land Mobile Network
PSM	Power Save Mode
QoS	Quality of Service
RAN	Radio Access Network
RF	Radio Frequency
SC-FDMA	Single-carrier frequency-division multiple access
SIM	Subscriber Identity Module (an application running on a UICC)
SMS	Short Message Service
TCO	Total Cost of Ownership
TDMA	Time division multiple access
TR	Technical Report
UE	User Equipment
UICC	Universal Integrated Circuit Card (sometimes known as the SIM card)
UL	Uplink
USIM	Universal Subscriber Identity Module
UTDOA	Uplink-Time Difference of Arrival
WAN	Wide Area Network
Wi-Fi	Wireless Fidelity
WLCSP	Wafer-level redistribution Chip Scale Package

1.5 References

Ref	Doc Number	Title
[1]	3GPP TS 31.120	UICC-Terminal Interface; Physical, electrical and logical test specification, Release 13 or higher.
[2]	3GPP TS 31.121	“UICC-Terminal interface; Universal Subscriber Identity Module (USIM) application test specification, Release 13 or higher.
[3]	3GPP TS 31.124	Mobile Equipment (ME) conformance test specification; Universal Subscriber Identity Module Application Toolkit

Ref	Doc Number	Title
		(USAT) conformance test specification, Release 13 or higher.
[4]	OMA-ETS-LightweightM2M-V1_0	Enabler Test Specification for Lightweight M2M v1.0, publication date 20160726 or later.
[5]	oneM2M TS 0013	oneM2M Interoperability Testing
[6]	oneM2M TS 0017	oneM2M Implementation Conformance Statements
[7]	oneM2M TS 0018	oneM2M Test Suite Structure and Test Purposes
[8]	oneM2M TS 0019	oneM2M Abstract Test Suite & Implementation eXtra Information for Test
[9]	GSMA TS.35	IoT Device Connection Efficiency Test Book, Version 3.0, 30 March 2016
[10]	3GPP TS.34.114	User Equipment (UE) / Mobile Station (MS) Over The Air (OTA) antenna performance; Conformance testing
[11]	3GPP TS.37.544	Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA); User Equipment (UE) Over The Air (OTA) performance; Conformance testing
[12]	CTIA OTA Test Plan v3.6	Test Plan for Wireless Device Over-the-Air Performance
[13]	RFC2119	Key words for use in RFCs to Indicate Requirement Levels
[14]	3GPP TS.36.304	Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode
[15]	3GPP TS36.321	Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification
[16]	3GPP TS.36.331	Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification

2 Basic Operation

2.1 Cell Selection

2.1.1 CAT-M1 Device Cell Selection Procedure - CLP.23_2.1.1_TC_001

Purpose	To verify that CAT-M1 device could successfully perform the cell selection procedure with CloT EPS Optimizations
Requirement under test	CLP.22_2.1.2_REQ_001
Entry Criteria	CAT-M1 Device is configured with “ <i>CloT EPS Optimizations</i> ” in “ <i>Preferred and Supported Network Behaviour</i> ” CAT-M1 Device is Switched OFF The network is configured to support “ <i>CloT EPS Optimizations</i> ”
Test Procedure	CAT-M1 Device is Switched ON CAT-M1 Device is in EMM-IDLE mode reads SIB1 EUTRAN Cell fulfils all requirements for a suitable cell including the cell selection criteria for a cell based on Qrxlevmin which are also fulfilled (Srxlev > 0) as defined in the clause 5.2.3.2 of 3GPP TS 36.304 [14] Or EUTRAN Cell fulfils all requirements for a suitable cell including the cell selection criteria for a cell based on Qqualmin which are also fulfilled (Srxlev > 0 AND Squal > 0) as defined in the clause 5.2.3.2 of 3GPP TS 36.304 [14] CAT-M1 Device will select the EUTRAN cell and starts to read SIB2 Message to verify that “ <i>CloT EPS Optimizations</i> ” is supported in EUTRAN Cell.
Exit Criteria (Pass Criteria)	Verify that CAT-M1 Device performed cell selection with suitable cell including the validation of the cell selection criteria (S>0)

2.1.2 CAT-NB1 Device Cell Selection Procedure - CLP.23_2.1.2_TC_001

Purpose	To verify that the CAT-NB1 device could properly execute the Cell selection according the 3GPP 36.304.[14]
Requirement under test	TS.22_2.1.2_REQ_001
Entry Criteria	CAT-NB1 UE is powered off. Control Plane CloT EPS optimizations shall be supported by device and Network. The NB-IoT cells with good RSRP/RSRQ condition are available.
Test Procedure	Power on the CAT-NB1 UE. CAT-NB1 Device is in EMM-IDLE mode and reads SIB1-NB message CAT-NB1 UE evaluates the NB-IoT Cells based on Qrxlevmin and selects one suitable NB-IoT cell which Srxlev > 0 is fulfilled or CAT-NB1 UE evaluates the NB-IOT Cells based on Qqualmin and selects one suitable NB-IOT cell which Srxlev > 0 AND Squal >0 are fulfilled. CAT-NB1 device starts to register on the NB-IoT cell.
Exit Criteria	CAT-NB1 UE successfully camps on the NB-IoT cell according to the criterion defined in section 5.2.3.2a of 3GPP 36.304

2.2 Registration (Attach/Detach)

2.2.1 CAT-M1 Device Attach Procedure with Control Plane CloT EPS Optimazation - CLP.23_2.2.1_TC_001

Purpose	To verify that CAT-M1 device could successfully perform LTE Attach Procedure with Control Plane CloT EPS Optimizations
Requirement under test	CLP.22_2.2.2_REQ_001
Entry Criteria	CAT-M1 Device is configured with <i>“Control Plane CloT EPS Optimizations”</i> in <i>“Preferred and Supported Network Behaviour”</i> CAT-M1 Device is Switched OFF The network is configured to support <i>“Control Plane CloT EPS Optimizations”</i>
Test Procedure	CAT-M1 Device is Switched ON CAT-M1 Device is in EMM-IDLE mode reads SIB-2 to verify that <i>“Control Plane CloT EPS Optimizations”</i> is broadcast in EUTRAN Cell. CAT-M1 Device transmits an RRC Connection Request Message and eNodeB transmits an RRC Connection Setup Message. CAT-M1 Device transmits an RRC Connection Setup Complete Message to confirm the successful completion of the connection establishment by specify that UE supports <i>“Control Plane CloT EPS Optimizations”</i> CAT-M1 Device initiates the Attach Procedure by sending Attach Request Message by specifies that UE supports <i>“Control Plane CloT EPS Optimizations”</i> in <i>“UE Network Capability IE”</i> together with a PDN CONNECTIVITY REQUEST Message in the <i>ESM Message Container Information Element</i> to request PDN Connectivity The network responds to the CAT-M1 Device with Attach Accept Message that supports <i>“Control Plane CloT EPS Optimization”</i> in <i>“EPS Network Feature Support”</i> with the Activate Default EPS Bearer Context Request Message shall include PDN related parameters. CAT-M1 Device completes the Attach Procedure by sending the Attach Complete Message together with an Activate Default EPS Bearer Context Accept Message in the <i>ESM Message Container Information Element</i> to the network
Exit Criteria (Pass Criteria)	Verify that CAT-M1 Device received with <i>“Control Plane CloT EPS Optimization”</i> in Attach Accept Message and successfully attach procedure by sending Attach Complete Message

2.2.2 CAT-M1 Device Attach Procedure with User Plane CloT EPS Optimization - CLP.23_2.2.2_TC_001

Purpose	To verify that CAT-M1 device could successfully perform LTE Attach Procedure with User Plane CloT EPS Optimizations
Requirement under test	CLP.22_2.2.2_REQ_001

Entry Criteria	<p>CAT-M1 Device is configured with <i>“User Plane ClOT EPS Optimizations”</i> in <i>“Preferred and Supported Network Behaviour”</i></p> <p>If the CAT-M1 Device indicates support of <i>User Plane ClOT EPS optimization</i> then it shall also indicate support of <i>S1-U data transfer</i></p> <p>CAT-M1 Device is Switched OFF</p> <p>The network is configured to support <i>“User Plane ClOT EPS Optimizations”</i> and <i>“S1-U Data transfer”</i></p>
Test Procedure	<p>CAT-M1 Device is Switched ON</p> <p>CAT-M1 Device is in EMM-IDLE mode reads SIB-2 to verify that <i>“User Plane ClOT EPS Optimizations”</i> is broadcast in EUTRAN Cell.</p> <p>CAT-M1 Device transmits an RRC Connection Request Message and eNodeB transmits an RRC Connection Setup Message.</p> <p>CAT-M1 Device transmits an RRC Connection Setup Complete Message to confirm the successful completion of the connection establishment by specify that UE supports <i>“User Plane ClOT EPS Optimizations”</i></p> <p>CAT-M1 Device initiates the Attach Procedure by sending Attach Request Message by specifies that UE supports <i>“User Plane ClOT EPS Optimizations”</i> & <i>“S1-U Data Transfer”</i> in <i>“UE Network Capability IE”</i> together with a PDN CONNECTIVITY REQUEST Message in the <i>ESM Message Container Information Element</i> to request PDN Connectivity</p> <p>The network responds to the CAT-M1 Device with Attach Accept Message that supports <i>“User Plane ClOT EPS Optimization”</i> in <i>“EPS Network Feature Support”</i> with the Activate Default EPS Bearer Context Request Message shall include PDN related parameters.</p> <p>CAT-M1 Device completes the Attach Procedure by sending the Attach Complete Message together with an Activate Default EPS Bearer Context Accept Message in the <i>ESM Message Container Information Element</i> to the network</p>
Exit Criteria (Pass Criteria)	<p>Verify that CAT-M1 Device received with <i>“User Plane ClOT EPS Optimization”</i> in Attach Accept Message and successfully attach procedure by sending Attach Complete Message</p>

2.2.3 CAT-M1 Device Attach Procedure with ClOT EPS Optimizations (EMM Registered without PDN Connection) - CLP.23_2.2.3_TC_001

Purpose	<p>To verify that CAT-M1 device could successfully perform LTE Attach Procedure without PDN Connection</p>
Requirement under test	<p>CLP.22_2.2.2_REQ_001</p>
Entry Criteria	<p>CAT-M1 Device is configured with <i>“attachwithoutPDN Connectivity”</i> in <i>“Preferred and Supported Network Behaviour”</i></p> <p>CAT-M1 Device is Switched OFF</p> <p>The network is configured to support <i>“attachwithoutPDN Connectivity”</i></p>

Test Procedure	<p>CAT-M1 Device is Switched ON</p> <p>CAT-M1 Device is in EMM-IDLE mode reads SIB-2 to verify that “<i>attachwithoutPDN Connectivity</i>” is broadcast in EUTRAN Cell.</p> <p>CAT-M1 Device transmits an RRC Connection Request Message and eNodeB transmits an RRC Connection Setup Message.</p> <p>CAT-M1 Device transmits an RRC Connection Setup Complete Message to confirm the successful completion of the connection establishment by specify that UE supports “<i>attachwithoutPDN Connectivity</i>”</p> <p>CAT-M1 Device initiate the Attach procedure by including the ATTACH REQUEST Message by specify that UE supports “<i>attachwithoutPDN Connectivity</i>” in “<i>UE Network Capability IE</i>” with ESM DUMMY Message</p> <p>The Network responds to the CAT-M1 Device with Attach Accept Message that supports “<i>attachwithoutPDN Connectivity</i>” in “<i>EPS Network Feature Support</i>” with ESM DUMMY Message.</p> <p>CAT-M1 Device completes the Attach Procedure by sending the Attach Complete Message with ESM DUMMY Message</p>
Exit Criteria (Pass Criteria)	<p>Verify that CAT-M1 Device received with “<i>attachwithoutPDN Connectivity</i>” in Attach Accept Message and successfully attach procedure by sending Attach Complete Message</p>

2.2.4 CAT-M1 Device Detach Procedure - CLP.23_2.2.4_TC_001

Purpose	<p>To verify that CAT-M1 device could successfully perform LTE Detach Procedure with Clot EPS Optimizations</p>
Requirement under test	<p>CLP.22_2.2.2_REQ_002</p>
Entry Criteria	<p>CAT-M1 Device is configured with “<i>Clot EPS Optimizations</i>” in “<i>Preferred and Supported Network Behaviour</i>”</p> <p>CAT-M1 Device is Switched ON</p> <p>CAT-M1 Device in RRC_CONNECTED State</p> <p>The network is configured to support “<i>Clot EPS Optimizations</i>”</p>
Test Procedure	<p>CAT-M1 Device will initiate an Explicit Detach procedure to the Network</p> <p>CAT-M1 Device sends Detach Request Message (GUTI, Switch Off) in NAS Level to the Network</p> <p>If Switch Off indicated that detach is not due to a switch off situation, the network sends a Detach Accept Message to the CAT-M1 Device</p>
Exit Criteria (Pass Criteria)	<p>Verify that CAT-M1 Device sends Detach Request Message to the Network.</p>

2.2.5 CAT-NB1 device Attach Procedure with Control Plane Clot EPS Optimizations CLP.23_2.2.5_TC_001

Purpose	<p>To verify that the CAT-NB1 device could successfully complete LTE Attach Procedure with Control Plane Clot EPS Optimizations.</p>
Requirement under test	<p>CLP.22_2.2.2_REQ_001</p>

Entry Criteria	<p>CAT-NB1 Device shall be configured with “Control Plane CloT EPS Optimizations” in “Preferred and Supported Network Behaviour”.</p> <p>The network shall be configured to support “Control Plane CloT EPS Optimizations”.</p> <p>CAT-NB1 Device is Switched OFF.</p>
Test Procedure	<p>CAT-NB1 Device is Switched ON</p> <p>CAT-NB1 Device transmits an RRCConnectionRequest-NB Message and eNodeB transmits an RRCConnectionSetup-NB Message.</p> <p>CAT-NB1 Device transmits an RRCConnectionSetupComplete-NB Message to confirm the successful completion of the connection.</p> <p>CAT-NB1 Device initiates the Attach Procedure by sending Attach Request Message by specifies that UE supports “Control Plane CloT EPS Optimizations” in “UE Network Capability IE” together with a PDN CONNECTIVITY REQUEST Message in the ESM Message Container Information Element to request PDN Connectivity</p> <p>The network responds to the CAT-NB1 Device with Attach Accept Message that supports “Control Plane CloT EPS Optimization” in “EPS Network Feature Support” with the Activate Default EPS Bearer Context Request Message shall include PDN related parameters.</p> <p>CAT-NB1 Device completes the Attach Procedure by sending the Attach Complete Message together with an Activate Default EPS Bearer Context Accept Message in the ESM Message Container Information Element to the network</p>
Exit Criteria	<p>Verify that CAT-NB1 Device received with “Control Plane CloT EPS Optimization” in Attach Accept Message and successfully complete attach procedure by sending Attach Complete Message</p>

2.2.6 CAT-NB1 Device Attach Procedure with User Plane CloT EPS Optimization CLP.23_2.2.6_TC_001

Purpose	<p>To verify that CAT-NB1 device could successfully perform LTE Attach Procedure with User Plane CloT EPS Optimizations.</p>
Requirement under test	<p>CLP.22_2.2.2_REQ_001</p>
Entry Criteria	<p>CAT-NB1 Device shall be configured with “Control Plane CloT EPS Optimizations” and “User Plane CloT EPS Optimizations” in “Preferred and Supported Network Behaviour”.</p> <p>If the CAT-NB1 Device indicates support of <i>User Plane CloT EPS optimizations</i> then it shall also indicate support of <i>S1-U data transfer</i>.</p> <p>The network shall be configured to support “Control Plane CloT EPS Optimizations” and “User Plane CloT EPS Optimizations” and “S1-U Data transfer”.</p> <p>CAT-NB1 Device is Switched OFF.</p>

Test Procedure	<p>CAT-NB1 Device is Switched ON</p> <p>CAT-NB1 Device transmits an RRCConnectionRequest-NB Message and eNodeB transmits an RRCConnectionSetup-NB Message.</p> <p>CAT-NB1 Device transmits an RRCConnectionSetupComplete-NB Message to confirm the successful completion of the connection establishment by specify that UE supports “<i>User Plane CIoT EPS Optimizations</i>” .</p> <p>CAT-NB1 Device initiates the Attach Procedure by sending Attach Request Message by specifies that UE supports “Control Plane CIoT EPS Optimizations” and “<i>User Plane CIoT EPS Optimizations</i>” and “<i>S1-U Data Transfer</i>” in “<i>UE Network Capability IE</i>” together with a PDN CONNECTIVITY REQUEST Message in the <i>ESM Message Container Information Element</i> to request PDN Connectivity.</p> <p>The network responds to the CAT-NB1 Device with Attach Accept Message that supports “Control Plane CIoT EPS Optimizations” and “<i>User Plane CIoT EPS Optimization</i>” in “<i>EPS Network Feature Support</i>” with the Activate Default EPS Bearer Context Request Message shall include PDN related parameters.</p> <p>CAT-NB1 Device completes the Attach Procedure by sending the Attach Complete Message together with an Activate Default EPS Bearer Context Accept Message in the <i>ESM Message Container Information Element</i> to the network</p>
Exit Criteria	<p>Verify that CAT-NB1 Device received with “<i>User Plane CIoT EPS Optimization</i>” in Attach Accept Message and successfully attach procedure by sending Attach Complete Message</p>

2.2.7 CAT-NB1 Device Attach Procedure with CIoT EPS Optimizations (EMM Registered without PDN Connection) CLP.23_2.2.7_TC_001

Purpose	<p>To verify that CAT-NB1 device could successfully perform LTE Attach Procedure with EMM Registered without PDN Connection</p>
Requirement under test	<p>CLP.22_2.2.2_REQ_001</p>
Entry Criteria	<p>CAT-NB1 Device shall be configured with “Control Plane CIoT EPS Optimizations” and “<i>Attach without PDN Connectivity</i>” in “<i>Preferred and Supported Network Behaviour</i>”</p> <p>The network shall be configured to support “Control Plane CIoT EPS Optimizations” and “<i>Attach without PDN Connectivity</i>”.</p> <p>CAT-NB1 Device is Switched OFF.</p>
Test Procedure	<p>CAT-NB1 Device is Switched ON</p> <p>CAT-NB1 Device is in EMM-IDLE mode and reads <i>SystemInformationBlockType1-NB</i> to verify that “<i>Attach without DN Connectivity</i>” is broadcasting in NB-IoT Cell.</p> <p>CAT-NB1 Device transmits an RRCConnectionRequest-NB Message and eNodeB transmits an RRCConnectionSetup-NB Message.</p> <p>CAT-NB1 Device transmits an RRCConnectionSetupComplete-NB Message to confirm the successful completion of the connection establishment by specify that UE supports “<i>Attach without PDN Connectivity</i>”</p> <p>CAT-NB1 Device initiate the Attach procedure by including the ATTACH REQUEST Message by specify that UE supports “<i>Attach without PDN Connectivity</i>” and “Control Plane CIoT EPS Optimizations” in “<i>UE Network Capability IE</i>” with ESM DUMMY Message</p> <p>The Network responds to the CAT-NB1 Device with Attach Accept Message that supports “<i>Attach without PDN Connectivity</i>” and “Control Plane CIoT EPS Optimizations” in “<i>EPS Network Feature Support</i>” with ESM DUMMY Message.</p>

	CAT-NB1 Device completes the Attach Procedure by sending the Attach Complete Message with ESM DUMMY Message
Exit Criteria (Pass Criteria)	Verify that CAT-NB1 Device received with “ <i>Attach without PDN Connectivity</i> ” in Attach Accept Message and successfully attach procedure by sending Attach Complete Message

2.2.8 CAT-NB1 Device Attach Procedure with Clot EPS Optimizations (SMS transfer without Combined Attach) CLP.23_2.2.8_TC_001

Purpose	To verify that CAT-NB1 device could successfully perform LTE Attach Procedure for “SMS transfer without Combined Attach”
Requirement under test	CLP.22_2.2.2_REQ_001
Entry Criteria	<p>CAT-NB1 Device shall be configured with “SMS transfer without Combined Attach” and “Control Plane Clot EPS Optimizations” in “<i>Preferred and Supported Network Behaviour</i>”.</p> <p>The network is configured to support “SMS transfer without Combined Attach” and “Control Plane Clot EPS Optimizations”.</p> <p>CAT-NB1 Device is Switched OFF.</p>
Test Procedure	<p>CAT-NB1 Device is Switched ON.</p> <p>CAT-NB1 Device transmits an RRCConnectionRequest-NB Message and eNodeB transmits an RRCConnectionSetup-NB Message.</p> <p>CAT-NB1 Device transmits an RRCConnectionSetupComplete-NB Message to confirm the successful completion of the connection establishment.</p> <p>CAT-NB1 Device initiates the Attach Procedure by sending Attach Request and shall indicate "SMS only" in the additional update type IE and shall set the EPS attach type IE to "EPS attach", also may contain a PDN CONNECTIVITY REQUEST Message in the <i>ESM Message Container Information Element</i> to request PDN Connectivity.</p> <p>The network responds to the CAT-NB1 Device with Attach Accept Message, and may with the Activate Default EPS Bearer Context Request Message including PDN related parameters.</p> <p>CAT-NB1 Device completes the Attach Procedure by sending the Attach Complete Message together with an Activate Default EPS Bearer Context Accept Message in the <i>ESM Message Container Information Element</i> to the network</p>
Exit Criteria (Pass Criteria)	Verify that CAT-NB1 Device received Attach Accept Message and successfully attach procedure by sending Attach Complete Message

2.2.9 CAT-NB1 Device Detach Procedure CLP.23_2.2.9_TC_001

Purpose	To verify that CAT-NB1 device could successfully perform LTE Detach Procedure
Requirement under test	CLP.22_2.2.2_REQ_002
Entry Criteria	<p>CAT-NB1 Device is switched ON.</p> <p>CAT-NB1 Device is attached to the NB-IoT cell.</p>
Test Procedure	<p>CAT-NB1 Device sends NAS message Detach Request to networks.</p> <p>CAT-NB1 Device receives the Detach Accept message from networks.</p>
Exit Criteria (Pass Criteria)	Verify that CAT-NB1 Device received Detach Accept Message and successfully detach procedure by sending Detach Request Message.

2.3 Device Capabilities

2.3.1 CAT-M1 Device Capability Transfer / Success - RRC Level - CLP.23_2.3.1_TC_001

Purpose	The purpose of this procedure is to transfer CAT-M1 Device capability information from the UE to E-UTRAN - RRC Level
Requirement under test	CLP.22_2.3.2_REQ_001
Entry Criteria	CAT-M1 Device is switched ON CAT-M1 Device in RRC_CONNECTED State
Test Procedure	eNodeB shall request the radio capability by sending UE Capability Enquiry Message to request UE radio access capability information. CAT-M1 Device shall send the radio capability by sending RRC UE Capability Information Message RRC UE Capability Information Message will include E-UTRAN parameter, Inter-RAT parameter and Radio Paging Information. eNodeB will transfer the radio capability to MME.
Exit Criteria (Pass Criteria)	Verify that CAT-M1 Device sends UE Radio Device Capability (in RRC Level) in RRC UE Capability Information Message

2.3.2 CAT-M1 Device Capability Transfer / Success - NAS Level - CLP.23_2.3.2_TC_001

Purpose	The purpose of this procedure is to transfer CAT-M1 Device capability information from the UE to E-UTRAN - NAS Level
Requirement under test	CLP.22_2.3.2_REQ_001
Entry Criteria	CAT-M1 Device is switched ON CAT-M1 Device in RRC_CONNECTED State
Test Procedure	CAT-M1 Device initiates the Attach Procedure by sending Attach Request Message shall include UE Network Capability IE or MS Network Capability IE or both which includes with different <i>CloT EPS optimization</i> that CAT-M1 Device Support The Network responds to the CAT-M1 Device with Attach Accept Message that supports in " <i>EPS Network Feature Support</i> " in relation to <i>CloT EPS optimization</i> that network supports.
Exit Criteria (Pass Criteria)	Verify that CAT-M1 Device sends UE Core Network Capability Information (in NAS Level) in Attach Request Message

2.3.3 CAT-NB1 device Capability Transfer / Success - RRC Level CLP.23_2.3.3_TC_001

Purpose	The purpose of this procedure is to transfer CAT-NB1 Device capability information from the UE to E-UTRAN - RRC Level
Requirement under test	CLP.22_2.3.2_REQ_001
Entry Criteria	CAT-NB1 Device is switched ON. CAT-NB1 Device in RRC_CONNECTED State.

Test Procedure	<p>eNodeB shall request the radio capability by sending UECapabilityEnquiry-NB Message to request UE radio access capability information.</p> <p>CAT-NB1 Device shall send the radio capability by sending UECapabilityInformation-NB Message.</p> <p>For CAT-NB1 device, UECapabilityInformation-NB Message shall include <i>ue-Capability-Container-NB</i> and <i>ue-RadioPagingInfo-NB</i>.</p> <p>eNodeB will transfer the radio capability to MME.</p>
Exit Criteria (Pass Criteria)	Verify that CAT-NB1 Device sends the device capabilities (in RRC Level) in UECapabilityInformation-NB Message

2.3.4 CAT-NB1 device Capability Transfer / Success - NAS Level CLP.23_2.3.4_TC_001

Purpose	The purpose of this procedure is to transfer CAT-NB1 Device capability information from the UE to E-UTRAN - NAS Level
Requirement under test	CLP.22_2.3.2_REQ_001
Entry Criteria	CAT-NB1 Device is switched ON.
Test Procedure	<p>CAT-NB1 Device initiates the Attach Procedure by sending Attach Request Message shall include UE Network Capability IE or MS Network Capability IE or both which includes different CloT EPS optimizations that CAT-NB1 Device Supports.</p> <p>The Network responds to the CAT-NB1 Device with Attach Accept Message that supports in “EPS Network Feature Support” in relation to CloT EPS optimization that network supports.</p>
Exit Criteria (Pass Criteria)	Verify that CAT-NB1 Device sends the device capabilities (in NAS Level) in Attach Request Message

2.4 Data Transfer and Throughput

2.4.1 CAT M1 Data Transfer and Throughput with Control Plane CloT EPS Optimizations - CLP.23_2.4.1_TC_001

Purpose	The purpose of this procedure is to verify the data transfer with Control Plane CloT EPS Optimizations
Requirement under test	CLP.22_2.4.2_REQ_001
Entry Criteria	<p>CAT-M1 Device is switched ON</p> <p>CAT-M1 Device in RRC_CONNECTED State</p>
Test Procedure	<p>The uplink user data via the control plane, the CAT-M1 Device initiates the procedure by sending the ESM DATA TRANSPORT Message including the user data to be sent in the <i>User data container IE</i>.</p> <p>If the downlink user data will transfer by the network will send the ESM DATA TRANSPORT message. When receiving the ESM DATA TRANSPORT message, the UE forwards the contents of the <i>User data container IE</i> to the upper layers.</p> <p>Check the data transfer in different radio conditions (<i>Near and Centre Cell Conditions</i>) in relation to the different Modulation scheme.</p>

Exit Criteria (Pass Criteria)	Verify that CAT-M1 Device sends the data traffic in the uplink and the downlink direction via the control plane. The pass criteria for the throughput values is to be agreed between the CAT-M1 Device Manufacturer and the Mobile Network Operator. This requirement and respective test cases agreed between MNO and Vendors should be viewed as preliminary, and final throughput values for normal coverage mode will be consulted through the RAN 5 process.
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2.4.2 CAT-M1 Data Transfer and Throughput with User Plane CloT EPS Optimizations - CLP.23_2.4.2_TC_001

Purpose	The purpose of this procedure is to verify the data transfer with User Plane CloT EPS Optimizations
Requirement under test	CLP.22_2.4.2_REQ_001
Entry Criteria	CAT-M1 Device is switched ON CAT-M1 Device in RRC_CONNECTED State If the CAT-M1 Device indicates support of <i>User Plane CloT EPS optimization</i> then it shall also indicate support of <i>S1-U Data Transfer</i>
Test Procedure	The uplink and the downlink user data are transfer using DRB's (Data Radio Bearers) in RRC_CONNECTED State with S1-U data transfer. Check the data transfer in different radio conditions (<i>Near, Centre and Edge Cell Conditions</i>) in relation to the different Modulation scheme.
Exit Criteria (Pass Criteria)	Verify that CAT-M1 Device sends the data traffic in the uplink and the downlink direction via S1-U data transfer. The pass criteria for the throughput values is to be agreed between the CAT-M1 Device Manufacturer and the Mobile Network Operator. This requirement and respective test cases agreed between MNO and Vendors should be viewed as preliminary, and final throughput values for normal coverage mode will be consulted through the RAN 5 process.

2.4.3 CAT-NB1 Device Data Transfer and Throughput with Control Plane CloT EPS Optimizations CLP.23_2.4.3_TC_001

Purpose	The purpose of this procedure is to verify the data transfer with Control Plane CloT EPS Optimizations.
Requirement under test	CLP.22_2.4.2_REQ_001
Entry Criteria	CAT-NB1 Device shall be configured to support "Control Plane CloT EPS Optimizations". CAT-NB1 Device in RRC_CONNECTED State.
Test Procedure	The uplink user data via the control plane, the CAT-NB1 Device initiates the procedure by sending the ESM DATA TRANSPORT Message including EPS bearer identity and the user data. If the downlink user data will transfer by the network will send the ESM DATA TRANSPORT message. When receiving the ESM DATA TRANSPORT message, the UE forwards the contents of the <i>User data container IE</i> to the upper layers. Check the data transfer in different radio conditions (<i>Near and Centre Cell Conditions</i>) in relation to the different Modulation scheme.

Exit Criteria (Pass Criteria)	Verify that CAT-NB1 Device sends the data traffic in the uplink and the downlink direction and document the throughput values achieved. The pass criteria for the throughput values is to be agreed between the CAT-NB1 Device Manufacturer and the Mobile Network Operator. This requirement and respective test cases agreed between MNO and Vendors should be viewed as preliminary, and final throughput values for normal coverage mode will be consulted through the RAN 5 process.
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2.4.4 CAT-NB1 Device Data Transfer and Throughput with User Plane ClOT EPS Optimizations CLP.23_2.4.4_TC_001

Purpose	The purpose of this procedure is to verify the data transfer with User Plane ClOT EPS Optimizations
Requirement under test	CLP.22_2.4.2_REQ_001
Entry Criteria	CAT-NB1 Device and networks shall be configured to support “Control Plane ClOT EPS Optimizations” and “User Plane ClOT EPS Optimizations”. The CAT-NB1 Device and networks shall also indicate support “S1-U Data Transfer”. CAT-NB1 Device is in RRC_CONNECTED State and user plane radio bears have been set up.
Test Procedure	The uplink and the downlink user data are transfer using DRB’s (Data Radio Bearers) in RRC_CONNECTED State with S1-U data transfer. Check the data transfer in different radio conditions (<i>Near, Centre and Edge Cell Conditions</i>) in relation to the different Modulation scheme.
Exit Criteria (Pass Criteria)	Verify that CAT-NB1 Device sends the data traffic in the uplink and the downlink direction. The pass criteria for the throughput values is to be agreed between the CAT-NB1 Device Manufacturer and the Mobile Network Operator. This requirement and respective test cases agreed between MNO and Vendors should be viewed as preliminary, and final throughput values for normal coverage mode will be consulted through the RAN 5 process.

2.5 Mobility

2.5.1 CAT-M1 Device Cell Reselection Procedure - CLP.23_2.5.1_TC_001

Purpose	To verify that CAT-M1 device could successfully perform Cell Reselection Procedure with ClOT EPS Optimizations
Requirement under test	CLP.22_2.5.1_REQ_001
Entry Criteria	CAT-M1 Device is configured with “ClOT EPS Optimizations” in “Preferred and Supported Network Behaviour” CAT-M1 Device in RRC_IDLE State in Cell#1 Two EUTRAN Cell: Cell#1 (Serving Cell) & Cell#2 (Neighbouring Cell) and the network are configured to support “ClOT EPS Optimizations”
Test Procedure	Change the Radio conditions, CAT-M1 Device detects the new cell Cell#2 with reselection criteria are met for this cell and ranked as the best cell. Cell-ranking criterion Rs for Serving Cell and Rn for Neighbouring Cell is defined in the clause 5.2.4.6 of 3GPP TS 36.304 CAT-M1 Device reselects the new cell Cell#2 and starts to reads MIB, SIB1, SIB2 and check that “ClOT EPS Optimizations” is broadcast in EUTRAN Cell.

Exit Criteria (Pass Criteria)	Verify that CAT-M1 Device performed Cell Reselection with New Cell Cell#2
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2.5.2 CAT-M1 Device Handover Procedure with CloT EPS Optimization - CLP.23_2.5.2_TC_001

Purpose	To verify that CAT-M1 device could successfully perform the handover procedure with CloT EPS Optimization
Requirement under test	CLP.22_2.5.1_REQ_002
Entry Criteria	CAT-M1 Device are configured with CloT EPS Optimizations that supports in <i>“Preferred and Supported Network Behaviour”</i> CAT-M1 is Switched ON Two EUTRAN Cell: Cell#1 & Cell#2 and the network are configured to support <i>“CloT EPS Optimizations”</i>
Test Procedure	CAT-M1 Device will perform Attach Procedure in Cell#1 with <i>CloT EPS Optimizations</i> . CAT-M1 Device will perform some data transfer on EPS bearer so that CAT-M1 Device will be in RRC_CONNECTED State Change the Radio conditions to make Cell#2 better ranked than Cell#1 so that CAT-M1 Device will perform the measurement and sends the measurement report for an event when the radio conditions are met. CAT-M1 Device does the handover successful to second cell (Cell#2). After the handover is successful, CAT-M1 Device initiates a Tracking Area Update Procedure to synchronization the Bearer Context Status when supports CloT EPS Optimizations The Network shall then indicate the EPS bearer status to the UE in the Tracking Area Update Accept Message and the UE shall locally release any non-transferred bearer.
Exit Criteria (Pass Criteria)	Verify that CAT-M1 Device performed the handover successfully in Cell#2 and successfully initiate a Tracking Area Update Procedure to synchronization the Bearer Context Status.

2.5.3 CAT-NB1 device Intra-Frequency Cell Reselection CLP.23_2.5.3_TC_001

Purpose	The purpose of this procedure is to verify the CAT-NB1 device could complete the cell reselection within the intra-Frequency NB-IoT cells under RRC-Idle mode.
Requirement under test	CLP.22_2.5.1_REQ_001
Entry Criteria	CAT-NB1 device shall be configured to support <i>“Control Plane CloT EPS Optimization”</i> . CAT-NB1 device is in RRC-Connected mode. One Intra-Frequency NB-IoT neighbour cell is available.

Test Procedure	<p>CAT-NB1 device has already received the SystemInformationBlockType3-NB/SystemInformationBlockType4-NB for intra-frequency cell reselection.</p> <p>CAT-NB1 device goes to RRC_Idle mode after receiving <i>RRCCONNECTIONRELEASE-NB</i> message.</p> <p>The serving cell fulfils $S_{rxlev} > S_{intraSearchP}$, the CAT-NB1 device may choose not to perform intra-frequency measurements.</p> <p>Adjust RSRP of the serving cell, and make the $S_{rxlev} < S_{intraSearchP}$.</p> <p>The CAT-NB1 device shall perform intra-frequency measurements.</p> <p>Adjust the RSRP of neighbour cell to good condition.</p>
Exit Criteria	<p>CAT-NB1 device successfully completes the cell reselection to the intra-Frequency neighbour cell according the section 5.2.4.6 and section 5.24.2a of 3GPP 36.304.</p>

2.5.4 CAT-NB1 device Inter-Frequencies Cell Reselection CLP.23_2.5.4_TC_001

Purpose	<p>The purpose of this procedure is to verify the CAT-NB1 device could complete the cell reselection within the inter-Frequencies NB-IoT cells under RRC-Idle mode.</p>
Requirement under test	<p>CLP.22_2.5.1_REQ_001</p>
Entry Criteria	<p>CAT-NB1 device shall be configured to support “Control Plane CIoT EPS Optimization”.</p> <p>CAT-NB1 device is in RRC-Idle mode.</p> <p>Two Inter-Frequencies NB-IoT cells are available.</p>
Test Procedure	<p>CAT-NB1 device has already received the SystemInformationBlockType5-NB for inter-frequencies cell reselection.</p> <p>CAT-NB1 device goes to RRC_Idle mode after receiving <i>RRCCONNECTIONRELEASE-NB</i> message.</p> <p>The serving cell fulfils $S_{rxlev} > S_{nonIntraSearchP}$, the CAT-NB1 device may choose not to perform intra-frequency measurements.</p> <p>Adjust the RSRP of the serving cell, and make the $S_{rxlev} < S_{nonIntraSearchP}$.</p> <p>The CAT-NB1 device shall perform inter-frequencies measurements.</p> <p>Adjust the RSRP of neighbour cell to good condition.</p>
Exit Criteria	<p>CAT-NB1 device successfully completes the cell reselection to the inter-Frequencies neighbour cell according the section 5.2.4.6 and section 5.24.2a of 3GPP 36.304.</p>

2.5.5 CAT-NB1 device Cell Redirection CLP.23_2.5.5_TC_001

Purpose	<p>The purpose of this procedure is to verify the CAT-NB1 device could complete redirection to another NB-IoT cells when leaving RRC-Connected Mode to RRC-Idle Mode.</p>
Requirement under test	<p>CLP.22_2.5.1_REQ_001</p>
Entry Criteria	<p>CAT-NB1 device shall be configured to support “Control Plane CIoT EPS Optimization”.</p> <p>CAT-NB1 device is in RRC-Connected Mode.</p> <p>The NB-IoT cell with the target frequency is in a good condition.</p>

Test Procedure	<p>CAT-NB1 device receives the <i>RRCConnectionRelease-NB</i> message with target frequency contained in “<i>redirectedCarrierInfo IE</i>”.</p> <p>CAT-NB1 device goes to RRC_Idle Mode and starts to search for the NB-IoT cell on the target frequency.</p> <p>CAT-NB1 device successfully camps on the target frequency NB-IoT cell.</p>
Exit Criteria	<p>CAT-NB1 device successfully completes the redirection to the target frequency NB-IoT cell.</p>

2.6 Suspend/Resume

2.6.1 CAT-M1 Device Suspend Procedure with User Plane CloT EPS Optimizations - CLP.23_2.6.1_TC_001

Purpose	To verify that CAT-M1 device could successfully perform the suspend procedure
Requirement under test	CLP.22_2.6.2_REQ_001
Entry Criteria	<p>CAT-M1 Device is configured with “<i>User Plane CloT EPS Optimizations</i>” in “<i>Preferred and Supported Network Behaviour</i>”</p> <p>CAT-M1 Device is Switched ON</p> <p>The network is configured to support “<i>User Plane CloT EPS Optimizations</i>”</p>
Test Procedure	<p>The eNodeB transmits an RRC Connection Release Message to release RRC connection and move CAT-M1 Device in RRC_IDLE state.</p> <p>RRC Connection Release Message shall be included with “<i>resumeldentity</i>” and “<i>release cause: rrc-Suspend</i>”</p>
Exit Criteria (Pass Criteria)	CAT-M1 Device will store resumeldentity during RRC connection Release

2.6.2 CAT-M1 Device Resume Procedure with User Plane CloT EPS Optimizations - TS23_2.6.2_TC_001

Purpose	To verify that CAT-M1 device could successfully perform the resume procedure
Requirement under test	TS.22_2.6.2_REQ_002
Entry Criteria	<p>CAT-M1 Device is configured with “<i>User Plane CloT EPS Optimizations</i>” in “<i>Preferred and Supported Network Behaviour</i>”</p> <p>CAT-M1 Device in RRC_IDLE State</p> <p>The network is configured to support “<i>User Plane CloT EPS Optimizations</i>”</p>

Test Procedure	<p>CAT-M1 Device is triggered to send some user data in uplink direction.</p> <p>CAT-M1 Device is in EMM-IDLE mode reads SIB-2 to verify that “User Plane Clot EPS Optimizations” is broadcast in EUTRAN Cell.</p> <p>CAT-M1 Device transmits an RRC Connection Resume Request Message with resumeldentity and including information needed by the eNodeB to access the UE's stored AS Context.</p> <p>eNodeB transmits an RRC Connection Resume Setup Message and CAT-M1 Device reply back with RRC Connection Resume Complete Message</p> <p>Security is fully resumed on UE side after reception and processing of RRC Connection Resume Message.</p> <p>Some EPS bearer can't be resumed by the network, in that case eNodeB will reconfigures the radio bearers</p> <p>Uplink Data from the UE can now be forwarded by eNodeB using S1-Connection</p>
Exit Criteria (Pass Criteria)	CAT-M1 Device will resume the session and sends the uplink data to the network.

2.6.3 CAT-NB1 device Suspend Procedure with User Plane Clot EPS Optimizations CLP.23_2.6.3_TC_001

Purpose	To verify that CAT-NB1 device could successfully perform the suspend procedure
Requirement under test	CLP.22_2.6.2_REQ_001
Entry Criteria	<p>CAT-NB1 Device shall be configured with “User Plane Clot EPS Optimizations” and “Control Plane Clot EPS Optimizations” in “Preferred and Supported Network Behaviour”.</p> <p>The network are configured to support “User Plane Clot EPS Optimizations” and “Control Plane Clot EPS Optimizations”.</p> <p>CAT-NB1 Device is Switched ON.</p>
Test Procedure	<p>The eNodeB transmits an RRCConnectionRelease-NB Message to release RRC connection and move CAT-NB1 Device to RRC_IDLE.</p> <p>RRCConnectionRelease-NB Message shall be included with “resumeldentity” and “release cause: <i>rrc-Suspend</i>”</p>
Exit Criteria (Pass Criteria)	CAT-NB1 Device will store resumeldentity during RRC connection Release

2.6.4 CAT-NB1 device Resume Procedure with User Plane Clot EPS Optimizations CLP.23_2.6.4_TC_001

Purpose	To verify that CAT-NB1 device could successfully perform the resume procedure
Requirement under test	CLP.22_2.6.2_REQ_002
Entry Criteria	<p>CAT-NB1 Device shall be configured with “User Plane Clot EPS Optimizations” and “Control Plane Clot EPS Optimizations” in “Preferred and Supported Network Behaviour”.</p> <p>The network are configured to support “User Plane Clot EPS Optimizations” and “Control Plane Clot EPS Optimizations”.</p> <p>CAT-NB1 Device is in RRC_IDLE State.</p>

Test Procedure	<p>CAT-NB1 Device is triggered to send some data in uplink</p> <p>CAT-NB1 Device transmits an RRCConnectionResumeRequest-NB Message with resumeldentity and including information needed by the eNodeB to access the UE's stored AS Context.</p> <p>In case any EPS bearers can't be resumed by the network, eNodeB will reconfigure the radio bearers via RRCConnectionReconfiguration-NB Messages.</p> <p>Uplink Data from the UE can now be forwarded by eNodeB.</p>
Exit Criteria (Pass Criteria)	CAT-NB1 Device will resume the session and sends the uplink data to the network.

3 Enhanced Coverage

3.1 Random Access

3.1.1 NPRACH configuration in Random Access - CLP.23_3.1.1_TC_001

Purpose	To verify that the category NB1 UE could properly execute the random access procedure defined in clause 5.1 in TS 36.321 [15] using the NPRACH configuration contained in <i>NPRACH-ConfigSIB-NB</i> in TS 36.331 [16]
Requirement under test	TS.22_3.1.2_REQ_001
Entry Criteria	<p>UE is powered on and in RRC_IDLE mode.</p> <p>Network configures 3 coverage levels.</p> <p>Choose a proper location for CAT-NB1 Device to ensure the Device is in coverage level 0/1/2. The test is performed respectively for each coverage level.</p>
Test Procedure	<p>The Network sends Paging message.</p> <p>CAT-NB1 Device transmits Random Access Preamble using NPRACH resource corresponding to current enhanced coverage level.</p> <p>The Network sends Random Access Response message.</p> <p>CAT-NB1 Device transmits Msg3.</p>
Exit Criteria	UE should send Random Access Preamble using proper resource.

3.1.2 PRACH configuration in Random Access - CLP.23_3.1.2_TC_001

Purpose	To verify that the category CAT-M1 UE could properly execute the random access procedure defined in clause 5.1 in TS 36.321 [15] using the PRACH configuration contained in <i>PRACH-ConfigSIB</i> in TS 36.331 [16]
Requirement under test	CLP.22_3.1.2_REQ_001
Entry Criteria	<p>UE is powered on and in RRC_IDLE mode.</p> <p>Network configures 3 coverage levels.</p> <p>Choose a proper location for CAT-M1 Device to ensure the Device is in coverage level 0/1/2. The test is performed respectively for each coverage level.</p>

Test Procedure	<p>The Network sends Paging message.</p> <p>CAT-M1 Device transmits Random Access Preamble using PRACH resource corresponding to current enhanced coverage level.</p> <p>The Network sends Random Access Response message.</p> <p>CAT-M1 Device transmits Msg3.</p>
Exit Criteria	UE should send Random Access Preamble using proper resource.

3.2 Data Transfer and Throughput

3.2.1 Data Transfer and Throughput of CAT-NB1 UE with Control Plane Clot EPS Optimizations - CLP.23_3.2.1_TC_001

Purpose	To verify that the category NB1 UE could properly execute the procedures of NPDCCH/NPDSCH/NPUSCH using repetition numbers larger than 1 defined in TS 36.211.
Requirement under test	CLP.22_3.2.2_REQ_003
Entry Criteria	<p>UE is powered on and in RRC_CONNECTED mode.</p> <p>Network configures 3 coverage levels.</p>
Test Procedure	<p>The uplink user data via the control plane, the CAT-NB1 Device initiates the procedure by sending the ESM DATA TRANSPORT Message including the user data to be sent in the <i>User data container IE</i>.</p> <p>If the downlink user data will transfer by the network will send the ESM DATA TRANSPORT message. When receiving the ESM DATA TRANSPORT message, the UE forwards the contents of the <i>User data container IE</i> to the upper layers.</p> <p>Check the data transfer in different radio conditions (<i>Near, Centre and Edge Cell Conditions</i>) in relation to the different Modulation scheme and different coverage level.</p>
Exit Criteria	<p>Verify that CAT-NB1 Device sends the data traffic in the uplink and the downlink direction via the control plane.</p> <p>The pass criteria for the throughput values is to be agreed between the CAT-NB1 Device Manufacturer and the Mobile Network Operator. This requirement and respective test cases agreed between MNO and Vendors should be viewed as preliminary, and final throughput values for normal coverage mode will be consulted through the RAN 5 process.</p>

3.2.2 Data Transfer and Throughput of CAT-NB1 UE with User Plane Clot EPS Optimizations - CLP.23_3.2.2_TC_001

Purpose	The purpose of this procedure is to verify the data transfer with User Plane Clot EPS Optimizations
Requirement under test	CLP.22_3.2.2_REQ_003
Entry Criteria	<p>UE is powered on and in RRC_CONNECTED mode.</p> <p>Network configures 3 coverage levels.</p> <p>If the CAT-NB1 Device indicates support of <i>User Plane Clot EPS optimization</i> then it shall also indicate support of <i>S1-U Data Transfer</i></p>

Test Procedure	<p>The uplink and the downlink user data are transfer using DRB's (Data Radio Bearers) in RRC_CONNECTED State with S1-U data transfer.</p> <p>Check the data transfer in different radio conditions (<i>Near, Centre and Edge Cell Conditions</i>) in relation to the different Modulation scheme.</p>
Exit Criteria (Pass Criteria)	<p>Verify that CAT-NB1 Device sends the data traffic in the uplink and the downlink direction via S1-U data transfer.</p> <p>The pass criteria for the throughput values is to be agreed between the CAT-NB1 Device Manufacturer and the Mobile Network Operator. This requirement and respective test cases agreed between MNO and Vendors should be viewed as preliminary, and final throughput values for normal coverage mode will be consulted through the RAN 5 process.</p>

3.2.3 Data Transfer and Throughput of CAT-M1 UE - CLP.23_3.2.3_TC_001

Purpose	The purpose of this procedure is to verify the data transfer with Cat-M1
Requirement under test	CLP.22_3.2.2_REQ_001
Entry Criteria	<p>UE is powered on and in RRC_CONNECTED mode.</p> <p>Network configures 3 coverage levels.</p> <p>If the CAT-M1 Device indicates support of <i>User Plane Clot EPS optimization</i> then it shall also indicate support of <i>S1-U Data Transfer</i></p>
Test Procedure	<p>The uplink and the downlink user data are transfer using DRB's (Data Radio Bearers) in RRC_CONNECTED State with S1-U data transfer.</p> <p>Check the data transfer in different radio conditions (<i>Edge of cell Conditions invoking EC mode A and mode B</i>) in relation to the different Modulation scheme.</p>
Exit Criteria (Pass Criteria)	<p>Verify that CAT-M1 Device sends the data traffic in the uplink and the downlink direction via S1-U data transfer.</p> <p>The pass criteria for the throughput values is to be agreed between the CAT-M1 Device Manufacturer and the Mobile Network Operator. This requirement and respective test cases agreed between MNO and Vendors should be viewed as preliminary, and final throughput values for normal coverage mode will be consulted through the RAN 5 process.</p>

3.2.4 Data Transfer and Throughput of CAT-M1 UE with Control Plane Clot EPS Optimizations - CLP.23_3.2.4_TC_001

Purpose	The purpose of this procedure is to verify the data transfer with Cat-M1
Requirement under test	CLP.22_3.2.2_REQ_001
Entry Criteria	<p>UE is powered on and in RRC_CONNECTED mode.</p> <p>Network configures 2 coverage levels for UE supporting CE Mode A and 4 coverage levels for UE supporting CE Mode B.</p>

Test Procedure	<p>The uplink user data via the control plane, the CAT-M1 Device initiates the procedure by sending the ESM DATA TRANSPORT Message including the user data to be sent in the <i>User data container IE</i>.</p> <p>If downlink user data to be transferred, the network will send the ESM DATA TRANSPORT message. When receiving the ESM DATA TRANSPORT message, the UE forwards the contents of the <i>User data container IE</i> to the upper layers.</p> <p>Check the data transfer in different radio conditions (<i>Near, Centre and Edge Cell Conditions</i>) in relation to the different Modulation scheme and different coverage level.</p>
Exit Criteria	<p>Verify that CAT-M1 Device sends the data traffic in the uplink and the downlink direction via the control plane.</p> <p>The pass criteria for the throughput values is to be agreed between the CAT-M1 Device Manufacturer and the Mobile Network Operator. This requirement and respective test cases agreed between MNO and Vendors should be viewed as preliminary, and final throughput values for normal coverage mode will be consulted through the RAN 5 process.</p>

4 Power Test Cases

This section should be read in conjunction with CLP22 v1.0, MIoT Requirements document. The Conformance requirements contained with Section 4 of that document apply.

4.1 PSM Operation

4.1.1 PSM Request and Activation - CLP.23_4.1.1_TC_001

Purpose	To verify that the DUT could successfully request PSM during attach.
Requirement under test	CLP.22_4.1_REQ_001; CLP.22_4.1_REQ_005
Entry Criteria	<p>DUT is configured to use Power Saving Mode</p> <p>DUT is powered off</p>
Test Procedure	<p>Power on DUT.</p> <p>DUT initiates the Attach procedure by sending the “Attach Request” message that contains the “T3324 and T3412 Values”</p> <p>The network responds to the DUT with “Attach Accept” message that contains the “T3324 and T3412 values”.</p> <p>DUT completes the Attach procedure by sending the “Attach Complete” message.</p> <p>DUT releases the connection.</p> <p>Change the values of T3412 and T3324 in the DUT.</p> <p>Repeat steps 1-5</p>
Exit Criteria	<p>DUT shall contain “T3324 Value” in Attach Request in order to request PSM in step 2</p> <p>In Step 7 the DUT will send Attach Request message with updated timer values</p>

4.1.2 MT Data in PSM State - CLP.23_4.1.2_TC_001

Purpose	To verify that the DUT could successfully monitor Paging message and receive MT user data when T3324 Timer running and then enter PSM again when T3324 timer expires.
Requirement under test	CLP.22_4.1_REQ_001
Entry Criteria	DUT is configured to use Power Saving Mode DUT is powered off
Test Procedure	Power on DUT. DUT initiates the Attach procedure by sending the “Attach Request” message that contains the “T3324 Value” The network responds to the DUT with “Attach Accept” message that contains the “T3324 value”. DUT completes the Attach procedure by sending the “Attach Complete” message. DUT releases the connection. Initiate MT user data before T3324 expires. Stop MT data. DUT releases the connection, enters in idle state and starts T3324 timer. Initiate MT user data after T3324 expires.
Exit Criteria	DUT shall respond to the paging message, establish connection and receive MT data in step 6 DUT shall not give any response in step 8.

4.1.3 MO Data in PSM State - CLP.23_4.1.3_TC_001

Purpose	To verify that the DUT could successfully deactivate PSM at any time for the transfer of mobile originated user data.
Requirement under test	CLP.22_4.1_REQ_001; CLP.22_4.1_REQ_007
Entry Criteria	DUT is configured to use Power Saving Mode DUT is powered off
Test Procedure	Power on DUT. DUT initiates the Attach procedure by sending the “Attach Request” message that contains the “T3324 Value”, The network responds to the DUT with “Attach Accept” message that contains the “T3324 value”. DUT completes the Attach procedure by sending the “Attach Complete” message. DUT releases the connection. Wait for T3324 Timer to expire. Check CAT-M1, CAT-NB1 device entered PSM after expiry of T3324 by attempting to page the DUT Initiate MO user data after T3324 expires.

Exit Criteria	Check DUT enters PSM after the expiry of T3324 in step 5 DUT shall deactivate PSM , establish connection and send MO data in step 7
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4.1.4 Periodic Tracking/Routing Area Update - CLP.23_4.1.4_TC_001

Purpose	To verify that the UE successfully performs a Periodic Tracking/Routing Area Update procedure after the expiry of the T3412/T3312 timer when PSM is activated.
Requirement under test	CLP.22_4.1_REQ_001
Entry Criteria	DUT is configured to use Power Saving Mode DUT is powered off
Test Procedure	<p>Power on DUT.</p> <p>DUT initiates the Attach procedure by sending the “Attach Request” message that contains the “T3324 Value”,</p> <p>The network responds to the DUT with “Attach Accept” message that contains the “T3324 value” for PSM and “T3412 Value” for Periodic TAU or “T3312 Value” for Periodic RAU</p> <p>DUT completes the Attach procedure by sending the “Attach Complete” message.</p> <p>DUT releases the connection and enters in idle state. DUT enters PSM after T3324 expires.</p> <p>After the expiry of the T3412 or T3312 timer, DUT sends a TRACKING AREA UPDATE REQUEST or ROUTING AREA UPDATE REQUEST message.</p> <p>The network responds to the DUT with TRACKING AREA UPDATE ACCEPT or ROUTING AREA UPDATE ACCEPT message that contains the “T3324 value”</p> <p>DUT completes the TAU or RAU procedure by sending the TRACKING AREA UPDATE COMPLETE (if GUTI allocated) message or ROUTING AREA UPDATE COMPLETE message (if P-TMSI changed)</p> <p>DUT releases the connection and enters in idle state. DUT enters PSM after T3324 expires.</p> <p>Initiate MT user data after T3324 expires</p>
Exit Criteria	<p>DUT should sends a TRACKING AREA UPDATE REQUEST with EPS update type set to "periodic updating" or ROUTING AREA UPDATE REQUEST message with update type set to "periodic updating".</p> <p>DUT shall include “T3324 value” IE in step 2 & 6.</p> <p>Check DUT enters PSM again after the expiry of T3324 in step 9</p>

4.1.5 Reduced Current Drain in PSM- CLP.23_4.1.5_TC_001

Purpose	To verify that the UE supports a reduced current drain when in Power Saving Mode
Requirement under test	CLP.22_4.1_REQ_003

Entry Criteria	<p>The DUT battery is replaced with the “dummy battery”.</p> <p>The dummy battery is connected to a combined DC power source and current measurement device.</p> <p>The DC power source is configured to maintain a voltage equal to the Nominal Battery Voltage across the dummy battery terminals.</p> <p>DUT is powered off</p> <p>I-eDRX is disabled in DUT</p> <p>All other radio's (WiFi/BT etc) in the device are switched off</p>
Test Procedure	<p>DUT is configured to disable Power Saving Mode</p> <p>Activate the DUT</p> <p>Wait 3 minutes after DUT has completed registration.</p> <p>In idle mode, record a minimum of 120 samples over a continuous 30 minute period, using ammeters or automated power monitors if available.</p> <p>Calculate the average current drain from the measured samples, denoted by $I_{PSM_Disabled}$.</p> <p>Power off DUT.</p> <p>DUT is configured to use Power Saving Mode, with sleep timer (T3412) set to at least 30 minutes.</p> <p>Activate the DUT</p> <p>Wait 3 minutes after DUT completed registration.</p> <p>In PSM mode, record a minimum of 120 samples over a continuous 30 minute period, using ammeters or automated power monitors if available.</p> <p>Calculate the average current drain from the measured samples, denoted by $I_{PSM_Enabled}$</p>
Exit Criteria	<p>The current drain in PSM ($I_{PSM_Enabled}$) should be several orders of magnitude lower than the one in idle mode($I_{PSM_Disabled}$)</p>

4.1.6 Periodic Tracking Area Update, T3412 - CLP.23_4.1.6_TC_001

Purpose	To verify that the DUT accepts t3412 value from NW
Requirement under test	CLP.22_4.1_REQ_001; CLP.22_4.1_REQ_006
Entry Criteria	<p>DUT is configured to use Power Saving Mode</p> <p>DUT is configured with preferred t3412 value (different from NW)</p> <p>DUT is powered off</p>

<p>Test Procedure</p>	<p>Power on DUT.</p> <p>DUT initiates the Attach procedure by sending the ATTACH REQUEST message that contains the “T3324 and T3412 Values”</p> <p>The network responds to the DUT with “ATTACH ACCEPT message that contains the “T3324 value” and a different “T3412 value” for periodic TAU.</p> <p>DUT completes the Attach procedure by sending the “ATTACH COMPLETE” message.</p> <p>DUT releases the connection and enters in idle state. DUT enters PSM after T3324 expires.</p> <p>After the expiry of the T3412 timer, DUT sends a TRACKING AREA UPDATE REQUEST message.</p> <p>The network responds to the DUT with TRACKING AREA UPDATE ACCEPT message that contains the “T3324 and T3412 values”</p> <p>DUT completes the TAU procedure by sending the TRACKING AREA UPDATE COMPLETE.</p>
<p>Exit Criteria</p>	<p>DUT shall send Attach Request containing “T3324 Value” and a preferred “T3412 Value” in order to request PSM in step 2 and 6.</p> <p>Check DUT accepts new Value for T3412 in ATTACH COMPLETE message in step 4.</p> <p>Check DUT initiates TAU after expiry of T3412 in step 6.</p>

4.2 I-eDRX Operation

4.2.1 eDRX Request and Activation - CLP.23_4.2.1_TC_001

<p>Purpose</p>	<p>To verify that the DUT could successfully request eDRX during attach and monitor Paging according to eDRX cycle and PTW (except EC-GSM).</p>
<p>Requirement under test</p>	<p>CLP.22_4.1_REQ_002; CLP.22_4.1_REQ_008; CLP.22_4.1_REQ_009</p>
<p>Entry Criteria</p>	<p>Idle mode extended DRX is allowed in the serving cell.</p> <p>DUT is configured to use eDRX</p> <p>DUT is powered off</p>
<p>Test Procedure</p>	<p>Power on DUT.</p> <p>DUT initiates the Attach procedure by sending the “Attach Request” message that contains the “Extended DRX parameters” IE.</p> <p>The network responds to the DUT with “Attach Accept” message that contains the “Extended DRX parameters” to indicate the eDRX cycle and PTW (except EC-GSM).</p> <p>DUT completes the Attach procedure by sending the “Attach Complete” message.</p> <p>DUT releases the connection.</p> <p>Initiate MT user data and the network sends Paging message.</p> <p>DUT responds to the Paging and receives the MT data.</p> <p>Repeat steps 1-7 with a different value for “Extended DRX Parameter” IE</p>

Exit Criteria	DUT shall contain “Extended DRX parameters” in Attach Request in order to request eDRX in step 2 DUT shall correctly receive Paging message, establish connection and receive MT user data in step 7. DUT shall correct request and use the requested eDRX parameter as defined in Step 8
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5 Service Layer (oneM2M)

The oneM2M Service Layer interface test case SHALL follow the test case defined in the following oneM2M Specifications:

- TS-0013 - Interoperability_Testing [5]:
 - RemoteCSE Management in Clause 8.1.2
 - Application Entity Registration in Clause 8.1.3
 - Container Management in Clause 8.1.4
- TS-0017 - Implementation Conformance Statements [6]

6 USIM/eUICC OTA

UICC and USIM device interface test cases SHALL follow the test cases defined in documents [2] and [3] referenced in Section 1.5.

7 USIM Toolkit

USIM ToolKit device interface test cases SHALL follow the test cases defined in document [3], referenced in Section 1.5.

8 Antenna Performance

It is expected that Antenna Performance in a free space environment within relevant bands and areas will be compliant with 3GPP and CTIA specifications, 3GPP TS.34.114 [10], TS.37.544 [11] and CTIA, OTA Test Plan v 3.6 [12] or later versions of these documents when available.

Test cases will be agreed with Operators and Manufacturers on a case by case basis.

9 Device Management (LwM2M)

LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5

10 Mapping of Test Cases to Requirements

MiIoT Requirements Document Section		Requirement	Test Case	Comments
2	Basic Operation	CLP.22_2.1.2_REQ_001	CLP.23_2.1.1_TC_001 (CAT-M1) CLP.23_2.1.2_TC_001 (CAT-NB1)	
		CLP.22_2.1.2_REQ_002	EC-GSM-IoT Test Cases to be defined when Manufacturer support is available.	
		CLP.22_2.2.2_REQ_001	CLP.23_2.2.1_TC_001 (CAT-M1) CLP.23_2.2.2_TC_001 (CAT-M1) CLP.23_2.2.3_TC_001 (CAT-M1) CLP.23_2.2.5_TC_001 (CAT-NB1) CLP.23_2.2.6_TC_001 (CAT-NB1) CLP.23_2.2.7_TC_001 (CAT-NB1) CLP.23_2.2.8_TC_001 (CAT-NB1)	
		CLP.22_2.2.2_REQ_002	CLP.23_2.2.4_TC_001 (CAT-M1) CLP.23_2.2.9_TC_001 (CAT-NB1)	
		CLP.22_2.2.2_REQ_003	EC-GSM-IoT Test Cases to be defined when Manufacturer support is available.	
		CLP.22_2.2.2_REQ_004	EC-GSM-IoT Test Cases to be defined when Manufacturer support is available.	
		CLP.22_2.3.2_REQ_001	CLP.23_2.3.1_TC_001 (CAT-M1) CLP.23_2.3.2_TC_001 (CAT-M1) CLP.23_2.3.3_TC_001 (CAT-NB1) CLP.23_2.3.4_TC_001 (CAT-NB1)	
		CLP.22_2.4.2_REQ_001	CLP.23_2.4.1_TC_001 (CAT-M1) CLP.23_2.4.2_TC_001 (CAT-M1) CLP.23_2.4.3_TC_001 (CAT-NB1) CLP.23_2.4.4_TC_001 (CAT-NB1)	
		CLP.22_2.4.2_REQ_002	EC-GSM-IoT Test Cases to be defined when Manufacturer support is available.	
		CLP22_2.4.2_REQ_003	To be agreed with Operator and Manufacturer	
		CLP.22_2.5.1_REQ_001	CLP.23_2.5.1_TC_001 (CAT-M1) CLP.23_2.5.3_TC_001 (CAT-NB1) CLP.23_2.5.4_TC_001 (CAT-NB1) CLP.23_2.5.5_TC_001 (CAT-NB1)	
		CLP.22_2.5.1_REQ_002	CLP.23_2.5.2_TC_001 (CAT-M1)	
		CLP.22_2.5.1_REQ_003	EC-GSM-IoT Test Cases to be defined when Manufacturer support is available.	
		CLP.22_2.6.2_REQ_001	CLP.23_2.6.1_TC_001 (CAT-M1)	

MiIoT Requirements Document Section	Requirement	Test Case	Comments
		CLP.23_2.6.3_TC_001 (CAT-NB1)	
	CLP.22_2.6.2_REQ_002	CLP.23_2.6.2_TC_001 (CAT-M1) CLP.23_2.6.4_TC_001 (CAT-NB1)	
3	Enhanced Coverage	CLP.22_3.1.2_REQ_001	CLP.23_3.1.2_TC_001
	CLP.22_3.1.2_REQ_002	EC-GSM-IoT Test Cases to be defined when Manufacturer support is available.	
	CLP.22_3.2.2_REQ_001	CLP.23_3.2.3_TC_001 CLP.23_3.2.4_TC_001	
	CLP.22_3.2.2_REQ_002	EC-GSM-IoT Test Cases to be defined when Manufacturer support is available.	
	CLP.22_3.2.2_REQ_003	CLP.23_3.2.1_TC_001 (CAT-NB1)	
4	Power Test Cases	CLP.22_4.1_REQ_001	CLP.23_4.1.1_TC_001 CLP.23_4.1.2_TC_001 CLP.23_4.1.3_TC_001 CLP.23_4.1.4_TC_001 CLP.23_4.1.6_TC_001
	CLP.22_4.1_REQ_002	CLP.23_4.3.1_TC_001	
	CLP.22_4.1_REQ_003	CLP.23_4.1.5_TC_001	
	CLP.22_4.1_REQ_004	EC-GSM-IoT Test Cases to be defined when Manufacturer support is available.	
	CLP.22_4.1_REQ_005	CLP.23_4.1.1_TC_001	
	CLP.22_4.1_REQ_006	CLP.23_4.1.6_TC_001	
	CLP.22_4.1_REQ_007	CLP.23_4.1.3_TC_001	
	CLP.22_4.1_REQ_008	CLP.23_4.2.1_TC_001	
	CLP.22_4.1_REQ_009	CLP.23_4.2.1_TC_001	
5	Service Layer (oneM2M)	CLP.22_5.3_REQ_001	The oneM2M Service Layer interface test case SHALL follow the test case defined in the following oneM2M Specifications: [5] TS-0013 - Interoperability_Testing: RemoteCSE Management in Clause 8.1.2 Application Entity Registration in Clause 8.1.3 Container Management in Clause 8.1.4 [6] TS-0017 - Implementation Conformance Statements
	CLP.22_5.3_REQ_002	The oneM2M Service Layer interface test case SHALL follow	

MiOT Requirements Document Section	Requirement	Test Case	Comments
		the test case defined in the following oneM2M Specifications: [5] TS-0013 - Interoperability_Testing: RemoteCSE Management in Clause 8.1.2 Application Entity Registration in Clause 8.1.3 Container Management in Clause 8.1.4 [6] TS-0017 - Implementation Conformance Statements	
	CLP.22_5.3_REQ_003	The oneM2M Service Layer interface test case SHALL follow the test case defined in the following oneM2M Specifications: [5] TS-0013 - Interoperability_Testing: RemoteCSE Management in Clause 8.1.2 Application Entity Registration in Clause 8.1.3 Container Management in Clause 8.1.4 [6] TS-0017 - Implementation Conformance Statements	
6	SIM/eUICC OTA	CLP.22_6.1_REQ_001	UICC and USIM device interface test cases SHALL follow the test cases defined in documents [2] and [3] referenced in Section 1.5.
		CLP.22_6.1_REQ_002	UICC and USIM device interface test cases SHALL follow the test cases defined in documents [2] and [3] referenced in Section 1.5.
		CLP.22_6.1_REQ_003	UICC and USIM device interface test cases SHALL follow the test cases defined in documents [2] and [3] referenced in Section 1.5.
		CLP.22_6.1_REQ_004	UICC and USIM device interface test cases SHALL follow the test cases defined in documents [2] and [3] referenced in Section 1.5.
7	USIM Tool Kit	CLP.22_7.3_REQ_001	USIM ToolKit device interface test cases SHALL follow the test cases defined in document [3], referenced in Section 1.5.
		CLP.22_7.3_REQ_002	USIM ToolKit device interface test cases SHALL follow the test cases defined in document [3], referenced in Section 1.5
		CLP.22_7.3_REQ_003	USIM ToolKit device interface test cases SHALL follow the test cases

MioT Requirements Document Section	Requirement	Test Case	Comments
		defined in document [3], referenced in Section 1.5	
8	Antenna Performance	It is expected that Antenna Performance in a free space environment within relevant bands and areas will be complaint with 3GPP and CTIA specifications where/when they are available.	Test cases will be agreed with Operators and Manufacturers on a case by case basis.
9	Device Management (LwM2M)	CLP.22_9.2_REQ_001	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_002	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_003	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_004	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_005	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_006	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_007	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_008	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_009	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_010	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_011	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.
		CLP.22_9.2_REQ_012	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.

MiOT Requirements Document Section		Requirement	Test Case	Comments
		CLP.22_9.2_REQ_013	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.	
		CLP.22_9.2_REQ_014	LWM2M test cases SHALL follow the test cases defined in document [4], referenced in Section 1.5.	

Annex A Document Management

A.1 Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
1.0	18 November 2016	New PRD (CLP23 v0.1).	TCJWG/PSMC	David Hills

A.2 Other Information

Type	Description
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