**3GPP TSG-RAN WG4 Meeting #116bis R4-2515055**

**Prague, Czech Republic, Oct. 13-17, 2025**

**Source:** Moderator (MediaTek inc.)

**Title:** Way Forward for [116bis][310] Rel-19 RRM performance\_Part2

**Document for:** Approval

# Introduction

This document is to capture all agreements for thread [116bis][310] NTN RRM performance part 2, including the following topics:

* Topic#1: RRM performance requirements for NR NTN Ku band (AI 5.10.2)
* Topic#2: NTN testing for NGSO (AI 6.6.3.2)
* Topic#3: RRM performance requirements for IoT NTN phase 3 (AI 6.20.3)
* Topic#4: RRM performance requirements for IoT-NTN TDD mode (AI 6.21.2)

# Topic# 1: NR NTN Ku band (AI 5.10.2)

#### **Issue 1-1-1: Measurement accuracy with new band**

*Moderator: this issue was treated online on Monday*

Agreement

* The legacy measurement accuracy requirements for Ka band NTN (FR2-NTN) shall be reused for Ku band with FR1 numerology and FR2 numerology.
* Introduce FR1 numerology in FR2-NTN accuracy requirements table.
* The following measurement accuracy requirements shall be considered:
  + Intra-frequency RSRP accuracy requirements
  + Inter-frequency RSRP accuracy requirements
  + Intra-frequency RSRQ accuracy requirements
  + Inter-frequency RSRQ accuracy requirements
  + Intra-frequency SINR accuracy requirements
  + Inter-frequency SINR accuracy requirements
  + L1-RSRP accuracy requirements
* FFS the band group to include Ku band

#### **Issue 1-2-1: test cases with new requirement**

*Moderator: this issue was treated online on Monday*

Agreement

* For Ku band with FR1 and FR2 numerology, introduce new test cases for hard and soft satellite switching for VSAT UEs

#### **Issue 1-2-2: UE transmit timing test for NGSO VSAT**

*Moderator: this issue was treated online on Monday*

Agreement

* Introduce NGSO configuration for transmit timing test case of a mobile VSAT.
  + Further discuss the need to emulate the mobility of the mobile NGSO VSAT UE.

#### **Issue 1-2-3: Test cases for Ku bands in FR2-NTN**

*Moderator: this issue was treated online on Monday*

Agreement

* For Ku bands in FR2-NTN, the existing test cases defined for FR2-NTN (in R18 for Ka band) are re-used, unless otherwise specified.
  + No explicit clarification is needed in the specification; by default, FR2-NTN test cases apply unless otherwise specified.

#### **Issue 1-2-4: Test cases for Ku bands in FR1-NTN**

*Moderator: this issue was treated online on Monday*

Further discuss the following options

* Option 1: reuse exiting test cases defined for SAN FR1
  + Add a table clarifying test applicability for the corresponding test cases for VSAT UEs.
  + Add OTA related parameters
* Option 2: reuse existing test cases defined for FR2-NTN, unless otherwise specified
  + Introduce a new configuration that corresponds to the reference channels used for FR1-NTN numerology.

#### **Issue 1-2-5: Test applicability and principle**

Tentative Agreement in AH

* The testing related to satellite access defined in A.3.36 with FR2 can be a reference.
* If mobile VSAT UE supports both GSO and NGSO, the GSO-based test cases can be skipped if the UE passes NGSO-based test cases.
* RAN4 to discuss the test applicability for VSAT supporting Ku bands in both FR1-NTN and FR2-NTN, if such VSAT exists.
  + Option 1: it is at least to pass two test configurations: one with FR1 numerology and one with FR2 numerology.
  + Other options are not precluded.

Topic# 2: NTN testing for NGSO (AI 6.6.3.2)

#### **Issue 2-1-1: R19 UL timing tests and test requirement impact**

*Moderator: this issue was treated online on Monday*

Agreement

* Apply the new FR1-NTN channel model for R19 UL transmit timing test cases
  + No impacts for the test procedure or test requirements; apply the following adaptation
    - Change the “Propagation condition” from “AWGN” to “AWGN with time varying Doppler and delay shifts”
    - Clarify that in test requirements is calculated based on the generated UL channel with time varying Doppler and delay shifts.
    - During the tests, UE position is needed to be added and set by AT command at the beginning of T1 or other suitable method. In successive time periods of different T, UE position should keep unchanged. The TE adds the NGSO channel model by itself.
  + Do not add new additional margins in the test case. Test tolerance is left for RAN5
* FFS applicability of the timing advance test and its additional margin

#### **Issue 2-2-1: Extend the applicability of the new channel model for the existing test cases**

WayForward

* Further discuss the options. Companies are encouraged to provide an analysis of the impact of RRM test cases.
  + Option 1: apply to only UL transmit timing test cases, per the current WID.
  + Option 2: apply to all NTN FR1 RRM tests.

#### **Issue 2-3-1: Applicability of the new channel model for pre-Rel-19 NTN UEs**

WayForward

* Further discuss the options
  + Option 1: not apply to pre-Rel-19 test cases
  + Option 2: apply to pre-Rel-19 test cases subject to DUT declaration

#### **Issue 2-3-2: Applicability of pre-Rel-19 static NTN channel model**

WayForward

* This is pending due to Issue 2-2-1

Topic# 3: Testing for CB-Msg3-EDT (AI 6.20.3)

#### **Issue 3-1-1: Test purpose**

Tentative Agreement in AH

* The RAN4 test case for CB-Msg3 shall test the following functionalities:

a. Reception of an incorrect message over CB-RNTI

b. Reception of a correct message of CB-RNTI

c. No CB-Msg3 response within CB-Ms3ResponseTimer

d. The calculated UE Tx power at every CB-Msg3 retransmission according to the respective formula

e. FFS The right amount of transmission of replicas.

#### **Issue 3-1-2: Test configuration for CB-Msg3-EDT**

Tentative Agreement in AH

* The CB-Msg3-EDT configuration, as configured in CB-Msg3-ConfigSIB-NB-r19 should be provided.
* The legacy RSRP threshold used in the random access test can be reused for cb-Msg3-MinRSRP-Threshold-NB-r19.

#### **Issue 3-1-3: Test configuration for HARQ**

Tentative Agreement in AH

* The HARQ feedback upon reception of Msg4 shall be configured in the configuration of gNB parameters in the test case.

#### **Issue 3-1-4: Ensure CB-MSG3 transmission**

WayForward

* Leave the decision to R5

Topic# 4: IoT-NTN TDD mode (AI 6.21.2)

#### **Issue 4-1-1: Introduction of new band group**

*Moderator: this issue was treated online on Tuesday*

Agreement

* Band groups for NB-IoT for satellite access in Table 3.5.1A-1 shall be updated to include NTN TDD band 249 as follows:
* Table 3.5.1A-1: Band groups for NB-IoT for satellite access

|  |  |  |
| --- | --- | --- |
| Group | E-UTRA FDD | |
|  | Band group notation | Operating bands |
| A | NFDD\_SAB\_A |  |
| B | NFDD\_SAB\_B |  |
| C | NFDD\_SAB\_C |  |
| D | NFDD\_SAB\_D |  |
| E | NFDD\_SAB\_E |  |
| F | NFDD\_SAB\_F |  |
| G | NFDD\_SAB\_G | 253, 254, 255, 256 |
| H | NFDD\_SAB\_H |  |
| I | NFDD\_SAB\_I |  |
| J | NFDD\_SAB\_J |  |
| K | NFDD\_SAB\_K |  |
| L | NFDD\_SAB\_L |  |
| M | NFDD\_SAB\_M |  |
| N | NFDD\_SAB\_N |  |
| X | NTDD\_SAB\_N | 249 |

* Update Annex B.3.25A to include IoT NTN TDD band 249 and if required with different minimum NRSRP value as follows:
* **Table B.3.25A-1: NB-IoT intra-frequency absolute NRSRP and NRSRQ Accuracy Requirements**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **E-UTRA/NR operating band groups Note 1** | **Minimum NRSRP** |
| **dBm/15kHz** |
| **Conditions** | NFDD\_SAB \_G | -139.8 |
|  | NTDD\_SAB\_X | FFS |
| NOTE 1: E-UTRA/NR operating band groups are as defined in Section 3.5. | | |

#### **Issue 4-1-2: Measurement accuracy – General**

Tentative Agreement in AH

* RAN4 to define accuracy requirements for NRSRP, NRSRQ and downlink channel quality report.
* RAN4 to consider adding section 9.1.22X (based on the existing 9.1.22A) with updated side conditions and band groups.
* ~~measurement accuracy requirements apply, provided at least [1] DL subframe per 9 radio frame of measured cell is available at the UE for NRSRP/NRSRQ measurements assuming measured cell is identified cell.~~

#### **Issue 4-1-3: Measurement accuracy – Detail**

*Moderator: this issue was treated online on Tuesday*

Agreement

* RAN4 to consider introducing intra frequency absolute NRSRP accuracy requirement for IoT NTN TDD as follows:

**Table 9.1.22X.1-1: NRSRP Intra frequency absolute accuracy for UE Category NB1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | | |
| **Normal condition** | **Extreme condition** | **Ês/Iot** | **Io Note 1 range** | | | |
| **E-UTRA/NR operating band groups Note 2** | **Minimum Io** | | **Maximum Io** |
| **dB** | **dB** | **dB** |  | **dBm/15kHz** | **dBm/BWChannel** | **dBm/BWChannel** |
| ±6 | ±9 | ≥-1 dB | NTDD\_SAB\_X | -122.9 | N/A | -70 |
| ±8 | ±11 | ≥-1 dB | NTDD\_SAB\_X | N/A | -70 | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: E-UTRA/NR operating band groups are as defined in Section 3.5. | | | | | | |

* RAN4 to consider introducing intra frequency absolute NRSRQ accuracy requirement for IoT NTN TDD as follows:

**Table 9.1.22X.2-1: NRSRQ Intra frequency absolute accuracy for UE Category NB1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | |
| **Normal condition** | **Extreme condition** | **Ês/Iot** | **Io Note 1 range** | | |
| **E-UTRA/NR operating band groups Note 3** | **Minimum Io** | **Maximum Io** |
| **dB** | **dB** | **dB** |  | **dBm/15kHz** | **dBm/BWChannel** |
| ±5.2 | ±8.2 | ≥ -1 dB~~-3 dB~~ | NTDD\_SAB\_X | -122.9 | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.  NOTE 3: E-UTRA/NR operating band groups are as defined in Section 3.5. | | | | | |

* RAN4 to consider adding inter frequency absolute NRSRP accuracy requirement for IoT NTN TDD as follows:

**Table 9.1.22X.3-1: NRSRP Inter frequency absolute accuracy for UE Category NB1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | | |
| **Normal condition** | **Extreme condition** | **Ês/Iot** | **Io Note 1 range** | | | |
| **E-UTRA/NR operating band groups Note 2** | **Minimum Io** | | **Maximum Io** |
| **dB** | **dB** | **dB** |  | **dBm/15kHz** | **dBm/BWChannel** | **dBm/BWChannel** |
| ±6 | ±9 | ≥-1 dB ~~-6 dB~~ | NTDD\_SAB\_X | -122.9 | N/A | -70 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: E-UTRA/NR operating band groups are as defined in Section 3.5. | | | | | | |

* RAN4 to consider inter frequency inter frequency absolute NRSRPQ accuracy requirement for IoT NTN TDD as follows:

**Table 9.1.22X.4-1: NRSRQ Inter frequency absolute accuracy for UE Category NB1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | |
| **Normal condition** | **Extreme condition** | **Ês/Iot** | **Io Note 1 range** | | |
| **E-UTRA/NR operating band groups Note 3** | **Minimum Io** | **Maximum Io** |
| **dB** | **dB** | **dB** |  | **dBm/15kHz** | **dBm/BWChannel** |
| ±5.2 | ±8.2 | ≥-1 dB~~-3 dB~~ | NTDD\_SAB\_X | -122.9 | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.  NOTE 3: E-UTRA/NR operating band groups are as defined in Section 3.5. | | | | | |

* RAN4 to consider introducing downlink channel quality reporting accuracy requirement for IoT NTN TDD as follows:

**Table 9.1.22X.8-1: Downlink channel quality reporting accuracy for UE Category NB1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **NPDCCH Repetition** | **Pm-Dsg (%)** | **Conditions** | | | | |
| **Ês/Iot** | **Io NOTE 1 range** | | | |
| **E-UTRA/NR operating band groups NOTE 2** | **Minimum Io** | | **Maximum Io** |
|  | **dB** |  | **dBm/15kHz** | **dBm/BWChannel** | **dBm/BWChannel** |
| R NOTE 1 | ≤1 | ≥ -1 dB~~-6 dB~~ | NTDD\_SAB\_X | -122.9 | N/A | -70 |
| R/4 NOTE 1 | >1 | ≥ -1 dB ~~-6 dB~~ | NTDD\_SAB\_X | -122.9 | N/A | -70 |
| NOTE 1: R is the reported NPDCCH repetition level that UE has reported in CQI-NPDCCH-NB or CQI-NPDCCH-Short-NB.  NOTE 2: Io is assumed to have constant EPRE across the bandwidth.  NOTE 3: E-UTRA/NR operating band groups are as defined in Section 3.5. | | | | | | |

* ~~Companies are encouraged to provide simulation results, for the accuracy range shown in brackets.~~

#### **Issue 4-1-4: Measurement report mapping**

Tentative Agreement in AH

* The existing NRSRP, NRSRQ, and msg3-based measurement report mapping can be re-used for IoT NTN TDD mode without modification.

#### **Issue 4-1-5: PHR requirement**

Tentative Agreement in AH

* UE power class 6 should be excluded from the power headroom performance requirements for IoT NTN TDD mode.
* The power headroom performance requirements specified for UE category NB1 for satellite access in section 9.1.23A shall also apply to IoT NTN TDD mode.

#### **Issue 4-2-1: Updated Reference Channel**

Tentative Agreement in AH

* For UE category NB1 operating in IoT NTN TDD mode,
  + Update the NPDSCH reference channel based on Table A.3.1.5.3.1 as follows:

Table X.3.1.5.3-1: NPDSCH Reference Channel for UE category NB1 for standalone operation

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | |
| NPDSCH Reference channel | - | R.18 HD-FDD | R.19 HD-FDD |
| Channel bandwidth | KHz | 200 | 200 |
| Number of transmitter antennas | - | 1 | 2 |
| Allocated subframes per Radio Frame | subframes | Note 1 | Note 1 |
| Modulation |  | QPSK | QPSK |
| Target coding rate |  | 1/3 | 1/3 |
| Information Bit Payload |  |  |  |
| For Sub-Frame ~~1, 2~~, 3, 6, 7, 8 | Bits | 72 Note 2 | 72 Note 2 |
| For Sub-Frame 4, 9 | Bits | Note 3 | Note 3 |
| For Sub-Frame 0, 5 | Bits | 0 | 0 |
| Number of Code Blocks per Sub-Frame |  |  |  |
| For Sub-Frame 1, 2, 3, 6, 7, 8 |  | 1 Note 4 | 1 Note 4 |
| For Sub-Frame 4, 9 |  | Note 5 | Note 5 |
| For Sub-Frame 0, 5 |  | 0 | 0 |
| Maximum number of repetitions | - | Note 6 | Note 6 |
| Cell ID | - | Note 7 | Note 7 |
| Note 1: Shall depend upon the NPDSCH scheduling  Note 2: Only apply for subframes scheduled with NPDSCH.  Note 3: 72 for subframes scheduled with NPDSCH when mod 2 ≠ 0. Otherwise 0.  Note 4: only apply for subframes scheduled with NPDSCH..  Note 5: 1 for subframes scheduled with NPDSCH when mod 2 ≠ 0. Otherwise 0.  Note 6: Maximum number of repetitions shall depend upon the test configuration.  Note 7: Cell ID shall depend upon the test configuration. | | | |

* + The existing NPDCCH reference channel parameters specified for NB-IoT NTN FDD for standalone mode can also be applicable for IoT NTN TDD mode
  + Update the OCNG parameters based on Table A.3.2.3.3.1 as follows:

Table X.3.2.3.3-1: NOP.3 FDD: OCNG FDD Pattern 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Allocation** | **Relative power level  [dB]** | | | **NPDCCH and NPDSCH**  **Data** |
| **Subframe** | | |
| 0, 4 | 5, 9 | ~~1-~~3, 6-8 |
| 0 | 0 (Note 2) | 0 (Note 2) | 0 | Note 1 |
| Note 1: This physical resource block is assigned to a virtual UE for transmission of NPDCCH or NPDSCH; the data transmitted over the NOCNG NPDCCH or NPDSCH shall be uncorrelated QPSK modulated pseudo random data. The parameter is used to scale the power of NPDCCH and NPDSCH. If two transmit antennas with NBRS are used in the test, the NPDCCH and NPDSCH parts of NOCNG shall be transmitted to the virtual users by both transmit antennas with NBRS and according to the antenna transmission mode 2. The parameter applies to each antenna port separately, so the transmit power of the NPDCCH and NPDSCH parts of NOCNG is equal between both the transmit antennas with NBRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.  Note 2: Value of is applicable to PRBs not used for transmission of NPSS, NSSS and NPBCH in anchor cell (= 0).  Note 3: SI transmissions, and NPDCCH and NPDSCH for the UE under test, have precedence over NOCNG. | | | | |

* + Update the NPRACH reference configurations based on Table A.3.18-1 as follows:

Table X.3.18-1: NPRACH.R-1: HD-FDD Reference NPRACH Configuration

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Field | Value | | | Comment | |
| Parameters not per NPRACH coverage level | | | | | |
| rsrp-ThresholdsPrach | {rsrp1, rsrp2} | | | The values of NPRACH RSRP thresholds for will be set according the requirement of individual test cases | |
| nprach-CP-Length | us66dot7 | | | NPRACH format 0 | |
| Parameters per NPRACH coverage Level | | | | | |
| *CE Level* | *Level 0* | *Level 1* | *Level 2* | | Valid values as defined in TS 36.331 [2] | |
| nprach-Periodicity | ms640~~ms40~~ | ms640~~ms40~~ | FFS ~~ms40~~ | | {ms40, ms80, ms160, ms240, ms320, ms640, ms1280, ms2560} | |
| nprach-StartTime | ms8 | ms8 | ms8 | | {ms8, ms16, ms32, ms64, ms128, ms256, ms512, ms1024} | |
| nprach-SubcarrierOffset | n0 | n0 | n0 | | {n0, n12, n24, n36, n2, n18, n34} | |
| nprach-NumSubcarriers | n12 | n12 | n12 | | {n12, n24, n36, n48} | |
| nprach-SubcarrierMSG3-RangeStart | {one} | {one} | {one} | | {zero, oneThird, twoThird, one} | |
| maxNumPreambleAttemptCE | n3 | n5 | n7 | | {n3, n4, n5, n6, n7, n8, n10} | |
| numRepetitionsPerPreambleAttempt | n1 | n8 | n16~~n32~~ | | {n1, n2, n4, n8, n16, n32, n64, n128} | |
| npdcch-NumRepetitions-RA | r1 | r8 | r16~~r32~~ | | {r1, r2, r4, r8, r16, r32, r64, r128, r256, r512, r1024, r2048} | |
| npdcch-StartSF-CSS-RA | v64~~v8~~ | v32~~v2~~ | V64~~v2~~ | | {v1dot5, v2, v4, v8, v16, v32, v48, v64} | |
| npdcch-Offset-RA | zero | zero | zero | | {zero, oneEighth, oneFourth, threeEighth} | |
| nprach-NumCBRA-StartSubcarriers | n8 | n8 | n8 | | {n8, n10, n11, n12, n20, n22, n23, n24, n32, n34, n35, n36, n40, n44, n48} | |
| Note 1: See Clause 6.7.3.2 in TS 36.331 [2] for further information on the parameters in this table. | | | | | |

#### **Issue 4-2-2: Test case list**

*Moderator: this issue was treated online on Monday*

Agreement

* Following list of test cases from the existing NB-IoT NTN FDD mode are applicable for IoT NTN TDD:

|  |  |
| --- | --- |
| Test case | Description |
| Re-selection | A.13.1.1.1 HD – FDD and IoT NTN TDD Intra frequency case for UE Category NB1 Standalone mode in normal coverage  A.13.1.1.3 HD – FDD and IoT NTN TDD Intra frequency case for UE Category NB1 Standalone mode in normal coverage with UE specific DRX |
| A.13.1.1.4 HD – FDD and IoT NTN TDD Inter frequency case for UE Category NB1 Standalone mode in normal coverage with UE specific DRX |
| RRC Re-establishment | A.13.3.1.1 HD-FDD and IoT NTN TDD Intra-frequency RRC Re-establishment for UE category NB1 in Standalone mode under normal coverage |
| Random Access | A.13.3.2.1 Contention Based Random Access Test for UE category NB1 UEs in Satellite Access - Standalone mode in normal coverage |
| UE transmit timing | A.13.4.1.1 E-UTRAN HD-FDD and IoT NTN TDD – UE Transmit Timing Accuracy Tests for Category NB1 UE Standalone mode under normal coverage for Satellite Access |
| Timing Advance | A.13.4.2.1 HD-FDD and IoT NTN TDD UE Timing Advance Adjustment Accuracy Test for UE Category NB1 in Standalone Mode under Normal Coverage for Satellite Access |
| Radio Link Monitoring | A.13.4.3.1 HD-FDD and IoT NTN TDD Radio Link Monitoring Test for Out-of-sync in DRX for UE category NB1 Standalone mode in normal coverage  A.13.4.3.4 HD-FDD and IoT NTN TDD Radio Link Monitoring Test for In-sync with DRX for UE Category NB1 Standalone mode in Normal Coverage  A.13.4.3.5 HD-FDD and IoT NTN TDD Radio Link Monitoring Test for In-sync without DRX for UE Category NB1 Standalone mode in Normal Coverage  A.13.4.3.7 HD-FDD and IoT NTN TDD Radio Link Monitoring Test for Out-of-sync without DRX for UE Category NB1 Standalone mode in Normal Coverage |
| Measurements | A.13.5.1 HD-FDD and IoT NTN TDD Intra-frequency neighbour cell measurement for UE category NB1 in standalone mode under normal coverage for Satellite Access |
| A.13.5.2 HD-FDD and IoT NTN TDD Inter-frequency neighbour cell measurement for UE category NB1 in standalone mode under normal coverage for Satellite Access |
| A.13.5.3 HD-FDD and IoT NTN TDD Intra-frequency location-based neighbour cell measurement for UE category NB1 in standalone mode under normal coverage for Satellite Access |
| Downlink channel quality reporting accuracy | A.13.6.2.1 E-UTRAN HD-FDD and IoT NTN TDD Downlink channel quality reporting accuracy for UE Category NB1 Standalone mode under normal coverage  A.13.6.2.3 E-UTRAN HD-FDD and IoT NTN TDD Downlink channel quality reporting accuracy on non-anchor carrier for UE Category NB1 Standalone mode under normal coverage  A.13.6.2.5 E-UTRAN HD-FDD and IoT NTN TDD Downlink channel quality reporting accuracy in **RRC\_CONNECTED** for UE Category NB1 Standalone mode under normal coverage |

#### **Issue 4-2-3: Test configuration - General**

*Moderator: this issue was treated online on Tuesday*

Agreement

* Only NGSO configuration is applicable.
* For existing NB-IoT NTN test cases, create a new test configuration with the new reference channel models and reuse the test description. The test requirements when the new configuration is used might be adapted to reflect the agreements of the core requirements.

#### **Issue 4-2-4: Principle of testing TDD and FDD frame structure**

WayForward

* Further discuss the principle of testing TDD and FDD frame structure.
  + Option 1: A UE capable of both TDD and FDD, the UE is required to pass either TDD or FDD per the DUT’s declaration.
  + Option 2: define a test case list to be tested for each configuration for the UE that supports both TDD and FDD frame structures
  + Other options are not precluded.

#### **Issue 4-2-5: Test configuration for random access test**

*Moderator: this issue was treated online on Tuesday*

Agreement

* Update the NPRACH procedure test configuration parameters, based on Table A.13.3.2.1.1-2.
* FFS the suitable values.
* FFS the applicable CE level in this test case

Table X.13.3.2.1.1-3: NPRACH-Configuration parameters for HD-FDD contention based random access test for UE category NB1 Standalone mode in Normal Coverage

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Field** | **Value** | | | | **Comment** | |
| **Parameters not per NPRACH resource** | | | | | | |
| RSRP-ThresholdsNPRACH-InfoList | {39, 24} | | | | Corresponding to {-101, -116} dBm as defined in Table 9.1.4-1 | |
| nprach-CP-Length | us66dot7 | | | |  | |
| nrs-Power | -5 dBm/15 kHz | | | | As defined in clause 6.7.3 in TS 36.331. | |
| Backoff Parameter Index | 1 | | | | As defined in table 7.2-2 in TS 36.321 | |
| Configured UE transmitted power () | 23 dBm for power class 3,  20 dBm for power class 5 | | | | As defined in clause 6.2B.4 in TS 36.102 | |
| powerRampingStep | dB2 | | | |  | |
| preambleInitialReceivedTargetPower | dBm-112 | | | |  | |
| preambleTransMax-CE | n6 | | | |  | |
| **Parameters per NPRACH Resource** | | | | | | |
| ***NPRACH Resource*** | ***Level 0*** | ***Level 1*** | ***Level 2*** |  | |
| nprach-Periodicity | ~~ms40~~ | ~~ms240~~ | ~~ms1280~~ |  | |
| nprach-StartTime | ms8 | ms64 | ms512 |  | |
| nprach-SubcarrierOffset | n0 | n0 | n0 |  | |
| nprach-NumSubcarriers | n12 | n12 | n12 |  | |
| nprach-SubcarrierMSG3-RangeStart | zero | zero | zero |  | |
| maxNumPreambleAttemptCE | n3 | n6 | n10 |  | |
| numRepetitionsPerPreambleAttempt | n2 | n8 | n64 |  | |
| npdcch-NumRepetitions-RA | ~~r4~~ | ~~r16~~ | ~~r128~~ |  | |
| npdcch-StartSF-CSS-RA | ~~v1dot5~~ | ~~v1dot5~~ | ~~v1dot5~~ |  | |
| npdcch-Offset-RA | zero | zero | Zero |  | |
| nprach-NumCBRA-StartSubcarriers | n8 | n8 | n8 |  | |
| ra-ResponseWindowSize (per NPRACH Resource) | ~~pp2~~ | ~~pp2~~ | ~~pp2~~ |  | |
| mac-ContentionResolutionTimer (per NPRACH Resource) | ~~pp8~~ | ~~pp8~~ | ~~pp8~~ |  | |
| Note 1: See Clause 6.7.3 in TS 36.331 for further information on the parameters in this table. | | | | | | |

#### **Issue 4-2-6: Test configuration for timing test**

Tentative Agreement in AH

* Update the timing advance accuracy test configuration parameters, based on Table A.13.4.2.1.1-2.
* FFS the suitable values.
* FFS the applicable CE level in this test case

Table X.13.4.2.1.1-2: General Test Parameters for E-UTRAN Timing Advance Accuracy Test for UE Category NB1 in Standalone Mode under Normal Coverage for Satellite Access

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| NB-IoT operational mode | |  | Standalone |  |
| CP Length | |  | Normal |  |
| Satellite information | Config 1 |  | SSC.1 |  |
| Config 2 |  | SSC.2 |  |
| Timing Advance Command (*TA*) value during T1 | |  | 31 | *NTA* = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2 |
| Timing Advance Command (*TA*) value during T2 | |  | 39 | *NTA* = 128 |
| Number of repetitons | NPDCCH |  | ~~128~~ | Smaller repetition values for NTN TDD |
| NPDSCH |  | ~~128~~ |  |
| NPUSCH |  | ~~32~~ |  |
| DRX | |  | OFF |  |
| T1 | | s | 5 |  |
| T2 | | s | 5 |  |

#### **Issue 4-2-7: Test configuration for RLM test**

*Moderator: this issue was treated online on Tuesday*

Agreement

* RAN4 to discuss the Qin and Qout for RLM test cases based on Rmax =2.

Appendix – CR work split

# Topic# 1: NR NTN Ku band (AI 5.10.2)

|  |  |  |
| --- | --- | --- |
| Test case | Description | Volunteer |
| hard and soft satellite switching for VSAT UEs | Introduce new test cases, including FR1 and FR2 numerology | ZTE Corporation, Sanechips |
| Other RRM test cases | for Ku bands in FR1-NTN | Nokia |

Topic# 2: NTN testing for NGSO (AI 6.6.3.2)

|  |  |  |
| --- | --- | --- |
| Test case | Description | Volunteer |
| NR NTN timing test | 38.133 | Xiaomi |
| IoT NTN timing test | 36.133 | Samsung |

Topic# 3: Testing for CB-Msg3-EDT (AI 6.20.3)

|  |  |  |
| --- | --- | --- |
| Test case | Description | Volunteer |
| Random Access  (A.13.3.2) | A.13.3.2.X1 Contention Based Random Access Test for UE category NB1 UEs in Satellite Access - Standalone mode in normal coverage for CB-msg3-EDT | MTK |

Topic# 4: IoT-NTN TDD mode (AI 6.21.2

|  |  |
| --- | --- |
| Description | Volunteer |
| Measurement accuracy | Cambridge Consultants Ltd |
| RMC |

|  |  |  |
| --- | --- | --- |
| Test case | Description | Volunteer |
| Re-selection | A.13.1.1.1 HD – FDD and IoT NTN TDD Intra frequency case for UE Category NB1 Standalone mode in normal coverage  A.13.1.1.3 HD – FDD and IoT NTN TDD Intra frequency case for UE Category NB1 Standalone mode in normal coverage with UE specific DRX | Nokia |
| A.13.1.1.4 HD – FDD and IoT NTN TDD Inter frequency case for UE Category NB1 Standalone mode in normal coverage with UE specific DRX |
| RRC Re-establishment | A.13.3.1.1 HD-FDD and IoT NTN TDD Intra-frequency RRC Re-establishment for UE category NB1 in Standalone mode under normal coverage | MTK |
| Random Access | A.13.3.2.1 Contention Based Random Access Test for UE category NB1 UEs in Satellite Access - Standalone mode in normal coverage |
| UE transmit timing | A.13.4.1.1 E-UTRAN HD-FDD and IoT NTN TDD – UE Transmit Timing Accuracy Tests for Category NB1 UE Standalone mode under normal coverage for Satellite Access | ZTE Corporation, Sanechips |
| Timing Advance | A.13.4.2.1 HD-FDD and IoT NTN TDD UE Timing Advance Adjustment Accuracy Test for UE Category NB1 in Standalone Mode under Normal Coverage for Satellite Access |
| Radio Link Monitoring | A.13.4.3.1 HD-FDD and IoT NTN TDD Radio Link Monitoring Test for Out-of-sync in DRX for UE category NB1 Standalone mode in normal coverage  A.13.4.3.4 HD-FDD and IoT NTN TDD Radio Link Monitoring Test for In-sync with DRX for UE Category NB1 Standalone mode in Normal Coverage  A.13.4.3.5 HD-FDD and IoT NTN TDD Radio Link Monitoring Test for In-sync without DRX for UE Category NB1 Standalone mode in Normal Coverage  A.13.4.3.7 HD-FDD and IoT NTN TDD Radio Link Monitoring Test for Out-of-sync without DRX for UE Category NB1 Standalone mode in Normal Coverage |  |
| Measurements | A.13.5.1 HD-FDD and IoT NTN TDD Intra-frequency neighbour cell measurement for UE category NB1 in standalone mode under normal coverage for Satellite Access | Huawei |
| A.13.5.2 HD-FDD and IoT NTN TDD Inter-frequency neighbour cell measurement for UE category NB1 in standalone mode under normal coverage for Satellite Access |
| A.13.5.3 HD-FDD and IoT NTN TDD Intra-frequency location-based neighbour cell measurement for UE category NB1 in standalone mode under normal coverage for Satellite Access |
| Downlink channel quality reporting accuracy | A.13.6.2.1 E-UTRAN HD-FDD and IoT NTN TDD Downlink channel quality reporting accuracy for UE Category NB1 Standalone mode under normal coverage  A.13.6.2.3 E-UTRAN HD-FDD and IoT NTN TDD Downlink channel quality reporting accuracy on non-anchor carrier for UE Category NB1 Standalone mode under normal coverage  A.13.6.2.5 E-UTRAN HD-FDD and IoT NTN TDD Downlink channel quality reporting accuracy in **RRC\_CONNECTED** for UE Category NB1 Standalone mode under normal coverage |  |