GTI
NB-IoT Interoperability Test Specification

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Test Specification

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Contents

1 Scope

This document defines the Inter-Operatability test cases for NB-IoT chipsets, modules and devices

2 References

[1] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".
[2] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".
[3] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode".
[4] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol Specification".

3 Definitions, symbols and abbreviations

Abbreviation	Definitions
AS	Application Service
C-IoT	Cellular Internet of Things
CoAP	Constrained Application Protocol
CP	Control Plane
eDRX	extended DRX
EPRE	Energy Per Resource Element
LwM2M	Lightweight Machine To Machine
NB-IoT	Narrow Band Internet of Things
PSM	Power Saving Mode
RoHC	Robust Header Compression
UE	User Equipment

4 Test Environment

4.1 Test Environment

The test environment defined in this specification consists of the following equipment.

- The wireless equipment and interfaces include eNB, an S1 interface between eNB and MME, an S1-U interface between eNB and S-GW.
- The core network equipment and interfaces include MMEs, S-GWs, P-GWs, SCEFs, HSSs, MSCs, SMSCs, OneNETs and ASs, and S6a, S11, S5, T6a, SGs, SGd.
- Data platform, including OneNET, AS and others.

The following figure shows NB-IoT network architecture for the logical entity

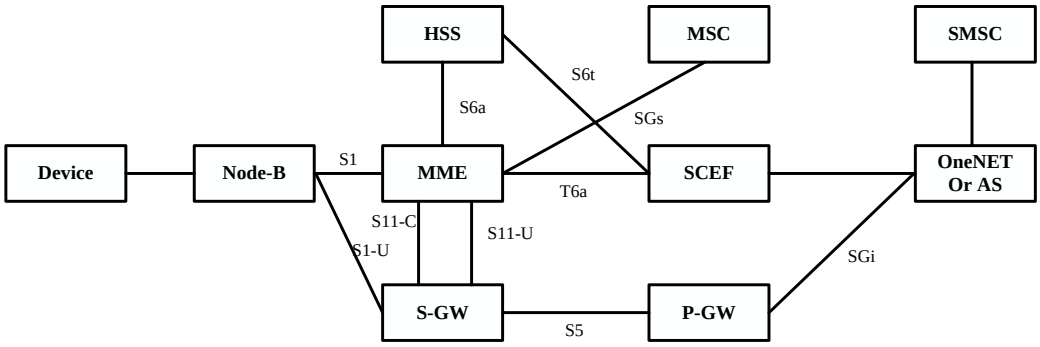

Figure4-1 NB-IoT network architecture

4.2 Coverage Definition

The following are the uplink test point selection principle in stand-alone, In-band and Guard-band Mode.

Stand-alone mode:

- Excellent Point: RSRP>-100dBm,
- Good Point: -105dBm >= RSRP >= -110dBm
- Middle Point: -115dBm >= RSRP >=-120dBm
- Poor Point: RSRP<-125dBm

In-band/Guard-band mode:

- Excellent Point: RSRP > -100dBm
- Good Point: -113dBm >= RSRP >= -118dBm
- Middle Point: -123dBm > = RSRP >= -128dBm
- Poor Point: RSRP < -133dBm

The downlink test point shall be selected accroding to NRS-SINR value. NRS-SINR=(|H0,0|^2+|H0,1|^2)／(2|ni|^2).

- Excellent Point: >10dB
- Good Point: 5~10dB
- Middle Point: 0dB~5dB
- Poor Point: -5dB~0dB

Or with reference to the 3GPP specification, the test points could be selected based on MCL (Maximum Coupling Losses), which is the difference between the eNB maximum transmit power and the receive sensitivity.

- Nomal Coverage: CE=0, MCL＜144dB

- Robust Coverage: CE=1, 144dB＜MCL＜154dB
- Extreme Coverage: CE=2, 154dB＜MCL＜164dB

4.3 Default Configuration

Parameter	Default configuration	Description
Band	900MHz	
Mode	Stand-Alone	Using default value of Stand-Alone if there is no specific configuration in test case
System Bandwidth	200KHz	
Networking	Intra-frequency	
Uplink subcarrier spacing and Number of uplink subcarriers	Adaptive	
Port number	Dual port	
eNB antenna number	2Tx2R	
Uplink power control	enabled	
UE Maximum transmit power	23dBm	
NPRACH repeatation	144dB:1;154dB:8;164dB:32	
NPDCCH, NPDSCH, NPUSCH repeatation	Adaptive	
eNB Transmit Power	TX dual channel: 2×10W	
Data Transmission Plane	CP	UP will be special specified

5 Basic Functionality Test

5.1 Attach/Detach

TC NO.	5.1
Test Case	Attach/Detach
Test Purpose	To verify if UE can attach to NB-IoT network successfully after power on To verify if UE support the detach procedure.
Related specifications	TS 24.301
Initial configuration	1. NB-IoT cell works well; 2. 6 combinations among 2 kinds of cell deployment types (Stand-alone and In-band) and 3 kinds of the subcarrier spacing (3.75kHz ST, 15kHz ST, 15kHz MT).

Test procedure	1. Scenario 1: UE and network both support stand-alone and 3.75kHz ST; 2. UE is located at the cell coverage area, UE powers on; 3. UE should do cell search, random access, RRC connection setup, etc. to do attach procedure, UE camps on the tested cell; 4. UE powers off, UE sends Detach Request message to do detach procedure, network replies with Detach Accept message; 5. Scenario 2: UE and network support stand-alone and 15kHz ST, repeats step 2-4; 6. Scenario 3: UE and network support stand-alone and 15kHz MT, repeats step 2-4; 7. Scenario 4: UE and network support In-band and 3.75kHz ST, repeats step 2-4; 8. Scenario 5: UE and network support In-band and 15kHz ST, repeats step 2-4; 9. Scenario 6: UE and network support In-band and 15kHz MT, repeats step 2-4.
Check Point	1. Step3, UE sends Attach Request message, check if the "Control plane CIoT EPS optimization supported" and "User plane CIoT EPS optimization supported" within the "UE network Capability" both are set to 1, check if Attach Request message carries "Additional update type"; check if Attach Request message carries "Voice domain preference and UE's usage setting"; 2. Step3, after UE receives "Attach Accept" message, UE should send "Attach complete" to accomplish attach procedure; 3. Step4, check if UE launched the detach procedure after it powers off.
Message Flow	

5.2 PSM Request and Activation

TC NO.	5.2
Test Case	PSM Request and Activation
Test Purpose	To verify if UE support PSM request, activation, deactivation To verify if UE does period TAU regularly when PSM is active.
Related specifications	TS 24.301
Initial configuration	1. NB-IoT cell works well; 2. UE supports and enables PSM.

Test procedure	1. UE is located at the cell coverage area, UE powers on; 2. UE launches the attach procedure, “Attach Request” message should carry “T3324 value” IE to request PSM; 3. Network replies with “Attach Accept” message which carries “T3324 value” to configure PSM, T3324 value = 00001010(i.e. Active Time=20s), “Attach Accept” message also carries T3412 value = 0010011, i.e. TAU period is 3 minutes; 4. UE sends “Attach Complete” to accomplish the attach procedure; 5. Network releases RRC connection, UE enters RRD_IDLE state, UE should enter PSM after T3324 timer timeout; 6. UE sends “TRACKING AREA UPDATE REQUEST” to do periodic TAU after T3412 Timer timeouts, network replies with “TRACKING AREA UPDATE ACCEPT” with “T3324 value”, T3324 value =00001010(i.e. Active Time =20s); 7. UE sends “TRACKING AREA UPDATE COMPLETE” to accomplish TAU procedure; 8. Network releases RRC connection, UE enters RRC_IDLE state, UE enters PSM after T3324 Timer timeouts; 9. UE sends “TRACKING AREA UPDATE REQUEST” to do periodic TAU after T3412 Timer timeouts, network replies with “TRACKING AREA UPDATE ACCEPT” without “T3324 value” IE; 10. UE sends “TRACKING AREA UPDATE COMPLETE” to accomplish TAU procedure; 11. Network releases RRC connection, UE enters RRC_IDLE state; launches downlink traffic to trigger paging to UE after 30s; 12. UE responses to paging and starts to receive downlink data; 13. Network release RRC connection.
Check Point	1. Step2, check if UE carries “T3324 value” IE” in “Attach Request” message to request PSM; 2. Step6, Check if UE sends “TRACKING AREA UPDATE REQUEST” with “T3324 value” IE after T3412 Timer timeouts, and the “EPS update type” IE should be “periodic updating”; 3. Step8, UE should enter PSM state after T3324 Timer timeouts; 4. Step12, UE doesn’t enter PSM state after network deactivate PSM, UE should response the paging message.
Message Flow	

5.3 eDRX Request and Activation

TC NO.	5.3
Test Case	eDRX Request and Activation
Test Purpose	To verify if UE support eDRX request, activation, deactivation To verify if UE can receive paging message regularly according eDRX period when eDRX is active.
Related specifications	TS 36.321, TS 24.301, TS 36.331
Initial configuration	1. NB-IoT cell works well; 2. NB-IoT cell supports idle state eDRX (eDRX-Allowed-r13 within SystemInformationBlockType1 set to TRUE); 3. UE supports and enables eDRX.

Test procedure	1. UE is located at the cell coverage area, UE power on; 2. UE launches the attach procedure, “Attach Request” message should carry “Extend DRX parameters” IE to request Idle state eDRX; 3. Network replies with “Attach Accept” message which carries “Extend DRX parameters” to configure idle state eDRX, eDRX period is set to 2 HFN, PTW is set to 5.12s; “Attach Accept” message doesn’t carry “T3324 value” IE; 4. UE sends “Attach Complete” to accomplish the attach procedure; 5. Network releases RRC connection, UE enters RRD_IDLE state; 6. Launches downlink traffic , and starts to page UE; 7. UE responses to paging and starts to receive downlink data; 8. Network releases RRC connection; 9. UE powers off; 10. Network modifies eDRX parameters, eDRX period is set to 10 HFN, PTW is set to 10.24s; 11. Repeats step 1-9.
Check Point	1. Step2, check if “Attach Request” message carries “Extended DRX parameters” IE; 2. Step7, UE should receive paging message correctly and receive downlink data successfully.
Message Flow	

5.4 PSM simultaneous with eDRX

TC NO.	5.4
Test Case	PSM simultaneous with eDRX
Test Purpose	To verify if UE support PSM and eDRX simultaneously
Related specifications	TS 24.301
Initial configuration	1. NB-IoT cell works well; 2. NB-IoT cell supports idle state eDRX (eDRX-Allowed-r13 within SystemInformationBlockType1 set to TRUE); 3. UE supports and enables eDRX, PSM.
Test procedure	1. UE is located at the cell coverage area, UE power on; 2. UE launches the attach procedure, “Attach Request” message should carry “Extend DRX parameters” IE to request Idle state eDRX, carry “T3324 value” to request PSM; 3. Network replies with “Attach Accept” message containing “T3324 value” to configure PSM, T3324 value = 00100010(i.e. Active Time = 2min) , containing “Extend DRX parameters” to configure idle state eDRX, eDRX period is set to 2 HFN, the “T3324 value” (TAU period) should be longer than case execution time; 4. UE sends “Attach Complete” to accomplish the attach procedure; 5. Network releases RRC connection, UE enters RRC_IDLE state; 6. Launches downlink traffic during Active Time running phases(i.e. within 2 minutes after network release RRC connection), network pages UE; 7. UE responses to paging and starts to receive downlink data; 8. Network releases RRC connection, UE enters RRC_IDLE state; 9. Wait for 2 minutes(UE enters PSM already), launches downlink traffic; 10. UE has no any responses.
Check Point	1. Step2, UE applies for PSM and eDRX through “Attach Request” message; 2. Step7, UE should receive paging message correctly, and receive downlink data successfully;

	3. Step10, UE enters PSM, should have no response.
Message Flow	

5.5 Control Plane Data Transmission

TC NO.	5.5
Test Case	Control Plane Data Transmission
Test Purpose	To verify if UE support Control plane CIoT EPS optimization data transmission To verify if UE supports IPv4 and IPv6
Related specifications	TS 24.301, TS 36.331
Initial configuration	1. NB-IoT cell works well; 2. UE and network both support IPv4 and IPv6; 3. 6 combinations among 2 kinds of cell deployment types(Stand-alone and In-band) and 3 kinds of the subcarrier spacing (3.75kHz ST, 15kHz ST, 15kHz MT).
Test procedure	1. Scenario 1: UE and network both support stand-alone and 3.75kHz ST; 2. UE is located at the cell coverage area, UE power on; 3. UE sends “Attach Request” message to launch attach procedure; 4. Network replies with “Attach Accept” message which carries IPv4 address, the “EPS network feature support” IE carries “Control plane CIoT EPS optimization supported”, the “Additional update result” IE carries “control plane CIoT EPS optimization accepted” and “user plane CIoT EPS optimization not accepted”; 5. UE sends “Attach Complete” message to accomplish attach procedure, UE enter EMM-IDLE state; 6. Launches uplink traffic, UE sends “CONTROL PLANE SERVICE REQUEST” to trigger traffic request flow, and carries “EMM DATA TRANSPORT” containing user data; 7. UE goes back to EMM_IDLE state after it sends data completely; 8. Launches downlink traffic, network pages UE; 9. UE receives paging and responses with “CONTROL PLANE SERVICE REQUEST” to trigger traffic request flow, the message carries “mobile terminating request”; 10. Network sends “ESM DATA TRANSPORT” containing downlink data, UE receives downlink data successfully; 11. UE does detach procedure; 12. UE re-triggers attach procedure, set PDN type to IPv6, repeats step 2-11, at step4, the network carries IPv6 address; 13. Scenario 2: UE and network support stand-alone and 15kHz ST, repeats step 2-12; 14. Scenario 3: UE and network support stand-alone and 15kHz MT, repeats step 2-12; 15. Scenario 4: UE and network support In-band and 3.75kHz ST, repeats step 2-12; 16. Scenario 5: UE and network support In-band and 15kHz ST, repeats step 2-12; 17. Scenario 6: UE and network support In-band and 15kHz MT, repeats step 2-12.
Check Point	1. Step3, UE sends “Attach Request” message, the “Control plane CIoT EPS optimization support” value within “UE network Capability” IE should be set to 1, “Additional update type” is set to “control plane CIoT EPS optimization”(01); the PDN type within the “PDN CONNECTIVITY

	REQUEST" message is set to IPv4; 2. Step6, UE can transfer uplink data successfully on control plane; 3. Step9, UE can response to paging message and launch traffic request flow; 4. Step10, UE can receive downlink data successfully on control plane; 5. Step12, UE re-triggers attach procedure, the "PDN Type" within "PDN CONNECTIVITY REQUEST" message is IPv6.
Message Flow	

5.6 User Plane Data Transmission

TC NO.	5.6
Test Case	User Plane Data Transmission
Test Purpose	To verify if UE support user Plane CIoT EPS optimization data transmission, if UE supports IPv4 and IPv6
Related specifications	TS 24.301, TS 36.331
Initial configuration	1. NB-IoT cell works well; 2. UE and network both support IPv4 and IPv6; 3. 6 combinations among 2 kinds of cell deployment types(Stand-alone and In-band) and 3 kinds of the subcarrier spacing(3.75kHz ST, 15kHz ST, 15kHz MT).
Test procedure	1. Scenario 1: UE and network both support stand-alone and 3.75kHz ST; 2. UE is located at the cell coverage area, UE power on; 3. UE sends "Attach Request" message to launch attach procedure, the "User plane CIoT EPS optimization supported" set to 1; 4. Network replies with "Attach Accept" message which carries IPv4 address, "Control plane CIoT EPS optimization supported" and "User plane CIoT EPS optimization supported", the "Additional update result" IE carries "control plane CIoT EPS optimization not accepted" and "user plane CIoT EPS optimization accepted"; 5. UE sends "Attach Complete" message to accomplish attach procedure, and runs Suspend flow to enter EMM-IDLE state; 6. Launches uplink traffic on UE side, UE runs Resume flow to return to EMM-CONNECTED state, UE transfers data on user plane; 7. UE goes back to EMM_IDLE state after it sends data completely through Suspend flow; 8. Launches downlink traffic, network pages UE; 9. UE receives paging and returns to EMM-CONNECTED state through Resume flow, UE receives downlink data on user plane; 10. UE does detach procedure; 11. UE re-triggers attach procedure, and set PDN type to IPv6, repeats step 2-9, in step3, the network carries IPv6 address; 12. Scenario 2: UE and network support stand-alone and 15kHz ST, repeats step 3-11; 13. Scenario 3: UE and network support stand-alone and 15kHz MT, repeats step 3-11; 14. Scenario 4: UE and network support In-band and 3.75kHz ST, repeats step 3-11; 15. Scenario 5: UE and network support In-band and 15kHz ST, repeats step 3-11; 16. Scenario 6: UE and network support In-band and 15kHz MT, repeats step 3-11.

Check Point	1. Step3, UE sends “Attach Request” message, the “Control plane CIoT EPS optimization support” value and “User plane CIoT EPS optimization support” value within “UE network Capability” IE should both be set to 1, “Additional update type” is set to “user plane CIoT EPS optimization”(10); the PDN type within the “PDN CONNECTIVITY REQUEST” message is set to IPv4; 2. Step6, UE can transfer uplink data successfully on user plane; 3. Step9, UE can response to paging message and return to EMM-CONNECTED state ; 4. Step9, UE can receive downlink data successfully on user plane; 5. Step10, UE re-triggers attach procedure, the “PDN Type” within “PDN CONNECTIVITY REQUEST” message is IPv6.
Message Flow	

6 Performance Test

6.1 Delay

6.1.1 Delay of Access

TC NO.	6.1.1
Test Case	Delay of Access
Test Purpose	To measure the delay from UE Power on to the "Attach Complete"
Related specifications	TS 34.301
Initial configuration	1. NB-IoT cell works well; 2. Uplink Subcarrier Spacing support 3.75K ST, 15K ST and 15K MT.
Test procedure	1. Scenario 1: uplink subcarrier using the 3.75kHz ST; 2. Excellent points; 3. UE is in the coverage area of the test area, and power on the UE; 4. UE execute cell search, random access, RRC connection establishment and other attachment processes, UE registers to the cell; 5. Statistics the delay from UE Power on to the "Attach Complete"; 6. Power off UE with detach; 7. Repeat step 2-5, total test 10 times, record the delay of Access; 8. Repeat step 3-7 under a good point, a middle point, a poor point respectively. 9. Scenario 2: the uplink subcarrier using the 15kHz ST, repeating step 2-8; 10. Scenario 3: the uplink subcarrier using the 15kHz MT, repeating step 2-8.
Check Point	Step5, Measure the delay of access under different coverage.
Message Flow	

6.1.2 Delay of Uplink CP Data Transmission

TC NO.	6.1.2
Test Case	Delay of Uplink CP Data Transmission
Test Purpose	To measure the Delay of Uplink CP Data Transmission

Related specifications	TS 34.301 TS36.331
Initial configuration	1. NB-IoT cell works well; 2. Uplink Subcarrier Spacing support 3.75K ST, 15K ST and 15K MT.
Test procedure	1. Scenario 1: the uplink subcarrier using the 3.75kHz ST; 2. UL cases, excellent coverage point; UE and network settings for CP transmission; 3. UE is in the coverage area of the test area, and power on the UE; 4. UE completes the attachment process and enters the EMM-IDLE state; 5. UE triggers the uplink UDP data packet transmission (single packet 20 bytes). The UE starts the service request process by sending CONTROL PLANE SERVICE REQUEST, and carries ESM DATA TRANSPORT message and contains user data; 6. Statistics the delay from the trigger uplink UDP packet transmission to the network side receives the UDP packet delay. The uplink delay is defined as sending the service request from the UE side to the RLC ACK delay; 7. Repeat step 4- step 5, total test 10 times, record the uplink transmission delay; 8. Repeat step 3-7 under a good point, a middle point, a poor point respectively; 9. Scenario 2: the uplink subcarrier using the 15kHz ST, repeating step 2-8; 10. Scenario 3: the uplink subcarrier using the 15kHz MT, repeating step 2-8.
Check Point	Step8, Measure the uplink transmission delays under different coverage.
Message Flow	

6.1.3 Delay of Uplink UP Data Transmission

TC NO.	6.1.3
Test Case	Delay of Uplink UP Data Transmission
Test Purpose	To measure the Delay of Uplink UP Data Transmission
Related specifications	TS 34.301 TS36.331
Initial configuration	1. NB-IoT cell works well; 2. Uplink Subcarrier Spacing support 3.75K ST, 15K ST and 15K MT.
Test procedure	1. Scenario 1: the uplink subcarrier using the 3.75kHz ST; 2. UL cases, excellent coverage point; UE and network settings for UP transmission; 3. UE is in the coverage area of the test area, and power on the UE; 4. UE completes the attachment process and enters the EMM-IDLE state through “RRC suspend” process; 5. UE Triggers the uplink UDP packet transmission (single packet 20 bytes), and the UE returns to the EMM-CONNECTED state through the “RRC Resume” process, and transmits data through the user plane; 6. Statistics the delay from the trigger uplink UDP packet transmission to the network side receives the UDP packet delay. The uplink delay is defined as sending the service request from the UE side to the RLC ACK delay; 7. Repeat step 4- step 5, total test 10 times, record the uplink transmission delay; 8. Repeat step 3-7 under a good point, a middle point, a poor point respectively; 9. Scenario 2: the uplink subcarrier using the 15kHz ST, repeating step 2-8; 10. Scenario 3: the uplink subcarrier using the 15kHz MT, repeating step 2-8.

Check Point	Measure the uplink transmission delay under different coverage.
Message Flow	

6.1.4 Delay of Downlink CP Data Transmission

TC NO.	6.1.4
Test Case	Delay of Downlink CP Data Transmission
Test Purpose	To Measure the Delay of Downlink CP Data Transmission
Related specifications	TS 34.301 TS36.331
Initial configuration	1. NB-IoT cell works well.
Test procedure	1. DL cases, excellent coverage point; UE and network settings for CP transmission; 2. UE is in the coverage area of the test area, and power on the UE; 3. UE completes the attachment process and enters the EMM-IDLE state; 4. Network Triggers the downlink UDP packet transmission (single packet 20 bytes), Network paging UE; 5. UE receives the paging message and starts the service request flow through the reply CONTROL PLANE SERVICE REQUEST, which carries the "mobile terminating request"; 6. Network sends ESM DATA TRANSPORT, which carries the downlink data, and the terminal can receive the downlink data; 7. Statistics the delay from the trigger downlink UDP packet transmission to the UE side receives UDP packets, and the downlink delay is defined as the receipt of paging messages from the UE to RLC ACK; 8. UE completes the data transmission and enters the EMM-IDLE state; 9. Repeat step 4-8, total test 10 times, record the downlink transmission delay; 10. Repeat step 2-9 under a good point, a middle point, a poor point respectively.
Check Point	Measure the downlink transmission delay under different coverage.
Message Flow	

6.1.5 Delay of Downlink UP Data Transmission

TC NO.	6.1.4
Test Case	Delay of Downlink UP Data Transmission
Test Purpose	To measure the Delay of Downlink UP Data Transmission
Related specifications	TS 34.301 TS36.331
Initial configuration	1. NB-IoT cell works well.

Test procedure	1. DL cases, excellent coverage point; UE and network settings for CP transmission; 2. UE is in the coverage area of the test area, and power on the UE; 3. UE completes the attachment process and enters the EMM-IDLE state through “RRC suspend” process; 4. Network Triggers the downlink UDP packet transmission (single packet 20 bytes), Network paging UE; 5. UE receives the paging message and returns to the EMM-CONNECTED state through the “RRC Resume” process, and transmits data through the user plane; 6. Statistics the delay from the trigger downlink UDP packet transmission to the UE side receives UDP packets, and the downlink delay is defined as the receipt of paging messages from the UE to RLC ACK; 7. UE completes the data transmission and enters the EMM-IDLE state through “RRC suspend”; 8. Repeat step 4-7, total test 10 times, record the downlink transmission delay; 9. Repeat step 2-8 under a good point, a middle point, a poor point respectively.
Check Point	Measure the downlink transmission delay under different coverage.
Message Flow	

6.1.6 Delay of Cell Reselection

TC NO.	6.1.6
Test Case	Delay of Cell Reselection
Test Purpose	To measure delay of cell reselection
Related specifications	TS 36.331
Initial configuration	1. NB-IoT Cell A and Cell B work well, and the neighborhood relationship between two Cell is configured; 2. DL cases, test point 1 is Cell A good point; test point 2 is Cell B excellent point, test point 3 is Cell A poor point, test point 4 is Cell B middle point.
Test procedure	1. UE is at the Cell A test point 1, and Power on; 2. UE executes cell search, random access, RRC connection establishment and other attachment processes, UE register the Cell A; 3. Release the RRC link, UE is in the RRC_IDLE state; 4. Move UE from the test point 1 to test point 2; 5. Statistics the delay of UE reselection to the cell B, which is read from UE log (from synchronizing the Cell B, reading the broadcast message, until the SIB1 reads complete); 6. repeat step 4-5, total test 10 times, statistics good point average cell reselection delay; 7. Select test point 3 and test point 4, repeat step 1-6, and statistical poor point average cell reselection delay.
Check Point	1. Step 6, Statistics good point average cell reselection delay; 2. Step 7, Statistical poor point average cell reselection delay.
Message Flow	

6.2 Throughput

6.2.1 Uplink Throughput in Different Coverage

TC NO.	6.2.1
Test Case	Uplink Throughput in Different Coverage
Test Purpose	Test the terminal in the fixed-point scenario, the uplink throughput performance in different coverage
Related specifications	TS 24.301,TS 36.331
Initial configuration	1. NB-IoT cell works well; 2. The uplink subscribe spacing use 3.75kHz ST, 15kHz ST, 15kHz MT.
Test procedure	1. Scenario1:The uplink subscribe spacing using 3.75kHz ST; 2. UL cases, excellent coverage point 3. UE is in the coverage of the test area and complete attach procedure; 4. Trigger uplink UDP data transmission (single packet 50Byte), sending for 5 minutes. Calculate UDP receiving data rate at network side and BLER at UE side; 5. UE detach; 6. Repeat step3~5 under the good point, middle point and poor point, 7. Scenario2:The uplink subscriber spacing using 15kHz ST, repeat step2~6; 8. Scenario3:The uplink subscriber spacing using 15kHz MT, repeat step2~6.
Check Point	Measure uplink data rate and BLER under different coverage.
Message Flow	

6.2.2 Downlink Throughput in Different Coverage

TC NO.	6.2.2
Test Case	Downlink Throughput in Different Coverage
Test Purpose	Test the terminal in the fixed-point scenario, the downlink throughput performance in different coverage
Related specifications	TS 24.301,TS 36.331
Initial configuration	1. NB-IoT cell works well.
Test procedure	1. Choose excellent coverage point; 2. UE is in the coverage of the test area and complete attach procedure; 3. Trigger downlink UDP data transmission (single packet 50Byte), sending for 5 minutes. Calculate UDP receiving data rate at terminal side and BLER at network side; 4. UE detach; 5. Repeat step2~4 under the good point, middle point and poor point.
Check Point	Measure downlink data rate and BLER under different coverage.
Message Flow	