**3GPP TSG RAN meeting #95-e RP-220132**

**Electronic Meeting, March 17th -23rd, 2022** *rev from**RP-212803*

## Status Report to TSG

**Agenda item:** 9.5.2.2 - Solutions for NR to support NTN [RAN2 WI: NR\_NTN\_solutions]

|  |  |
| --- | --- |
| **WI / SI Name** | Solutions for NR to support non-terrestrial networks (NTN) |
| included in this status report | Study Item: No | Core part: Yes | Performance part:Yes | Testing part:- |
| **Acronym** | NR\_NTN\_solutions |
| **Unique ID** | 860046 |
| **TSG Tdoc of latest approved WI/SI description (if any)** | RP-213691 |
| **Target Completion Date****(indicate if changed)** | Study Item: - | Core part: 03/2022 -> 06/2022 | Performance part: 09/2022 | Testing part: - |
| **Overall Completion level** | Study Item: - | Core part: Overall: 90% RAN1: 100%RAN2: 100%RAN3: 100% RAN4: 85% | Performance Part: Overall: 0% RAN4: 0% | Testing part: - |

Note: Overall completion level percentage numbers should use one of the colors below:

* xx%: Normal progress, no RAN plenary action needed
* xx%: Progress behind schedule, may need RAN plenary intervention. If so, SR should clearly define requested action
* xx%: Progress critically behind, RAN plenary shall intervene. SR should define requested action

**Source:**

|  |  |
| --- | --- |
| **Leading WG** | RAN2 |
| **Rapporteur** | **Name** | Nicolas Chuberre |
| **Company** | Thales |
| **Email** | nicolas.chuberre@thalesaleniaspace.com |

## 1 Work plan related evaluation

|  |  |
| --- | --- |
| **Do you want to modify the time budget for this WI/SI compared to what was endorsed at the last RAN meeting?** | No |

*If you answered No: Then please remove the Excel file from the zip file of this status report.*

*If you answered Yes: Then please fill out the attached Excel template to request a modification of the time budgets for your WI /SI. The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI. The basis are the endorsed time budgets of the last RAN meeting. Please highlight all changes of the values.
 One time unit (TU) corresponds to ~ 2 hours in the meeting.
 If this status report covers a WI with Core and Performance part, then please have one line for each in the attached Excel table.
 Note: If no Excel table is attached, then this means no time budget change.*

**Additional explanations/motivations for the time budget changes in the attached Excel table:**

See exception sheet submitted for RAN4 activities

## 2. Detailed progress in RAN WGs since last TSG meeting (for all involved WGs)

 NOTE: Agreements and Open issues impacted cross-TSG aspects shall be explicitly highlighted

## 2.1 RAN1

#### 2.1.1 Agreements

* **RAN1#108-e, 21st February – 3rd March 2022, e-meeting**

[General]

Agreements on “Timing relationship enhancements”:

**Agreement**

Adopt the following TP for instances of “$K\_{cell,offset}$ is provided by *Koffset* in *ServingCellConfigCommon*” TS38.213: “where $K\_{cell,offset}$ is provided by *CellSpecific\_Koffset”*

**Agreement**

Adopt the following TP for Section 6.2.1 of TS38.214:



**Agreement**

In TS38.213 sections 8.2 and 8.2A, make the following change:

“If$N\_{TA,adj}^{UE}$or$N\_{TA,adj}^{common}$ as specified in [TS38.211 clause 4.3.1] is different from zero, the window starts after an additional $T\_{TA}+k\_{mac}$ msec …”

**Conclusion**

The additional delay introduced for the starts of *ra-ResponseWindow* and *msgB-ResponseWindow* should only apply to NTN. Continue discussion on a TP to TS38.213 sections 8.2 and 8.2A, such as:

“If$N\_{TA,adj}^{UE}$or$N\_{TA,adj}^{common}$ is different from zero, the window starts after an additional $T\_{TA}+k\_{mac}$ msec …”

**Conclusion**

Update of K\_mac with MAC CE is not supported in Rel-17 NTN.

**Conclusion**

The size of the PDSCH-to-HARQ\_feedback timing indicator field in DCI is not extended when the range of the K1 value is extended in Rel-17 NTN

**Conclusion**

K\_offset is not introduced for type 1 configured grant in Rel-17 NTN.

**Conclusion**

Beam-specific K\_offset is not supported for initial access in Rel-17 NTN.

**Conclusion**

Regarding the delay between PDCCH reception and application of new PUCCH beam, “28 symbols” is the absolute time between the time UE receives PDCCH and the time UE applies new PUCCH beam.

Text Proposal TP#3B (for 38.213, Clause 9) in section 11.2 of R1-2202811 is endorsed.

Text Proposal TP#9C (for 38.214, Clause 5.1.4.2) in section 11.7 of R1-2202811 is endorsed.

Text Proposal TP#10C (for 38.214, Clause 5.1.5) in section 11.8 of R1-2202811 is endorsed.

Text Proposal TP#11C (for 38.214, Clause 5.2.1.5.1) in section 11.9 of R1-2202811 is endorsed.

Text Proposal TP#12C (for 38.214, Clause 5.2.1.5.2) in section 11.10 of R1-2202811 is endorsed.

**Agreement**

Adopt the following TP for Section 5.2.2.5 of TS38.214:

--- Start of TP ---

5.2.2.5          CSI reference resource definition

The CSI reference resource for a serving cell is defined as follows:

-    In the frequency domain, the CSI reference resource is defined by the group of downlink physical resource blocks corresponding to the band to which the derived CSI relates.

-    In the time domain, the CSI reference resource for a CSI reporting in uplink slot *n'* is defined by a single downlink slot$n-n\_{CSI\\_ref}-K\_{offset}⋅\frac{2^{μ\_{DL}}}{2^{μ\_{K\_{offset}}}}$*,* ~~if UE is configured with the higher layer parameter~~ *~~CellSpecific\_Koffset,~~ ~~n~~*~~-~~*~~n~~~~CSI\_ref~~*~~, ,~~ where $K\_{offset}$ is a parameter configured by higher layer as specified in [TS 38.213 clause 4.2], and where $μ\_{K\_{offset}}$is the subcarrier spacing configuration for $K\_{offset}$ with a value of 0 for frequency range 1, ~~otherwise,~~

*~~-~~* $K\_{offset}$ ~~is provided with a value of ms for frequency range 1 and is equal to~~ *~~CellSpecific\_Koffset - UESpecific\_Koffset~~* ~~if~~ *~~UESpecific\_Koffset~~* ~~is provided in MAC CE and~~ *~~CellSpecific\_Koffset,~~* ~~otherwise;~~

-  where  $+\left⌊\left(\frac{N\_{slot,offset,UL}^{CA}}{2^{μ\_{offset,UL}}}-\frac{N\_{slot,offset,DL}^{CA}}{2^{μ\_{offset,DL}}}\right)∙2^{μ\_{DL}}\right⌋ $and and  are the subcarrier spacing configurations for DL and UL, respectively, and $N\_{slot, offset}^{CA}$ and  are determined by higher-layer configured *ca-SlotOffset* for the cells transmitting the uplink and downlink, as defined in clause 4.5 of [4, TS 38.211]

--- End of TP ---

**Agreement**

Adopt the following TP for Section 6.1.2.1 of TS38.214:

--- Start of TP ---

6.1.2.1          Resource allocation in time domain

<<< unchanged paragraphs omitted >>>

in *CSI-ReportConfig* for the  triggered CSI Reporting Settings and  is the *(m+1)*th entry of .

-            The slot *Ks* where the UE shall transmit the PUSCH is determined by *K2* as *Ks* =, if UE is configured with ca-SlotOffset for at least one of the scheduled and scheduling cell, $K\_{s}=\left⌊n⋅\frac{2^{μ\_{PUSCH}}}{2^{μ\_{PDCCH}}}\right⌋+K\_{2}+K\_{offset}⋅\frac{2^{μ\_{PUSCH}}}{2^{μ\_{K\_{offset}}}}$, otherwise, where $K\_{offset}$ is a parameter configured by higher layer as specified in [TS38.213 clause 4.2] ~~if the UE is configured with the higher layer parameter~~ *~~CellSpecific\_Koffset~~*~~,~~ *~~K~~~~s~~* ~~=, otherwise~~, and where $μ\_{K\_{offset}}$is the subcarrier spacing configuration for $K\_{offset}$ with a value of 0 for frequency range 1, *n* is the slot with the scheduling DCI, K*2* is based on the numerology of PUSCH,  and  are the subcarrier spacing configurations for PUSCH and PDCCH, respectively,$K\_{offset}$ ~~is provided with a value of ms for frequency range 1 and is equal to~~ *~~CellSpecific\_Koffset - UESpecific\_Koffset~~* ~~if~~ *~~UESpecific\_Koffset~~* ~~is provided in MAC CE~~ and the scheduling DCI is other than DCI format 0\_0 with CRC scrambled by TC-RNTI~~, and~~ *~~CellSpecific\_Koffset~~* ~~otherwise~~.

--- End of TP ---

**Agreement**

Adopt the following TP for Section 6.2.1 of TS38.214:

--- Start of TP ---

6.2.1   UE sounding procedure

-   If the UE receives the DCI triggering aperiodic SRS in slot *n* and none of the resource sets is configured with parameter *availableSlotOffset* across all configured BWPs in a component carrier, and if the UE is configured with ca-SlotOffset for at least one of the triggered and triggering cell, except when SRS is configured with the higher layer parameter *SRS-PosResource*, the UE transmits aperiodic SRS in each of the triggered SRS resource set(s) in slot , otherwise, the UE transmits aperiodic SRS in each of the triggered resource set(s) in slot$K\_{s}=\left⌊n⋅\frac{2^{μ\_{SRS}}}{2^{μ\_{PDCCH}}}\right⌋+K\_{2}+K\_{offset}⋅\frac{2^{μ\_{SRS}}}{2^{μ\_{K\_{offset}}}}$, where $K\_{offset}$is a parameter configured by higher layer as specified in [TS38.213 clause 4.2] ~~if the UE is configured with the higher layer parameter~~ *~~CellSpecific\_Koffset~~*~~,~~ *~~K~~~~s~~* ~~=, otherwise~~, and where

*-    k* is configured via higher layer parameter *slotOffset* for each triggered SRS resources set and is based on the subcarrier spacing of the triggered SRS transmission, *µSRS* and *µPDCCH* are the subcarrier spacing configurations for triggered SRS and PDCCH carrying the triggering command respectively;

*-* $μ\_{K\_{offset}}$is the subcarrier spacing configuration for $K\_{offset}$ with a value of 0 for frequency range 1~~, and~~ $K\_{offset}$ ~~is provided with a value of ms for frequency range 1 and is equal to~~ *~~CellSpecific\_Koffset -UESpecific\_Koffset~~* ~~if~~ *~~UESpecific\_Koffset~~* ~~is provided in MAC CE and~~ *~~CellSpecific\_Koffset~~* ~~otherwise~~.

-   $N\_{slot, offset, PDCCH}^{CA}$ and $μ\_{offset,PDCCH} $are the $ N\_{slot, offset}^{CA}$ and the, respectively, which are determined by higher-layer configured ca-SlotOffset for the cell receiving the PDCCH, $N\_{slot,offset,SRS}^{CA}$ and $μ\_{offset,SRS}$ are the  and the , respectively, which are determined by higher-layer configured ca-SlotOffset for the cell transmitting the SRS, as defined in [4, TS 38.211] clause 4.5.

-   If the UE receives the DCI triggering aperiodic SRS in slot *n* and when SRS is configured with the higher layer parameter *SRS-PosResource*, the UE transmits every aperiodic SRS resource in each of the triggered SRS resource set(s) in slot , if UE is configured with ca-SlotOffset for at least one of the triggered and triggering cell, $K\_{s}=\left⌊n⋅\frac{2^{μ\_{SRS}}}{2^{μ\_{PDCCH}}}\right⌋+K\_{2}+K\_{offset}⋅\frac{2^{μ\_{SRS}}}{2^{μ\_{K\_{offset}}}}$, otherwise, where $K\_{offset}$ is a parameter configured by higher layer as specified in [TS 38.213 clause 4.2] ~~if UE is configured with the higher layer parameter~~ *~~CellSpecific\_Koffset~~*~~,~~ *~~K~~~~s~~* ~~=, otherwise~~, and where

*-    k* is configured via higher layer parameter *slotOffset* for each aperiodic SRS resource in each triggered SRS resources set and is based on the subcarrier spacing of the triggered SRS transmission, *µSRS* and *µPDCCH* are the subcarrier spacing configurations for triggered SRS and PDCCH carrying the triggering command respectively;

*-* $μ\_{K\_{offset}}$is the subcarrier spacing configuration for $K\_{offset}$ with a value of 0 for frequency range 1.

*~~-~~* $K\_{offset}$ ~~is provided with a value of ms for frequency range 1 and is equal to~~ *~~CellSpecific\_Koffset -UESpecific\_Koffset~~* ~~if~~ *~~UESpecific\_Koffset~~* ~~is provided in MAC CE and~~ *~~CellSpecific\_Koffset~~* ~~otherwise.~~

-  $N\_{slot, offset, PDCCH}^{CA}$ and $μ\_{offset,PDCCH} $are the $ N\_{slot, offset}^{CA}$ and the, respectively, which are determined by higher-layer configured ca-SlotOffset for the cell receiving the PDCCH, $N\_{slot,offset,SRS}^{CA}$ and $μ\_{offset,SRS}$ are the  and the , respectively, which are determined by higher-layer configured ca-SlotOffset for the cell transmitting the SRS, as defined in [4, TS 38.211] clause 4.5.

--- End of TP ---

Agreements on “UL time and frequency synchronization”

**Agreement**

Modify second bullet of RAN1#107-e agreement on Epoch time as follows:

Otherwise, when Epoch time is not explicitly indicated in SIB (other than SIB1), epoch time of assistance information (i.e. Serving satellite ephemeris and Common TA parameters) is implicitly known as the end of the SI window during which the NTN-specific SIB SI message is transmitted.

**Agreement**

Add one additional NTN validity duration value for GEO i.e. 900 seconds. X = 4 bits.

**Agreement**

Modify bit allocations for orbital parameters ephemeris format as follows:

* Orbital parameters are indicated in 21 bytes payload:
	+ - Semi-major axis α (m) is 33 bits
			* Range: from 6500 km to 43000 km
			* The quantization step is 4.249 $×10^{-3}$m
		- Eccentricity e is 20 bits
			* Range: ≤ 0.015
			* The quantization step is 1.431 $×10^{-8}$
		- Argument of periapsis ω (rad) is 28 bits
			* Range: from 0 to 2π
			* The quantization step is 2.341 $×10^{-8}$ rad
		- Longitude of ascending node Ω (rad) is 28 bits
			* Range: from 0 to 2π
			* The quantization step is 2.341  $×10^{-8}$ rad
		- Inclination i (rad) is 27 bits
			* Range: from - π/2  to + π/2
			* The quantization step is 2.341  $×10^{-8}$ rad
		- Mean anomaly M (rad) at epoch time to is 28 bits
			* Range: from 0 to 2π
			* The quantization step is 2.341  $×10^{-8}$ rad

**Conclusion**

Confirm that the agreed position and velocity state vector ephemeris format for LEO/MEO/GEO may also be applied for HAPS/ATG.

The text proposal (for TS 38.211 clause 3.1) of updated proposal 11-1 in section 16 of R1-2202553 is endorsed.

Agreements on “Enhancements on HARQ”

**Agreement**

For HARQ feedback of each SPS PDSCH, UE follows the per-process configuration of HARQ feedback enabled/disabled for the associated HARQ process, except for the first SPS PDSCH after activation if HARQ feedback for SPS activation is additionally enabled.

**Agreement**

Update the RAN1#105-e agreement and apply the following TP.

* *Confirm the previous working assumption for X = T\_proc,1 where X is defined from the end of the reception of the last PDSCH or slot-aggregated PDSCH for a given HARQ process with disabled feedback to the start of the PDCCH carrying the DCI scheduling another PDSCH or set of slot-aggregated PDSCH or the PDSCH without corresponding PDCCH for the given HARQ process.*

|  |
| --- |
| ----------------------------------------Start of TP 38.214 V17.0.0 section 5.1 ----------------------------------<Unchanged parts are omitted>**5.1 UE procedure for receiving the physical downlink shared channel** <Unchanged parts are omitted>When HARQ feedback for the HARQ process ID is not disabled, the UE is not expected to receive another PDSCH for a given HARQ process until after the end of the expected transmission of HARQ-ACK for that HARQ process, where the timing is given by Clause 9.2.3 of [6, TS 38.213]. For HARQ-ACK subject to HARQ-ACK deferral described in Clause 9.2.5.4 of [6 TS 38.213], the expected transmission of HARQ-ACK corresponds to the expected transmission HARQ-ACK in a first slot. When HARQ feedback for the HARQ process ID is disabled, the UE is not expected to receive another PDCCH carrying a DCI scheduling a PDSCH or set of slot-aggregated PDSCH scheduled for the given HARQ process or to receive another PDSCH without corresponding PDCCH ~~scheduled~~ for the given HARQ process that starts until Tproc,1 after the end of the reception of the last PDSCH or slot-aggregated PDSCH for that HARQ process.<Unchanged parts are omitted>----------------------------------------End of TP 38.214 V17.0.0 section 5.1 ----------------------------------- |

**Agreement**

Adopt the following TP (38.214, Section 5.1):

|  |
| --- |
| ----------------------------------------Start of TP 38.214 V17.0.0 section 5.1 ---------------------------------------------<Unchanged parts are omitted>5.1 UE procedure for receiving the physical downlink shared channel<Unchanged parts are omitted>A UE shall upon detection of a PDCCH with a configured DCI format 1\_0, 1\_1 or 1\_2 decode the corresponding PDSCHs as indicated by that DCI. When the UE is scheduled with multiple PDSCHs by a DCI, HARQ process ID indicated by this DCI applies to the first PDSCH not overlapping with a UL symbol indicated by *tdd-UL-DL-ConfigurationCommon* or *tdd-UL-DL-ConfigurationDedicated* if provided, HARQ process ID is then incremented by 1 for each subsequent PDSCH(s) in the scheduled order, with modulo operation of *nrofHARQ-ProcessesForPDSCH* applied. HARQ process ID is not incremented for PDSCH(s) not received if at least one of the symbols indicated by the indexed row of the used resource allocation table in the slot overlaps with a UL symbol indicated by *tdd-UL-DL-ConfigurationCommon* or *tdd-UL-DL-ConfigurationDedicated* if provided. For any HARQ process ID(s) in a given scheduled cell, the UE is not expected to receive a PDSCH that overlaps in time with another PDSCH. When HARQ feedback for the HARQ process ID is not disabled, or for the HARQ process associated with the first SPS PDSCH when *HARQ-feedbackEnablingforSPSactive* is provided, the UE is not expected to receive another PDSCH for a given HARQ process until after the end of the expected transmission of HARQ-ACK for that HARQ process, where the timing is given by Clause 9.2.3 of [6, TS 38.213]. For HARQ-ACK subject to HARQ-ACK deferral described in Clause 9.2.5.4 of [6 TS 38.213], the expected transmission of HARQ-ACK corresponds to the expected transmission HARQ-ACK in a first slot. <Unchanged parts are omitted>----------------------------------------Start of TP 38.214 V17.0.0 section 5.1 --------------------------------------------- |

**Agreement**

Adopt the following TP (38.214, Section 5.3):

---------------------------------------- Start of TP TS 38.214 v17.0.0 section 5.3 ---------------------------------------------\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   Unchanged omitted    \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

If the first uplink symbol of the PUCCH   which carries the HARQ-ACK information, as defined by the assigned HARQ-ACK   timing K1 and Koffset,   if configured, and the PUCCH resource to be used and including the effect of   the timing advance, starts no earlier than at symbol L1, where L1   is defined as the next uplink symbol with its CP starting after  after the end of the last   symbol of the PDSCH carrying the TB being acknowledged, then the UE shall   provide a valid HARQ-ACK message.

-    N1 is based on µ of table 5.3-1 and table 5.3-2 for   UE processing capability 1 and 2 respectively, where µ corresponds to the one of (µPDCCH,   µPDSCH, µUL) resulting with the   largest Tproc,1, where   the µPDCCH corresponds to the subcarrier spacing of the PDCCH scheduling the PDSCH, the µPDSCH corresponds to the   subcarrier spacing of the scheduled PDSCH, and µUL corresponds to the subcarrier spacing of the   uplink channel with which the HARQ-ACK is assumed to be transmitted regardless of whether or not the PDSCH reception provides a transport block for a HARQ process with disabled HARQ-ACK information as indicated by HARQ-feedbackEnabling-disablingperHARQprocess, if provided, and κ is defined in clause 4.1 of   [4, TS 38.211].

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   Unchanged omitted      \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

---------------------------------------- End of TP TS 38.214 v17.0.0 section 5.3 ---------------------------------------------

**Agreement**

Adopt the following TP (38.214, Sections 5.1 and 6.1):

---------------------------------------- Start of TP TS 38.214 v17.0.0 section 5.1 & 6.1 --------------------------------------\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   Unchanged omitted      \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**5.1   UE procedure for receiving   the physical downlink shared channel**

For downlink, a maximum of 16 HARQ processes per cell are supported by the UE, or subject to UE capability, a maximum of 32 HARQ processes per cell as defined in [TS 38.306] ~~for the cases of μ = 5 and μ = 6~~. The number of processes the UE may assume will at most be used for the downlink is configured to the UE for each cell separately by higher layer parameter nrofHARQ-ProcessesForPDSCH, and when no configuration is provided the UE may assume a default number of 8 processes.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   Unchanged omitted    \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**6.1   UE procedure for   transmitting the physical uplink shared channel**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   Unchanged omitted    \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

For uplink, 16 HARQ processes per cell are supported by the UE, or subject to UE capability, a maximum of 32 HARQ processes per cell as defined in [TS 38.306] ~~for the cases of μ = 5 or μ = 6~~.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   Unchanged omitted      \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

----------------------------------- End of TP TS 38.214 v17.0.0 section 5.1 & 6.1 ---------------------------------------------

Agreements on “Others”

**Conclusion**

NTN-NR R17 does not support per-beam polarization signaling for any deployment scenarios.

Agreed LS out

* R1-2202838 LS on NR-NTN TP for TS 38.300 (Thales)
* R1-2202843 reply LS on NTN-specific SIB Moderator (Huawei)
* R1-2202873 Reply LS to RAN2 on NR NTN Neighbour Cell and Satellite Information Thales

Other documents agreed

* R1-2202836 DraftCR for TS38.300- (Thales).
* R1-2202811 TP #5C (for Clause 5.2.2.5 of TS38.214) in section 11.3
* R1-2202811 TP #6E (for Clause 6.1.2.1 of TS38.214) in section 11.4
* R1-2202811 TP #7D (for Clause 6.2.1 of TS38.214) in section 11.5
* R1-2202811 Text Proposal TP#3B (for 38.213, Clause 9) in section 11.2
* R1-2202811 Text Proposal TP#9C (for 38.214, Clause 5.1.4.2) in section 11.7
* R1-2202811 Text Proposal TP#10C (for 38.214, Clause 5.1.5) in section 11.8
* R1-2202811 Text Proposal TP#11C (for 38.214, Clause 5.2.1.5.1) in section 11.9
* R1-2202811 Text Proposal TP#12C (for 38.214, Clause 5.2.1.5.2) in section 11.10
* R1-2202553 Text proposal (for TS 38.211 clause 3.1) of updated proposal 11-1 in section 16
* R1-2202623 TP (for TS 38.214 clause 5.3) in [Initial Proposal 3.2.1-1] in section 3.2
* R1-2202623 TP (for TS 38.214 clause 5.1 and 6.1) in [Initial Proposal 4.2.1-1] in section 4.2

Email discussions

* [108-e-R17-RRC-NR-NTN] Email discussion on Rel-17 RRC parameters for NR to support NTN – Mohamed (Thales)
* [108-e-R17-NR-NTN-05] Email discussion on NR-NTN TP for TS38.300 ([R1-2201184](file:///C%3A%5CUsers%5Celjaafm%5CDocuments%5C3GPP%20documents%5CRAN1%5CTSGR1_108-e%5CDocs%5CR1-2201184.zip)) by February 24 – Mohamed (THALES)
* [108-e-R17-NR-NTN-01] Email discussion for maintenance on timing relationship enhancements – Jussi (Huawei)
* [108-e-R17-NR-NTN-02] Email discussion for maintenance on UL time and frequency synchronization – Mohamed (Thales)
* [108-e-R17-NR-NTN-03] Email discussion for maintenance on HARQ enhancements – Nan (ZTE)
* [108-e-R17-NR-NTN-04] Email discussion/approval on maintenance related to signaling of polarization information – Hao (OPPO)

 [Essential corrections]

None

#### 2.1.2 Remaining Open issues

Details on UE behaviour w.r.t Validity timer expiry

Support of negative TACommonDriftVariation values for GEO

Resolving the ambiguity in interpretation of SFN indicating Epoch time

## 2.2 RAN2

#### 2.2.1 Agreements

[General]

The RAN2 work plan described in R2-2107146 is considered as a basis for work.

* **RAN2#116-bis-e, 17th – 25th January 2022, e-meeting**

Agreements on ”User plane”

*RACH aspects*

1. Do not support allocating dedicated RA preamble for the RACH procedure triggered by TA reporting.

2. UE does not start or restart the timeAlignmentTimer after the UE reports its TA.

3. NTN specific parameters, e.g. ephemeris, K\_mac, common TA, cell-specific Koffset, network enable/disable TA report, etc., are provided in the new NTN-specific SIB.

4. The MAC CE for differential UE-specific K\_offset has a fixed size of a single octet.

5. Use an eLCID for the MAC CE for differential UE-specific K\_offset

1. priority of the TA report MAC CE is lower than LBT failure MAC CE and higher than MAC CE for SL-BSR prioritized.

2. UE triggers a TA reporting upon reception of configuration or reconfiguration of TA reporting trigger event if the UE has not reported TA before.

3. Other than event-triggered TA reporting, no more triggers are introduced for TA reporting in connected mode.

1. For the TA report triggering event which uses the offset threshold between current information about UE specific TA and the last successfully reported information about UE specific TA, no hysteresis or time to trigger is needed.

2. UE reports Full TA (i.e., T\_TA as defined in the UE’s TA formula). The size of the TA report MAC CE is fixed to two octets.

3. if SA3 will confirm that NTN-specific user consent will the available in Rel-17, the network could at least ask the UE to report its UE location for any reason at any time. FFS if we define an event-triggered reporting of UE location for TA reporting purposes.

*Other MAC aspects*

1. uplinkHARQ-DRX-Mode-r17 controls the DRX behaviour of HARQ processes in the same way for configured grants as for dynamic grants.

1. It is up to network implementation to ensure proper configuration of HARQ feedback (i.e. enabled or disabled) for HARQ processes used by an SPS configuration (no Stage 3 specification impact). FFS if a note in Stage 2 is needed

2. It is up to network implementation to ensure proper configuration of HARQ mode for HARQ processes used by a CG configuration (no Stage 3 specification impact). FFS if a note in Stage 2 is needed

3. For HARQ process(es) configured with HARQ Mode B, blind retransmission relies on UE being in DRX Active Time via other means (i.e. drx-RetransmissionTimerUL is not started).

4. For HARQ process(es) configured with disabled HARQ feedback, blind retransmission relies on UE being in DRX Active Time via other means (i.e. drx-RetransmissionTimerDL is not started).

1. RAN2 understanding is that: in general, all HARQ processes used by an SPS configuration are configured with the same HARQ feedback enabled/disabled state. No specification impact.

2. RAN2 understanding is that: in general, all HARQ processes used by a CG configuration are configured with the same HARQ state (e.g. A or B). No specification impact

1. AllowedHARQ-DRX-LCP also applies to CG

Working Assumption:

1. It is up to NW implementation to properly configure allowedHARQ-DRX-LCP or allowedCG-List for a LCH (e.g. to avoid conflicting configuration) (Comeback if we find a problem in the implementation in the spec)

Agreements on “Control plane”

*Earth fixed moving beams related issues*

A new NTN-specific SIB is introduced (SIBx), scheduled by SIB1

2. Introduce the following serving cell information to the corresponding SIBx (scheduled by SIB1):

 - Ephemeris;

 - common TA parameters;

 - validity duration for UL sync information;

 - t-Service;

 - cell reference location;

 - Epoch time.

 Also send a LS to RAN1 asking whether some parameters might be sent more frequently

3. For quasi-earth fixed cell, same as legacy, UE shall perform neighbour cell measurements of “higher priority NR inter-frequency or inter-RAT frequencies” regardless of the remaining serving time

4. RRC\_INACTIVE mode is supported for NTN

1. Regarding UE-based solution for SMTC adjustments, UE autonomously adjust the SMTCs based on location and ephemeris. FFS whether NW assistance information is provided.

2. UE can know the NW type implicitly no later than SIB1 reception, there is no explicit NW type indication in SIB1.

3. No LS is sent to RAN3 on the support of RRC\_INACTIVE.

1. Update of ephemeris and common TA information does not affect the value tag and does not trigger SI modification procedure.

2. The ntnUlSyncValidityDuration applies to the whole SIBX. UE acquires the updated SIBX when the timer expires. FFS whether to also include it in the LS to RAN1.

3. Location information can be used to determine when to start measurement.

4. UE may choose not to perform neighbour cell measurements of “NR intra-freq or inter-freq with equal or lower priority, or inter-RAT freq with lower priority”, if (the distance between UE and serving cell reference location is shorter than a threshold) and (legacy Srxlev/Squal condition is met, i.e., serving cell’s Srxlev/Squal is better than a threshold).

5. Location-based measurement initiation is only applied if the cell broadcasts location-related parameters (e.g. a threshold) and by implementation the UE has location information.

6. Before the stop-time based measurements are triggered, the UE measurements follow Legacy behaviour (i.e., based on Srxlev/Squal) and there is no measurement relaxation.

7. Cell stop time is not applied to cell ranking in determining the target cell for reselection.

Agreements on “UE capabilities”

1. define one single NR NTN UE capability to encompass essential features to support NTN, and UE can further indicate other optional capabilities.

2. gnss-Location-r16 is conditionally mandatory when UE indicates the support of NR NTN access, and update the field description to cover NTN case.

3. consider the following differentiation of user plane enhancements as baseline:

 Essential sub-features include:

 1) the adaptations of RACH;

 2) DRX HARQ RTT timer extension;

 3) the timer extension to accommodate long RTT for other MAC timers (e.g., extended sr-ProhibitTimer);

 4) the timer extension to accommodate long RTT in RLC and PDCP layers (FFS for LEO)

 Optional sub-features include:

 1) TA reporting (TA reporting during RACH using MAC CE, and Event-triggers for TA reporting in connected mode);

 2) disabling HARQ feedback for downlink transmission;

 3) new HARQ state for uplink transmission and the corresponding new LCP mapping rule for dynamic grants.

4. consider the following differentiation of control plane enhancements as baseline:

 Essential sub-features include (for NGSO, FFS for GEO):

 1) soft TAC update;

 2) SMTC enhancements (event-triggered assistance information reporting, 2 SMTC in parallel);

 Optional sub-features include:

 1) cell stop-time based neighbour cell measurements;

 2) location based cell reselection criteria;

 3) SMTC enhancements (4 SMTC in parallel and UE based solution in idle/inactive);

 4) CHO enhancements (location based CHO).

 FFS if CHO enhancements (time based and Event A4 based CHO) is essential or optional

5. Postpone the UE capability discussion on location reporting

Working Assumption (further check if anything can be per band):

1. the granularities of all the optional RAN2 determined sub-features with capability signalling are per UE.

1. RAN2 confirms that the RLC timer extension (i.e., t-Reassembly timer) is also essential for NGSO.

2. RAN2 confirms that the PDCP timer extension (i.e., discardTimer and t-Reordering timer) is also essential for NGSO.

3. RAN2 confirms that Multiple TACs feature (i.e., UE should be able derive multiple TACs per PLMN in a cell, and indicate to NAS layer all received TACs per PLMN) is essential for both GSO and NGSO.

4. The support of essential NTN features should be the Prerequisite for optional NR NTN UE capabilities.

1. Define single UE capability to encompass all features essential to support both GSO and NGSO, i.e., when UE indicates it, it means UE supports all the GSO and NGSO essential features (FFS for SMTC enhancements). (this does not automatically mean that interoperability testing between GSO and NGSO is also supported)

2. UE capabilities for optional CHO enhancements (at least location based CHO) for NTN are per band, which is also in line with R16 CHO design

Endorsed draft Running CR

* -

Agreed LS out:

* R2-2201881 LS to SA2, RAN3, SA3 “UE location during initial access (Thales)

Off line Email discussions during the meeting

* R2-2201755 [AT116bis-e][101][NTN] RACH aspects (Oppo)
* R2-2201756 [AT116bis-e][102][NTN] Idle/Inactive mode aspects (Huawei)
* R2-2201749 [AT116bis-e][107][NTN] Other MAC aspects (Interdigital)
* R2-2201740 [AT116bis-e][108][NTN] Reply LS on User Consent (QC)
* R2-2201741 & 1742 [AT116bis-e][109][NTN] Reply LSs to RAN4 and RAN1 (QC)
* R2-2201743 [AT116bis-e][110][NTN] UE location during initial access (Thales)
* R2-2201748 [AT116bis-e][112][NTN] Capabilities (Intel)

Post email discussions (short)

* [Post116bis-e][106][NTN] Stage 2 running CR (Thales)
* [Post116bis-e][107][NTN] RRC running CR and list of open issues (Ericsson)
* [Post116bis-e][108][NTN] 38.304 running CR and list of open issues (ZTE)
* [Post116bis-e][109][NTN] MAC running CR and list of open issues (Interdigital)
* [Post116bis-e][110][NTN] 38.306 running CR and list of open issues (Intel)
* [Post116bis-e][114][NTN] LSs to RAN1 on SIBx (Huawei)
* **RAN2#117-e, 21st February – 3rd March 2022, e-meeting**

Agreements on ”User plane”

Agreements via email - from offline 103:

1. During RA procedure for RRC re-establishment procedure, the UE should trigger TA report if an indication is broadcasted by the target cell’s SI.

2. During RA procedure for handover, the UE should trigger TA report if the target cell indicates this in the handover command.

3. Other than re-establishment (TA reporting controlled by target cell's SI) and handover procedure (TA reporting controlled by HO command), TA reporting in connected mode is not controlled by enabling/disabling indication in SI.

4. RAN2 confirms ra-ResponseWindow and msgB-ReponseWindow are not extended in NTN.

5. Existing parameter names are updated to: uplinkHARQ-mode, allowedHARQ-mode, and HARQ mode A/B.

6. A NOTE is added to MAC CR clarifying that prior to starting drx-HARQ-RTT-TimerUL/DL, latest UE-gNB RTT is used to set timer length.

7. MAC does not specify how UE detects a cell originates from a non-terrestrial network.

8. Repetition transmission based HARQ retransmission is always allowed and is explicitly indicated via DCI or semi-statically via RRC signalling (as in legacy). This revises the agreement from RAN2#114e (consensus)

9. DL MAC CE execution delay is not captured in MAC specification (consensus)

Agreements online:

1. RAN2 understanding: UE failing to acquire sufficiently accurate UE location to be used in the calculation of the UE’s Timing Advance value (see TS 38.211 [Y] clause 4.3.1) should not perform any UL transmission. No RAN2 specification impact.

2. "UE-specific TA MAC CE" consists of only one field with length 14 bits (+ 2 reserved bits), which contains the UE estimate of full UE-specific TA

3. "Differential UE-Specific K\_Offset MAC CE" consists of only one field with length 6 bits (+2 reserved bits), which contains the Differential UE-Specific K\_Offset

4. uplinkHARQ-mode and allowedHARQ-mode, if configured, also apply for SRB1 to SRB3

5. Upon reception of configuration or reconfiguration of TA reporting trigger event, if connected mode UE has not reported TA to current serving cell before (during this connection), the UE triggers a TA reporting (can further check this during the implementation in the MAC CR)

6. configuredGrantTimer length shall be extended with higher values (FFS on the actual values)

Agreements via email - from offline 103 - second round:

1. The name “UE-Specific TA MAC CE” is revised to “Timing Advance Report MAC CE”

2. Revise the field description of “UE-Specific MAC CE” as follows: Timing Advance: In FR1, the Timing Advance field indicates the least integer number of slots greater than or equal to the Timing Advance value (see TS 38.211 section 4.3.1). The length of the field is 14 bits.

3. The name “Differential UE-Specific K\_Offset MAC CE” is revised to “Differential Koffset MAC CE”.

4. When HARQ process 0 carries PUSCH transmission scheduled by RAR or PUSCH payload of MsgA, configuration of HARQ mode and allowedHARQ-mode is up to NW implementation, and UE always follows it (no specification impact)

5. Rel-17 NTN session will not further discuss clarification on UE DRX behaviour when PDCCH indicates a UL/DL transmission where drx-HARQ-RTT-TimerUL/DL for the corresponding HARQ process has already been running.

6. In NTN, the UE enters Active Time at the first SR transmission + UE-gNB RTT. The Active Time will continue until no pending SR, and the SR retransmission has no impact on the Active Time. Note: This does not impact UE entering Active Time during UE-gNB RTT offset if triggered due to other reasons (e.g. DRX timers).

7. In CFRA case, DRX Active Time follows legacy behaviour (i.e. UE enters DRX Active Time after successful reception of RAR, and remains in DRX Active Time until a PDCCH indicating a new transmission addressed to the C-RNTI of MAC entity has been received).

8. Upon validity timer expiry, UE shall suspend uplink transmission and re-acquire SI (FFS whether or not UE needs to flush HARQ buffer)

Agreements via email - from offline 103 - third round:

1. Blind Msg3 retransmission is supported in Rel-17 NTN. FFS whether this is enabled by a NOTE (P4), or explicit configuration (P5a and P5b).

2. The following NOTE is captured: “UE should attempt to re-aquire SIBxx prior to validity timer expiry by UE implementation.” Details of NOTE (potentially including additional clarification if needed) may be finalized in Stage 3. This is captured in RRC specification (e.g. Section 5.2.2.x)

Agreements online:

1. Specific UE location reporting procedures only for TA report purposes are not supported in Rel-17 NTN

2. UE behaviour upon validity timer expiry will be covered in RRC (can further discuss how interaction with MAC works). FFS which/whether any specific actions are taken

3. If a TA report is triggered and there are no available UL-SCH resources, the network may optionally configure UE to trigger an SR. A UE capability is introduced for this.

4. Introduce some procedural text to enable blind msg3 retransmission in NTN. FFS on the detailed text

Agreements on “Control plane”

*Idle mode*

Agreements:

1. Satellite ephemeris based cell reselection is represented by time and location based cell reselection. No further enhancement in this release for ephemeris based cell reselection.

2. No further enhancement on cell reselection priority in NTN. Remove the corresponding FFS from 38.304 CR.

3. No need to provide the timing information about the new upcoming cell for either earth fixed scenario or earth moving scenario in Rel-17.

4. No further enhancement on cell reselection procedure to support TN prioritization over NTN in Rel-17.

5. RAN2 assumes that in addition to the ephemeris information, assistance information is needed for UE-based SMTC adjustment in idle and inactive mode. (FFS on the option to enable this)

6. Adopt the text proposal in R2-2203725 to capture the location based cell reselection agreements in 38.304.

Working Assumption:

1. To prevent non-NTN capable UE from accessing an NTN cell in Rel-17, for NR-NTN RAN2 follows a similar solution as in IoT-NTN (FFS on the details and whether this is always needed or not).

Agreements via email - from offline 102 - second round:

1. The introduction of a distance threshold for cell reselection would not impact the cell reselection priority determination in inter-frequency and inter-RAT cell reselection criteria.

Agreements via email - from offline 102 - third round:

1. The validity timer information for neighbour cell’s ephemeris information should be introduced in system information and it can be the same as or different from the validity timer of the serving cell

Agreements online:

1. SMTC offset and change rate is needed to assist UE-based SMTC adjustment in idle and inactive mode (FFS on the signalling details, e.g. whether to broadcast feeder link delay difference or something different)

2. There is no need to indicate to UE in idle/inactive mode whether a cell (serving cell and/or neighbour cell) is earth moving or quasi-earth fixed.

Agreements:

1. RAN2 reconfirms that, in connected mode, UE location information can be sent to the NG-RAN. FFS if full UE location information based on user consent or coarse UE location information.

Agreements:

1. Send a new LS to SA3 indicating that if NTN specific User Consent for sending fine UE location information (full GNSS coordinates) will not be available in Rel-17, RAN2 will consider the solution where, upon network request, after AS security/connected mode is established, a UE can report its coarse UE location information (coarse GNSS coordinates) to the NG-RAN, with a possible reported value referring to "no coarse GNSS location available" (which the UE can set if it cannot/does not want to provide its coarse GNSS coordinates); and asking SA3 to come back to RAN2 if they have any concerns."

*Connected mode*

Agreements:

1. use CommonLocationInfo from 38.331 for NTN location reporting

2. The ellipsoid-Point IE specified in TS 36.331, TS 37.355 (and TS 23.032) is reused for definitions of reference locations in NR NTN. FFS if ellipsoidPointWithAltitude-r10

3. RAN2 to agree for value range for parameter distanceThresFromReferencex-r17 “Option 2 X bits to cover (0, z km) with linear granularity”.

4. RAN2 to adopt for HysteresisLocation-r17 ”INTEGER (0..32768)” with a granularity of 10 meters, i.e. the actual value is the field value \* 10 meters.

5. Configure a parameter OffsetThresholdTA in IE MAC-CellGroupConfig. FFS name of parameter

6. RAN2 to adopt as values for sr-ProhibitTimerExt-r17: {ms192, ms256, ms320, ms384, ms448, ms512, ms576, ms640}. FFS to add 2xRTT, 2x542 ms.

7. RRC processing delay is not impacted

8. The HARQ-feedbackEnablingforSPSactive-r17 is per BWP.

9. RAN2 should wait RAN1 response before progressing on discussing SIB1 NTN specific content.

10. Current SIBxx serving cell content can be adopted as baseline and RAN2 should wait RAN1 response before progressing on discussing further SIBxx NTN specific content.

11. At least neighbour cell Ephemeris information shall be broadcast. FFS on other information about neighbour cells

12. ntnUlSyncValidityDuration applies both to connected mode and idle mode

Agreements via email - from offline 101 - second round:

1. The ellipsoid-Point IE specified in TS 36.331, TS 37.355 (and TS 23.032) is reused for definitions of reference locations in NR NTN.

2. The following for entering and leaving conditions are agreed:

 Inequality D1-1 (Entering condition 1)

 Ml1-Hys>Thresh1

 Inequality D1-2 (Entering condition 2)

 Ml2+Hys>Thresh2

 1> consider the leaving condition for this event to be satisfied when condition D1-3 or D1-4 is fulfilled;

 Inequality D1-3 (Leaving condition 1)

 Ml1+Hys<Thresh1

 Inequality D1-4 (Leaving condition 2)

 Ml2-Hys>Thresh2

3. Largest value for OffsetThresholdTA should not be larger than 16 ms. FFS Include values smaller than 1ms

4. DiscardTimerExt2 has value 2000ms and 2-3 spare values

5. Values for sr-ProhibitTimerExt-r17: {ms192, ms256, ms320, ms384, ms448, ms512, ms576, ms640, ms1082}.

6. Introduce the RLC t-ReassemblyExt field with values {ms210, ms220, ms340, ms350, ms550, ms1100, ms1650, ms2200}.

7. Introduce an OPTIONAL field configuredGrantTimer-r17 with 8 bits representing values 66, 68, …, 574, 576.

8. Add “The network does not configure the configuredGrantTimer-r17 simultaneously with configuredGrantTimer (without suffix).” to the field description of configuredGrantTimer.

9. Capture the following: For SIBxx field description for ephemeris and common TA:

 “This field is excluded when determining changes in system information, i.e. changes of XXX should neither result in system information change notifications nor in a modification of valueTag in SIB1.”

Agreements via email - from offline 101 - third round:

1. remove FFS from field description condExecutionCond and revise the added sentence as: "If network configures condEventD1 or condEventT1 for a candidate cell network shall configure a second triggering event condEventA3, condEventA4 or condEventA5."

2. Z = 3000 km, X = 16 bits if integer with linear granularity

3. Range for OffsetThresholdTA is 0.5ms to 15ms, with spare bits

Agreements:

1. RAN2 clarifies that Epoch time applies only to Ephemeris parameters and common TA parameters and ntnUlSyncValidityDuration is started at Epoch time

2. RAN2 to agree on the below TP to be captured in TS 38.331 Section 5.2.2.4 Actions upon receipt of System Information

 5.x.x.x Actions upon reception of SystemInformationBlockTypeXX

 Upon receiving SystemInformationBlockTypeXX (SystemInformationBlockTypeXX), the UE shall:

 1> instruct the lower layers to start or restart TXXX with the duration ntnUlSyncValidityDuration from the subframe indicated by epochTime;

 NOTE: UE should attempt to re-acquire SystemInformationBlockTypeXX before the end of the duration indicated by ntnUlSyncValidityDuration and epochTime by UE implementation.

Working Assumption:

1. Upon validity timer expiry, UE shall suspend uplink transmission and re-acquire SI, flushing HARQ buffers

Agreements:

1. Joint time-based and location-based CHO execution triggering for the same candidate cell is not supported in Rel-17 NTN.

2. If the CHO is not executed at T2 (timer associated with this candidate CHO cell) the UE continues to operate in the source cell and evaluates other CHO execution conditions (if configured).

Working assumption:

1. T2 timer is defined as an INTEGER (1..6000), where each step represents 100 ms. Its maximum value corresponds to 10 minutes (600 seconds). FFS whether the maximum value needs to be aligned to the cell stop time

Agreements via email - from offline 108:

1. The maximum supported value for timer T2 is 10 minutes (600 seconds).

2. It is up to UE implementation how the UE evaluates the time- or location-based condition jointly with the RRM event Ax, as long as the UE has RRM measurement results within the time window [T1, T2] or when the location condition is met.

3. The maximum number of MeasIDs to be used for CHO execution triggering in NTN is not increased from 2 to 3.

Agreements via email - from offline 108:

1. The maximum supported value for timer T2 is 10 minutes (600 seconds).

2. It is up to UE implementation how the UE evaluates the time- or location-based condition jointly with the RRM event Ax, as long as the UE has RRM measurement results within the time window [T1, T2] or when the location condition is met.

3. The maximum number of MeasIDs to be used for CHO execution triggering in NTN is not increased from 2 to 3.

Agreements;

1. In NR NTN, RAN2 follows the restriction on the maximum number of gaps that could be configured simultaneously for each gap type (per-UE /per-FR1/per-FR2) confirmed in MGE WI, i.e., more than 2 simultaneous measurement gaps for each gap type are NOT considered in R17 NR NTN.

2. It’s up to network implementation to guarantee that the measurement gaps can cover all SMTCs configured for one frequency layer in gap-assisted scenarios.

3. Send LS to RAN4 asking if it's feasible/possible, for NTN, that two measurement gaps could be associated with the same frequency layer

Location aspects

Agreements:

1. In Rel-17, RAN2 does not work on a solution to provide (fine/coarse) UE location information during initial access

UE capabilities

Agreements via email - from offline 104:

1. The SMTC enhancements (event-triggered assistance information reporting, 2 SMTC in parallel) are essential for NGSO capable UEs.

2. Incorporate event-triggered TA reporting feature into TA reporting UE capability defined in RAN1 feature list.

3. Specify single UE capability to represent the support of both UL HARQ state B and the new LCP restriction.

4. Postpone the discussion on NTN SMTC UE capabilities, and if the updated RAN1/4 feature lists during this meeting don’t include NTN SMTC related UE capabilities, RAN2 sends an LS to RAN1/4 for triggering this discussion.

Agreements online:

1. RAN2 understands that in NTN, RTT values are assumed to be longer in the calculation of L2 buffer. No spec change

Agreements via email - from offline 104 - second round:

1. the UE capabilities for time based CHO and Event A4 based CHO are optional with capability signalling.

2. RAN2 confirms that, if UE supports both GSO and NGSO, it means UE also supports mobility between GSO and NGSO.

Agreements:

1. Define IoT bit for the support of {GSO, NGSO, both}, and this indication means all NTN essential features and optional features (FFS) UE indicates have been tested in the corresponding scenario(s). The exemplary spec change may be like:

 ntn-ScenarioSupport-r17 ENUMERATED {GSO, NGSO, both} OPTIONAL,

 nonTerrestrialNetwork-r17 ENUMERATED {supported} OPTIONAL,

 (FFS for optional features)

Endorsed draft Running CR

* R2-2203537 Stg2 running CR (Thales)

Agreed LS out:

* R2-2204113 LS to SA3 on UE location in connected mode in NTN

Off line Email discussions during the meeting

* [AT117-e][101][NTN] RRC open issues (Ericsson)
* [AT117-e][102][NTN] Idle mode open issues (ZTE)
* [AT117-e][103][NTN] MAC open issues (Interdigital)
* [AT117-e][104][NTN] UE caps open issues (Intel)
* [AT117-e][108][NTN] CHO open issues (Nokia)
* [AT117-e][109][NTN] Stage 2 CR (Thales)
* [AT117-e][115][NTN] UE location in connected mode (Thales)

Post email discussions (short)

* [POST117-e][101][NTN] RRC CR (Ericsson)
* [POST117-e][102][NTN] 38.304 CR (ZTE)
* [POST117-e][103][NTN] MAC CR (Interdigital)
* [POST117-e][104][NTN] UE Caps CR (Intel)
* [POST117-e][109][NTN] Stage 2 CR (Thales)
* [POST117-e][118][NTN] LS to SA3 (Thales)

[Essential corrections]

* In Rel-17, RAN2 does not work on a solution to provide (fine/coarse) UE location information during initial access

#### 2.2.2 Remaining Open issues

Details related to NTN/TN mobility

More over, about some specific objectives of the work item, note the following

1/ “*Identify potential issues associated to the use of the existing Location Services (LCS) application protocols to locate UE in the context of NTN and specify adaptations if any [RAN2/3]*”:

This can be closed on the basis that existing A-GNSS based and E-CID based methods are supported in Rel-17. However other 3GPP defined positioning methods are not supported in NTN as is in Rel-17.

2/ “*Furthermore the following can be considered with 2nd priority: Verify the applicability of existing Rel-16 ANR techniques to solve PCI confusion in order to support co-channel operation between HAPS & terrestrial networks and develop enhancements if needed [RAN2/3]*”:

This objective can simply be downscoped since there was no contribution on the topic during the WID. Hence the related WID can be revised as follow:

“*~~Furthermore the following can be considered with 2~~~~nd~~ ~~priority: Verify the applicability of existing Rel-16 ANR techniques to solve PCI confusion in order to support co-channel operation between HAPS & terrestrial networks and develop enhancements if needed [RAN2/3]~~*”

## 2.3 RAN3

#### 2.3.1 Agreements

* **RAN3#114-bis-e, 17th – 25th January 2022, e-meeting**

[General]

Agreements

* RAN3 to take into consideration “maximum 12 TACs per NR NTN cell” when designing the multiple TAC reporting in ULI.
* RAN3 may have to update RAN3’s TS (e.g. N2 and Xn) to take into account NTN User consent if agreed by SA3
* Upon RAN2 decision on UE location reporting to gNB during initial access, stage 2 specification may have to updated (e.g. construction of mapped CGI or location based AMF selection)
* Req1: ULI contains all broadcast TAIs (either single or multiple) in all cases.
* Req2: If known, ULI contains the TAI where the UE is geographically located (independent of single/multiple TAI)
* A list of TACs is added to ULI as a new optional IE.
* Add new cause value “UE not in PLMN serving area” in the NGAP to indicate the UE is not within the serving area of its current serving PLMN

BL CRs endorsed:

* R3-220010 Clarification of NAS Node Selection Function for NTN nodes providing access over multiple countries (Qualcomm Incorporated, Nokia, Nokia Shanghai Bell, Huawei)
* R3-220011 Support of NTN RAT identification and NTN RAT restrictions (Qualcomm Incorporated, Huawei, Thales, Ericsson, Nokia, Nokia Shanghai Bell, CATT)
* R3-220029 Support of NTN RAT identification and NTN RAT restrictions (Qualcomm Incorporated, Huawei, Thales, Ericsson, Nokia, Nokia Shanghai Bell, CATT)
* R3-221299 Support Non-Terrestrial Networks (Huawei, Thales, Ericsson, ZTE, Qualcomm Incorporated)

TP agreed

* R3-221362 TAC Reporting in ULI for NTN (Ericsson LM)
* R3-221293 (TP for BL CR for TS 38.300) mapped cell ID determination after AS security and TAC reporting (Nokia, Nokia Shanghai Bell)
* R3-221298 Country Routing and Cause Value for UE Context Release (Ericsson LM)
* R3-220714 (TP for NTN BL CR 38.413) On Cause Value for Cross-country Scenario (CATT)

Summary of email discussions

* R3-221266 CB # 2001\_NTN\_General (Thales – moderator)
* R3-221068 CB # 2002\_NTN\_NW-ID (Qualcomm - moderator)
* R3-221069 CB # 2003\_NTN\_Country\_Routing (CATT – moderator)

LS out agreed

* R3-221370 Reply LS on LS on TAC reporting in ULI and support of SAs and FAs for NR Satellite Access (R3-220121/S2-2109337) (Qualcomm Incorporated)
* R3-221379 LS to SA2 on RAN Initiated Release due to out-of-PLMN area condition

[Essential corrections]

None

* **RAN3#115-e, 21st February– 3rd March 2022, e-meeting**

[General]

Agreements

-

BL CRs endorsed:

* R3-221508 Clarification of NAS Node Selection Function for NTN nodes providing access over multiple countries (Qualcomm Incorporated, Nokia, Nokia Shanghai Bell, Huawei, Thales)
* R3-221509 Introduction of NTN (Qualcomm Incorporated, Huawei, Thales, , Ericsson, Nokia, Nokia Shanghai Bell, CATT)
* R3-221524 Introduction of NTN (Qualcomm Incorporated, Huawei, Thales, , Ericsson, Nokia, Nokia Shanghai Bell, CATT)
* R3-221609 Support Non-Terrestrial Networks (Huawei, Thales, Ericsson, ZTE, Qualcomm Incorporated)

TP agreed

* R3-221742 (TP for TS 38.300 BL CR on NTN) Discussion of the RAN2 LS on absence of UE location information at RRC Setup (Qualcomm Incorporated)
* R3-221921 UE location report during initial access (Huawei)
* R3-222862 New TP for TS 38.413 “new TAC structure”

Summary of email discussions

* R3-222796 CB # 2001\_NTN\_General (Thales – moderator)

LS Out

* R3-222795 LS on UE location during initial access in NTN” Thales (LS reply to RAN2’s LS in R3-221357)

#### 2.3.2 Remaining Open issues

None

## 2.4 RAN4

#### 2.4.1 Agreements

[General]

The RAN4 work plan described in R4-2104879 should be considered as a basis for work.

* **RAN4#101-bis-e, 17th – 25th January 2022, e-meeting**

**[GTW Agreements on BSRF Test Demod aspects**

Documents approved:

* R4-2203080 Way Forward on NTN\_solutions\_Part1 THALES
* R4-2203081 Draft text proposal to update TR 38.863 Samsung
* R4-2203040 TP to TR 38.863 on transmitter characteristics for satellite access node CATT
* R4-2203082 TP to TR 38.863 on channel raster and sync raster CATT
* R4-2203129 NTN - Regulatory information - TP to TR 38.863 Ericsson
* R4-2203084 TP to TR 38.863 on regulatory aspects for HAPS Nokia, Nokia Shanghai Bell
* R4-2203085 TP to TR 38.863 on general aspects Nokia, Nokia Shanghai Bell
* R4-2203086 Draft skeleton for TS 38.101-5 Samsung
* R4-2201257 TP for 38.863 on system parameters to clarify “NTN satellite bands” Huawei, HiSilicon
* R4-2201838 Draft proposal to update TR 38.863 NTN related RF and co-existence aspects THALES
* R4-2203087 Skeleton for TS 38.108 NR Satellite Access Node radio transmission and reception v0.0.1 THALES
* R4-2203132 Draft TR 38.863 update v0.2.0
* R4-2202988 Draft Text Proposal for TR 38.863 Samsung
* R4-2203130 WF on [307] NTN \_Solutions\_Part2 Samsung
* R4-2202991 Simulation assumptions for NTN co-existence Samsung, CATT
* R4-2202992 Simulation assumptions for HAPS co-existence Nokia
* R4-2202993 Summary of NTN co-existence study Samsung
* R4-2202994 Summary of HAPS co-existence study Nokia
* R4-2201078 TP to TR 38.863 on HAPS coexistence study Nokia, Nokia Shanghai Bell
* R4-2203124 WF on BS RF requirements for SAN type 1-H CATT
* R4-2203034 WF on Tx RF requirement for SAN type 1-O ZTE
* R4-2203035 WF on Rx RF requirement for SAN type 1-O Ericsson
* R4-2203036 WF on UE RF requirement for NTN UE Huawei
* R4-2203037 TP for 38.863 on UE transmission characteristics for satellite access Huawei
* R4-2203038 TP for 38.863 on maximum input level for NTN UE Xiaomi
* R4-2203039 TP for 38.863 on UE Receiver characteristics for satellite access Huawei
* R4-2203042 WF on general and NTN UE demodulation requirements Qualcomm Incorporated
* R4-2203043 WF on NTN SAN demodulation requirements Huawei, HiSilicon

[Other documents]

Email discussion summaries:

* R4-2203111 Email discussion summary for [101-bis-e][306] NTN\_Solutions\_Part1, THALES
* R4-2203112 Email discussion summary for [101-bis-e][307] NTN\_Solutions\_Part2, Samsung
* R4-2203113 Email discussion summary for [101-bis-e][308] NTN\_Solutions\_Part3, CATT
* R4-2203114 Email discussion summary for [101-bis-e][322] NR\_NTN\_Demod\_NWM, Qualcomm

**[GTW Agreements on RRM aspects]**

Agreements

* Define RRM requirements for all legacy DRX cycles
	+ FFS on applicability of 2.56s DRX cycle for earth-moving LEO deployment

Agreements

* Same cell Selection/Reselection delay requirements will apply for UE Idle/Inactive mode for LEO and GEO scenarios
	+ The requirements shall be based on LEO scenario assumptions

Documents approved:

* R4-2202637 WF on NR NTN RRM requirements, Qualcomm
* R4-2202638 WF on GNSS-related and timing requirements for NR NTN, Xiaomi

[Other documents]

Email discussion summaries:

* R4-2202729 Email discussion summary: [101-bis-e][212] NR\_NTN\_solutions\_RRM\_1, Qualcomm
* R4-2202730 Email discussion summary: [101-bis-e][213] NR\_NTN\_solutions\_RRM\_2, Xiaomi
* **RAN4#102-e, 21st February – 3rd March 2022, e-meeting**

**GTW Agreements on BSRF Test Demod aspects**

Documents approved:

* R4-2207330 TP TR 38.863 7.4.1 NTN UE Requirement (General)
* HUGHES Network Systems Ltd
* R4-2207338 TP for TR 38.863: Regulatory aspects for NTN satellite access nodes and UEs operating in UL1626.5-1660.5 MHz and DL 1525-1559 MHz frequencies ranges Ligado Networks
* R4-2207333 TP to TR 38.863 on Section 5.2 NTN Satellite band HUGHES Network Systems Ltd
* R4-2207339 TP to TR 38.863 Regulatory aspects for HAPS Nokia, Nokia Shanghai Bell
* R4-2207345 Draft text proposal for Clauses 7, 7.1, 7.2, 7.3 in TR 38.863 THALES
* R4-2207331 TP for 38.108: clause 5.3&5.4 on system parameters CATT
* R4-2207336 Draft text proposal for Clause 4.4 Satellite Access Node classes - TS 38.108 THALES
* R4-2207337 TP for 38.108: clause 4.3 requirement reference point CATT
* R4-2207340 TP to TR 38.108 on 4.5 Regional Requirement HUGHES Network Systems Ltd
* R4-2207335 TP for TS 38.108: General (5.1) and Operating Band (5.2) ZTE Corporation
* R4-2207332 TP on TS 38.101-5 for UE channel bandwidth and channel arrangement Qualcomm Incorporated
* R4-2207343 Draft text proposal for Clause 3 - TS 38.101-5 THALES
* R4-2207344 Draft text proposal for Clause 4 - TS 38.101-5 THALES
* R4-2207334 TP for TS 38.101-5: General (5.1) and Operating Band (5.2) ZTE Corporation
* R4-2207341 CR for TS 38.104: capturing HAPS requirements
* Softbank, Deutsche Telekom, Ericsson, NTT Docomo, KDDI, Nokia, Intelsat
* R4-2207346 Way Forward on NTN\_solutions\_Part1 THALES
* R4-2207347 WF on [309] NTN\_Solutions\_Part2 Samsung
* R4-2207348 Simulation assumptions for NTN co-existence Samsung, CATT
* R4-2207350 Summary of HAPS co-existence study Nokia
* R4-2207351 Draft text proposal to update TR 38.863 Chapter 6 Samsung
* R4-2207353 Draft text proposal for Clauses 6.4 and 6.5 in TR 38.863 to include simulation results based on Non-AAS antenna assumption THALES
* R4-2207387 WF on open issue for SAN CATT
* R4-2207456 WF on SAN SEM and spurious emission Thales
* R4-2207354 pCR to TS 38.108 - Scope and general Ericsson
* R4-2207355 TP to TS 38.108: section 4 Huawei, HiSilicon
* R4-2207356 TP to TS 38.108: section 3 Huawei, HiSilicon
* R4-2207362 TP for 38.108: clause 9.3 OTA Satellite Access Node output power CATT
* R4-2207363 TP for TS 38.108 Annex B ZTE Corporation
* R4-2207383 TP to TS 38.108: annex A (FRC) Huawei, HiSilicon
* R4-2207357 TP for 38.108: clause 9.7 OTA unwanted emissions CATT
* R4-2207358 pCR to TS 38.108 -Radiated Tx general and transmit power Ericsson
* R4-2207359 TP for TS 38.108 OTA output power dynamics(9.4) ZTE Corporation
* R4-2207360 Draft text proposal for Clause 7.3.4.7.3 OTA ACLR in TR 38.863 THALES
* R4-2207361 TP to TS 38.108: 9.5 (OTA Tx ON/OFF), 9.6 (OTA TX signal quality) and 9.8 (OTA Tx IMD) Huawei, HiSilicon
* R4-2207364 TP for 38.108: clause 10.5 OTA in-band selectivity and blocking CATT
* R4-2207365 pCR to TS 38.108 - Radiated Rx general and sensitivity Ericsson
* R4-2207366 TP for TS 38.108 OTA Rx requirements(10.3, 10.4,10.6 and 10.9) ZTE Corporation
* R4-2207367 Draft text proposal for Clause 7.3.5.6 OTA Out-of-band blocking in TR 38.863 THALES
* R4-2207368 TP to TS 38.108: section 10.7 (OTA Rx spur) and 10.8 (OTA Rx IMD) Huawei, HiSilicon
* R4-2207371 TP for TS 38.108: Output power dynamics (6.3) ZTE Corporation
* R4-2207372 Draft text proposal for Clause 6.1 and 6.2 Satellite Access Node output power - TS 38.108 THALES
* R4-2207460 Draft text proposal for Clause 7.3.2.2.4.1 ACLR in TR 38.863 THALES
* R4-2207373 TP to TS 38.108: section 6.4 (Tx ON/OFF) and 6.5 (TX signal quality) Huawei, HiSilicon
* R4-2207374 TP to TS 38.108: section 6.7 (Tx IMD) Huawei, HiSilicon
* R4-2203955 TP for 38.108: clause 7.1&7.2 on Rx refsens sensitivity
* R4-2207377 pCR to TS 38.108 - In-band selectivity and blocking Ericsson
* R4-2207378 TP for TS 38.108 Dynamic range(7.3) and In channel selectivity(7.8) ZTE Corporation
* R4-2207379 Draft text proposal for Clause 7.3.3.2.4 Out-of-band blocking in TR 38.863 THALES
* R4-2207380 Draft text proposal for Clause 7.5 Out-of-band blocking - TS 38.108 THALES
* R4-2207381 Draft text proposal for Clauses 7.3.3.2.3.1 Adjacent Channel Selectivity (ACS) and 7.3.3.2.3.2 In-band blocking in TR 38.863 THALES
* R4-2207382 TP to TS 38.108: section 7.6 (Rx spur) and section 7.7 (Rx IMD) Huawei, HiSilicon
* R4-2207416 WF on NTN UE RF requirement ZTE
* R4-2207391 TP for 38.101-5: clause 6.3 output power dynamics CATT
* R4-2207393 TP to TS 38.101-5 on clause 7.5 NTN UE ACS Mediatek India Technology Pvt.
* R4-2207394 TP to TS 38.101-5 on clause 7.6 Blocking characteristics Mediatek India Technology Pvt.
* R4-2207396 TP on TS 38.101-5 for general part of transmitter characteristics Qualcomm Incorporated
* R4-2207415 TP for TS38.101-5 on section 6.2 transmitter power Xiaomi
* R4-2207400 TP for TS38.101-5 on section 7.8 Intermodulation characteristics Xiaomi
* R4-2207404 pCR to TS 38.101-5 - Scope Ericsson
* R4-2207405 pCR to TS 38.101-5 - Receiver requirements general Ericsson
* R4-2207410 TP for 38.101-5 on Rx Spurious emissions and spurious response for satellite UE Huawei, HiSilicon
* R4-2207411 TP for TS 38.101-5: Maximum input level (7.4) ZTE Corporation
* R4-2207412 TP to TS 38.101-5 on 7.3 Reference sensitivity HUGHES Network Systems Ltd
* R4-2207413 TP for 38.101-5 clause 6.4 transmit signal qulity CATT
* R4-2207397 TP on TR 38.863 for NTN UE Tx requirements Qualcomm Incorporated
* R4-2207398 Draft TP to update TR 38.863 clause 7.4.3.2 on NTN UE ACS Mediatek India Technology Pvt.
* R4-2207399 Draft TP to update TR 38.863 clause 7.4.3.2 on Blocking characteristics Mediatek India Technology Pvt.
* R4-2207401 TP for TR38.863 on Intermodulation characteristics for NTN UE
* Xiaomi
* R4-2207402 TP for 38.863 on spurious response for NTN UE Xiaomi
* R4-2207403 TP for TR 38.863: Unwanted emissions for NTN satellite UEs transmitting in 1626.5 to 1660.5 MHz Ligado Networks
* R4-2207406 TP for TR 38.863: Updates to UE Maximum Output Power for n255 Ligado Networks, Inmarsat
* R4-2207414 TP for 38.863 on UE Receiver characteristics for satellite access Huawei, HiSilicon
* R4-2207464 WF on general and NTN UE demodulation requirements Qualcomm Incorporated
* R4-2207198 WF on NTN SAN demodulation requirements Huawei, HiSilicon

[Other documents]

Email discussion summaries:

* R4-2207438 Email discussion summary for [102-e][308] NTN\_Solutions\_Part1
* R4-2207439 Email discussion summary for [102-e][309] NTN\_Solutions\_Part2
* R4-2207440 Email discussion summary for [102-e][310] NTN\_Solutions\_Part3
* R4-2207441 Email discussion summary for [102-e][311] NTN\_Solutions\_Part4
* R4-2207442 Email discussion summary for [102-e][325] NR\_NTN\_Demod

**[GTW Agreements on RRM aspects]**

* Agreements
	+ For measurements of cells belonging to the same satellite as the serving cell:
		- No additional scheduling restrictions will be defined
		- Note: existing scheduling restrictions requirements may apply
	+ For measurements of cells belonging to different satellite as the serving cell and performed outside the MG:
		- Whether a UE can perform measurements on cells belonging to different satellite as the serving cell in parallel with normal operation (i.e. data/control transmission and/or reception, [and L1 measurements]) of serving cell without scheduling restrictions is up to UE capability.
		- FFS whether the capability applies for intra-frequency and/or inter-frequency measurements
		- For UEs not able to perform measurements in parallel with normal operation of serving cell scheduling restrictions shall apply.
* Agreements
	+ UE capability for the maximum number of supported MGs
		- NTN UE can support either one MG or two MGs subject to UE capability
		- Note: the decision can be revisited in case it is identified that the agreement contradicts to RAN2 design
* Agreements
	+ Double correction issue shall be taken into account in the gradual timing adjustment accuracy requirement.
* Agreements
	+ When the transmission timing error between the UE and the reference timing exceeds ±Te\_NTN then the UE is required to adjust its timing to within ±Te\_NTN.
	+ The reference timing shall be (NTA+NTA,UE-specific+NTA,common+NTA,offset)×Tc before the downlink timing of the reference cell.
	+ All adjustments made to the UE uplink timing shall follow these rules:
		- Option 1:
			* The maximum amount of the magnitude of the timing change in one adjustment shall be Tq.
			* The minimum aggregate adjustment rate shall be Tp per second.
			* The maximum aggregate adjustment rate shall be Tq per 200 ms.
		- Option 2:
			* The maximum amount of the magnitude of the timing change, apart from a change of (NTA,UE-specific+NTA,common) between the previous transmission and the current transmission, in one adjustment shall be Tq.
			* The minimum aggregate adjustment rate, apart from a change of (NTA,UE-specific+NTA,common) during the last one second, shall be Tp per second.
			* The maximum aggregate adjustment rate, apart from a change of (NTA,UE-specific+NTA,common) during the last 200ms, shall be Tq per 200 ms.
			* where the maximum autonomous time adjustment step Tq and the aggregate adjustment rate Tp are specified in Table 7.1.2.1-1.
	+ The maximum autonomous time adjustment step Tq and the aggregate adjustment rate Tp are specified in Table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency Range | SCS of uplink signals (kHz) | Tq\_NTN  | Tp\_NTN |
| 1 | 15 | [5.5 to 9.5]\*64\*Tc | [5.5 to 13.5]\*64\*Tc |
|  | 30 | [5.5 to 9.5]\*64\*Tc | [5.5 to 13.5]\*64\*Tc |
|  | 60 | NA | NA |
| NOTE: Tc is the basic timing unit defined in TS 38.211  |

Documents endorsed:

* R4-2203854 draft Cat-B CR (R17) MDT in NTN Qualcomm Incorporated
* R4-2203929 Requirements for RRC connected state mobility for NTN CATT
* R4-2204237 DraftCR on maximum interruption in paging reception for NR NTN Xiaomi
* R4-2204474 Draft CR for idle mode UE meausrement capability in NTN. LG Electronics UK
* R4-2204241 DraftCR on inter-frequency measurement requirements for NR NTN Xiaomi
* R4-2204297 Draft CR to general measurement requirement for NTN OPPO
* R4-2205378 CR on intra-frequency measurement requirements for NTN Huawei, HiSilicon
* R4-2205958 Draft CR on L1-RSRP measurements for Reporting in NTN Apple
* R4-2206900 draft CR on signaling characteristics for NTN Ericsson
* R4-2206901 DraftCR for serving cell evaluation and intra-frequency measurements of NTN UE cell reselections Intel Corporation
* R4-2206902 CR on IDLE mode mobility requirements for NTN Huawei, HiSilicon
* R4-2206903 WF on GNSS-related and timing requirements for NR NTN Xiaomi
* R4-2206906 Introduction of Timing advance requirement for NTN MediaTek
* R4-2206907 DraftCR on UE timer accuracy for NR NTN Xiaomi
* R4-2206908 DraftCR on UE transmit timing requirements for NTN Huawei

Documents approved

* R4-2207114 WF on NR NTN RRM requirements

[Other documents]

Email discussion summaries:

* R4-2207061 Email discussion summary: [102-e][220] NR\_NTN\_solutions\_RRM\_1
* R4-2207062 Email discussion summary: [102-e][221] NR\_NTN\_solutions\_RRM\_2

Agreed LS outs

* R4-2206904 Reply LS on NTN UL time and frequency synchronization requirements Xiaomi

Agreed Documents

* [Post 102-e][326] draftTS\_38108\_update R4-2207513, Draft TS 38.108 v0.1.0 Thales Draft TS 38.108 update including all agreed TPs
* [Post 102-e][327] draftTS\_38101-5\_update R4-2207514, Draft TS 38.101-5 v0.1.0 Samsung Draft TS 38.101-5 update including all agreed TPs
* [Post 102-e][328] draftTR\_38863\_update R4-2207515, Draft TR 38.863 v0.3.0 Samsung Draft TR 38.863 update including all agreed TPs

[Essential corrections]

None

#### 2.4.2 Remaining Open issues

RF part:

* SAN(Satellite access node): OBUE and SEM requirements (R4-2207456)
* NTN capable UE: REFSENS and OOBB for band n256; exception cases for UE coexistence requirement for band n256, n255 (details refer to R4-2207416)

RRM part:

* Measurement procedure requirements
	+ Measurement with multiple SMTCs
	+ Measurement requirements for UE supporting 2 measurement gaps

For both parts: Clarifications of missing values in [], resolving some TBD, FFS, and possible TR/TS inconsistencies

## 3. Detailed progress in SA/CT WGs since last TSG meeting (for all involved WGs)

NOTE: This section only needs to be filled in for WI/SIs where there is a corresponding relevant WI/SI in SA/CT.

## 3.1 SAx/CTs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Work Area |  WIDs/SIDs | Rapporteurs | RAN WIDs | Rapporteurs |
| 5G Satellite Aspects | SA2 led WI 5GSAT\_ARCH | jean-yves.fine@thalesgroup.com | RAN2 led WI NR\_NTN\_solutions | nicolas.chuberre@thalesaleniaspace.com |
| 5G Satellite Aspects | CT1 led SI 5GSAT\_ARCH-CT | amerc@qti.qualcomm.com | RAN2 led WI NR\_NTN\_solutions | nicolas.chuberre@thalesaleniaspace.com |

#### 3.1.1 Agreements with cross-TSG impacts

a Cell ID as used in the User Location Information on the NG/N2 interface corresponds to a fixed geographical area, and the Tracking Area is coupled with geographical area.

Note: NTN WID includes “identification of potential issues associated to the use of the existing Location Services (LCS) application protocols to locate UE in the context of NTN and specify adaptations if any [RAN2/3]”. This could be used to determine the UE location with sufficient level of accuracy if needed.

#### 3.1.2 Remaining Open issues with cross-TSG impacts

NOTE: This section should also flag any critical dependencies that need TSG attention.

* UE location information to be sent to NG-RAN in connected mode

## 4. References

NOTE: This can be e.g. a list of all related Tdocs in the affected WGs since last TSG, references to LSs, produced TRs/TSs, the work/study item description or status reports of previous TSGs.

## 4.1 RAN1

* **RAN1#107-bis-e, 17th – 25th January 2022, e-meeting**

Submitted TDOCs:

* -
* **RAN1#108-e, 21st February – 3rd March 2022, e-meeting**

Submitted TDOCs:

* R1-2201183 Draft Reply LS to RAN2 on NTN-specific SIB THALES
* R1-2201184 TP for RAN1 additions to the stg2 CR for TS 38.300 THALES
* R1-2202489 MEO Scenarios and Characteristics HUGHES Network Systems Ltd
* R1-2202285 Remaining issues on timing relationship enhancements in NTN LG Electronics
* R1-2202360 Remaining issues on timing relationship enhancements for NTN NEC
* R1-2201215 Timing relationship enhancements for NR-NTN MediaTek Inc.
* R1-2201271 Discussion on remaining issue for timing relationship enhancement OPPO
* R1-2201852 Remaining issues on timing relationship enhancements for NTN CMCC
* R1-2201358 Remaining issues on timing relationship enhancements for NTN CATT
* R1-2200937 Maintenance on timing relationship enhancements for NTN Huawei, HiSilicon
* R1-2201645 Maintenance aspects of time relations for Rel-17 NR over NTN Nokia, Nokia Shanghai Bell
* R1-2202206 Remaining issues of timing relationship for NR-NTN ZTE
* R1-2202241 Remaining issues on timing relationship enhancement for NTN Baicells
* R1-2201546 Discussion on timing relationship enhancements for NTN Spreadtrum Communications
* R1-2201771 Remaining Issues of Timing Relationship Enhancements for NR NTN Apple
* R1-2201744 Remaining issues on timing relationship enhancement for NTN InterDigital, Inc.
* R1-2201804 On timing relationship maintenance issues for NR NTN Ericsson Hungary Ltd
* R1-2202011 Maintenance issues on Timing relationship enhancements for NTN Samsung
* R1-2201921 Remaining issues on the timing relationship for NTN Xiaomi
* R1-2201969 Discussion on NTN timing relationship Lenovo, Motorola Mobility
* R1-2202138 Remaining issues on UL time and frequency synchronization for NTN Qualcomm Incorporated
* R1-2201922 Remaining issues on UL time and frequency synchronization for NTN Xiaomi
* R1-2202012 Maintenance issues on UL time and frequency synchronization for NTN Samsung
* R1-2201805 On UL time and frequency synchronization maintenance issues for NTN Ericsson Hungary Ltd
* R1-2201745 Remaining issues on UL time/frequency synchronization for NTN InterDigital, Inc.
* R1-2201772 Remaining Issues of Uplink Time and Frequency Synchronization for NR NTN Apple
* R1-2201547 Discussion on enhancements on UL time and frequency synchronization for NTN Spreadtrum Communications
* R1-2201581 Discussion on ambiguity of common TA calculation Sony
* R1-2202207 Remaining issues of UL synchronization for NR-NTN ZTE
* R1-2201646 Maintenance aspects of time and frequency synchronization for Rel-17 NR over NTN Nokia, Nokia Shanghai Bell
* R1-2200938 Maintenance on UL time and frequency synchronization enhancement for NTN Huawei, HiSilicon
* R1-2201011 Maintenance on UL timing and frequency synchronization in NTN THALES
* R1-2201359 Remaining issues on UL time and frequency synchronization enhancement for NTN CATT
* R1-2201387 Enhancements on UL time and frequency synchronization PANASONIC R&D Center Germany
* R1-2201853 Remaining issues on enhancements on UL time and frequency synchronization for NTN CMCC
* R1-2201477 Remaining issues on UL time and frequency synchronization enhancements for NTN NTT DOCOMO, INC.
* R1-2201272 Discussion on remaining issue for UL time and frequency synchronization OPPO
* R1-2201216 Enhancements on UL Time and Frequency Synchronisation for NR-NTN MediaTek Inc.
* R1-2202361 Remaining issues on UL time synchronization for NR NTN NEC
* R1-2202359 Remaining issues on UL time and frequency synchronization enhancement for NTN Baicells
* R1-2202286 Remaining issues on UL time and frequency synchronization enhancements in NTN LG Electronics
* R1-2202287 Remaining issues on HARQ enhancements in NTN LG Electronics
* R1-2202362 Remaining issues on HARQ enhancements for NR NTN NEC
* R1-2201273 Discussion on remaining issue for HARQ enhancements OPPO
* R1-2201478 Remaining issues on HARQ enhancements for NR NTN NTT DOCOMO, INC.
* R1-2201854 Remaining issues on enhancements on HARQ for NTN CMCC
* R1-2201360 Remaining issues on HARQ operation enhancement for NTN CATT
* R1-2201092 Remaining issues on HARQ enhancements for NR-NTN vivo
* R1-2200939 Maintenance on HARQ enhancement for NTN Huawei, HiSilicon
* R1-2201647 Maintenance aspects related to HARQ for Rel-17 NR over NTN Nokia, Nokia Shanghai Bell
* R1-2202208 Remaining issues of HARQ for NR-NTN ZTE
* R1-2202242 Remaining issues on HARQ enhancement for NTN Baicells
* R1-2201633 HARQ enhancement for NTN Panasonic Corporation
* R1-2201548 Discussion on enhancements on HARQ for NTN Spreadtrum Communications
* R1-2201773 Remaining Issue of HARQ Enhancements for NR NTN Apple
* R1-2201746 Remaining issues on HARQ enhancement for NTN InterDigital, Inc.
* R1-2201806 On HARQ maintenance issues for NR NTN Ericsson Hungary Ltd
* R1-2202013 Maintenance issues on HARQ aspects for NTN Samsung
* R1-2201923 Discussion on HARQ for NTN Xiaomi
* R1-2202139 Remaining issues on HARQ for NTN Qualcomm Incorporated
* R1-2201960 Remaining issues on enhancements on HARQ to support NTN CAICT
* R1-2201812 On other maintenance issues for NR NTN Ericsson Hungary Ltd
* R1-2202209 Remaining issues of additional enhancement for NR-NTN ZTE
* R1-2201648 Maintenance aspects of RRC parameters for Rel-17 NR over NTN Nokia, Nokia Shanghai Bell
* R1-2201855 Other Aspects for NTN CMCC
* R1-2201479 Remaining issues on other aspects for NR NTN NTT DOCOMO, INC.
* R1-2202364 Remaining issues for NR NTN NEC
* R1-2202424 Discussion on other design aspects for NTN Huawei, HiSilicon

## 4.2 RAN2

* **RAN2#116-bis-e, 17th – 25th January 2022, e-meeting**

Submitted TDOCs:

* R2-2200886 Updated NR-NTN-solutions work plan THALES
* R2-2200887 NR-NTN Stg2 running CR THALES
* R2-2201006 Stage-3 running 304 CR for NTN ZTE corporation, Sanechips
* R2-2200449 [Draft] Reply LS on Multiple SMTCs for NR NTN Qualcomm Incorporated
* R2-2200450 [Draft] Reply LS on NR NTN Neighbor Cell and Satellite Information Qualcomm Incorporated
* R2-2200145 LS on TAC reporting in ULI and support of SAs and FAs for NR Satellite Access (S2-2109337; contact: Qualcomm) SA2
* R2-2200148 Reply LS on NTN specific User Consent (S3-214349; contact: Qualcomm) SA3
* R2-2200149 Reply LS on UE location aspects in NTN (S3-214360; contact: CATT) SA3
* R2-2200150 Reply LS on UE location aspects in NTN (S3-214394; contact: Xiaomi) SA3
* R2-2200128 Reply LS on Multiple SMTCs for NR NTN (R4-2120308; contact: Qualcomm) RAN4
* R2-2200129 LS on NR NTN Neighbor Cell and Satellite Information (R4-2120309; contact: Qualcomm) RAN4
* R2-2200104 Reply LS on UE Location Aspects in NTN (R3-216067; contact: Ericsson) RAN3
* R2-2200071 Reply LS on UE TA reporting (R1-2112766; contact: Ericsson) RAN1
* R2-2201166 MAC open issues in NTN - RAN2#116bis-e InterDigital
* R2-2201433 Stage-3 running RRC CR for NTN Rel-17 Ericsson
* R2-2201405 DRAFT Reply LS on TAC reporting in ULI and support of SAs and FAs for NR Satellite Access China Telecommunications
* R2-2201167 Stage 3 NTN running CR for 38.321 - RAN2#116bis-e InterDigital
* R2-2200214 Discussion on remaining issues on TA reporting Intel Corporation
* R2-2200243 Discussion on RACH and TA report in NTN OPPO
* R2-2200347 Remaining issues about RACH and TA reporting Huawei, HiSilicon
* R2-2200377 Discussion on UE specific TA reporting vivo
* R2-2200270 Remaining issues related to TA report Xiaomi
* R2-2200627 TA report procedure Spreadtrum Communications
* R2-2201007 Discussion on RACH open issues and TA reporting aspects Nokia, Nokia Shanghai Bell
* R2-2200876 Considerations on RACH aspects CMCC
* R2-2200688 The Left Issues on UE-specific TA information reporting in NTN CATT
* R2-2200520 Consideration of TA report remaining issues of NTN China Telecom
* R2-2200746 Discussion on TA report during RA procedure ASUSTeK
* R2-2200747 Discussion on issue of restarting contention resolution timer ASUSTeK
* R2-2200764 Further discussion on TA reporting in NTN Lenovo, Motorola Mobility
* R2-2201034 Further considerations on TA reporting Samsung Research America
* R2-2201630 Reporting information about UE specific TA pre-compensation in NTNs Ericsson
* R2-2201193 Remaining issues on TA Report NEC Telecom MODUS Ltd.
* R2-2201164 UE-specific TA reporting and other RACH aspects InterDigital
* R2-2201363 Discussion on RACH and TA report aspects LG Electronics Inc.
* R2-2201324 Consideration on remaining issues of RACH aspects ZTE Corporation, Sanechips
* R2-2200911 CG enhancements in NTN Sony
* R2-2200618 Remaining issues on disabling uplink HARQ retransmission MediaTek Inc.
* R2-2200619 Round trip delay offset for configured grant timer MediaTek Inc.
* R2-2200689 Left Issues on DL/UL HARQ Aspects CATT
* R2-2201008 Discussion on left issues on MAC aspects Nokia, Nokia Shanghai Bell
* R2-2200870 Further Considerations on CG/SPS for NR NTN CMCC
* R2-2200787 Remaining issues on HARQ related timer handling for NR NTN vivo
* R2-2200788 Remaining issues on LCP aspects vivo
* R2-2200628 Discussion on HARQ and LCP remaining issues Spreadtrum Communications
* R2-2200444 HARQ process for SPS and CG Qualcomm Incorporated
* R2-2200271 Remaining issues related to HARQ retransmission state Xiaomi
* R2-2200348 Remaining issues about other MAC aspects Huawei, HiSilicon
* R2-2200244 Remaining issues on other MAC aspects in NTN OPPO
* R2-2201325 Consideration on remaining issues of other MAC aspects ZTE Corporation, Sanechips
* R2-2201364 Discussion on other MAC aspects LG Electronics Inc.
* R2-2201163 Remaining MAC open issues in NTN InterDigital
* R2-2201480 HARQ State A/B for CG/SPS aspects ITL
* R2-2201629 On configured scheduling, DRX, LCP, HARQ and SR/BSR in NTNs Ericsson
* R2-2201194 RLC t-Reassembly timer NEC Telecom MODUS Ltd.
* R2-2200245 Discussion on UE location information reporting OPPO
* R2-2200212 Discussion on location reporting Intel Corporation
* R2-2200289 Discussion on UE location reporting Huawei, HiSilicon
* R2-2200445 Discussion on coarse UE location report Qualcomm Incorporated
* R2-2200629 Discussion on TAC update and LCS in NTN Spreadtrum Communications
* R2-2200869 Views on UE Location Information Reporting in NTN CMCC
* R2-2200987 On reporting of UE location information ZTE corporation, Sanechips
* R2-2200879 UE location during initial access THALES
* R2-2200960 Reporting virtual location identifier for AMF/PLMN selection and location verification in NTN Fraunhofer IIS; Fraunhofer HHI; Thales
* R2-2200715 Discussion on UE location reporting in NTN Xiaomi
* R2-2200765 Remaining CHO issues in RRC running CR Lenovo, Motorola Mobility
* R2-2200912 Event triggered location reporting in NTN Sony
* R2-2200748 Discussion on event triggered based UE location report ASUSTeK
* R2-2201080 On LCS and TAC handling in Rel-17 NTN Nokia, Nokia Shanghai Bell
* R2-2201579 UE location reporting in initial access Samsung Research America
* R2-2201445 General aspects for NTN Ericsson
* R2-2201447 Remaining issues on TAC selection and reporting in NTN Samsung R&D Institute UK
* R2-2201404 Discussion of reply LS on TAC reporting in NTN China Telecom
* R2-2201408 Discussion on left issues on UE location report CATT
* R2-2201178 On UE location reporting in NTN Apple
* R2-2201079 On IDLE mode aspects in Rel-17 NTN Nokia, Nokia Shanghai Bell
* R2-2200621 Idle mode mobility for NTN-TN scenarios MediaTek Inc.
* R2-2200933 SMTC Adjustment for Idle and Inactive UEs in NTN Google Inc.
* R2-2201139 On Defining a New NTN-Specific SIB MediaTek Inc.
* R2-2200766 Ephemeris provision in system information for NTN Lenovo, Motorola Mobility
* R2-2200767 Further discussion on idle mode mobility in NTN Lenovo, Motorola Mobility
* R2-2200716 Discussion on RRC idle mode issues Xiaomi
* R2-2200690 Further Discussion on the Leftover Issues of IDLE/INACTIVE CATT
* R2-2200650 Discussion on NTN Idle mode measurement and cell reselection Transsion Holdings
* R2-2200665 Remaining idle mode issues in NTN LG Electronics Inc.
* R2-2200877 Further Considerations on Cell Re-selection CMCC
* R2-2201003 System information for NTN and idle mode mobility for intra-NTN and TN-NTN case ZTE corporation, Sanechips
* R2-2200630 Acquiring the ephemeris of neighbour cell Spreadtrum Communications
* R2-2200342 System information to assist cell reselection ITRI
* R2-2200446 Cell type indication Qualcomm Incorporated
* R2-2200447 IDLE mode measurements Qualcomm Incorporated
* R2-2200290 Discussion on idle mode aspects Huawei, HiSilicon
* R2-2200378 Remaining issues on idle/inactive mode mobility vivo
* R2-2200215 Discussion on TN prioritization over NTN for idle mode Intel Corporation
* R2-2200216 Discussion on enhancements to cell reselection Intel Corporation
* R2-2200246 Discussion on NTN specific system information OPPO
* R2-2201179 NTN-TN idle mode mobility Apple
* R2-2201165 Location-assisted cell reselection InterDigital
* R2-2201195 Location-assisted cell reselection NEC Telecom MODUS Ltd.
* R2-2201196 NTN to TN mobility in Idle or Inactive mode NEC Telecom MODUS Ltd.
* R2-2201446 Idle mode aspects for NTN Ericsson
* R2-2201580 Measurements and cell reselection Samsung Research America
* R2-2201180 NTN Ephemeris definition and signaling Apple
* R2-2201615 Discussion on system information enhancement for NR NTN Turkcell, BT Plc, Deutsche Telekom, Aselsan
* R2-2200247 Discussion on NTN UE capabilities OPPO
* R2-2201004 Leftover issues in CHO and measurements ZTE corporation, Sanechips
* R2-2200666 Connected mode remaining issues in NTN LG Electronics Inc.
* R2-2200913 SMTC enhancement in NTN Sony
* R2-2200620 On UE Capabilities in NR-NTN MediaTek Inc.
* R2-2200376 Remaining issues on UE capability for Rel-17 NTN vivo
* R2-2200213 Discussion on remaining issues on NR NTN UE capabilities Intel Corporation
* R2-2200040 Report of email discussion [Post116-e][111][NTN] UE capabilities (Intel) Intel Corporation
* R2-2200041 Draft 331 CR for NR NTN UE capabilities Intel Corporation
* R2-2200042 Draft 306 CR for NR NTN UE capabilities Intel Corporation
* R2-2200291 Discussion on UE capabilities Huawei, HiSilicon
* R2-2200448 Discussion on UE capabilities Qualcomm Incorporated
* R2-2201632 NR NTN UE capabilities Ericsson
* R2-2201545 L2 buffer calculation and QoS requirement Interdigital, Inc.
* **RAN2#117-e, 21st February – 3rd March 2022, e-meeting**

Submitted TDOCs:

* R2-2202131 Reply LS on LS on TAC reporting in ULI and support of SAs and FAs for NR Satellite Access (R3-220121/S2-2109337) (R3-221370; contact: Qualcomm) RAN3
* R2-2202132 LS on RAN Initiated Release due to out-of-PLMN area condition (R3-221379; contact: Qualcomm) RAN3
* R2-2202233 Stg2 running CR - NTN THALES
* R2-2202234 NTN RAN3's stg2 BL CR THALES
* R2-2202456 Draft 331 CR for NR NTN UE capabilities Intel Corporation
* R2-2202457 Draft 306 CR for NR NTN UE capabilities Intel Corporation
* R2-2203157 Introduction of Release-17 NTN Ericsson
* R2-2203385 Introduction of NTN ZTE corporation,Sanechips
* R2-2203425 Stage 3 NTN running CR for 38.321 - RAN2#117 InterDigital
* R2-2203482 Remaining MAC issues in NTNs Ericsson
* R2-2203423 Remaining MAC open issues in NTN InterDigital
* R2-2203424 Summary of [Pre117-e][NTN][103] MAC open issues InterDigital
* R2-2203256 On left open issues for MAC aspects Nokia, Nokia Shanghai Bell
* R2-2203257 Discussion on Validity timer expiry and restart Nokia, Nokia Shanghai Bell
* R2-2203298 Open issues on MAC aspects Samsung Research America
* R2-2203151 Discussion on TA reporting ITL
* R2-2203165 Discussion on open issues for MAC aspects LG Electronics Inc.
* R2-2202999 Discussion on MAC open issues in NTN OPPO
* R2-2202972 Consideration on MAC open issues ZTE Corporation, Sanechips
* R2-2202420 Remaining issues on HARQ process in NTN Spreadtrum Communications
* R2-2202563 UL synchronization failure in RRC\_CONNECTED Qualcomm Incorporated
* R2-2202613 Considerations on MAC open issues CMCC
* R2-2202546 UL synchronization and validity timer expiry Apple
* R2-2202547 UE location and TA reporting Apple
* R2-2202302 Discussion on MAC open issues Huawei, HiSilicon
* R2-2202303 Discussion on remaining MAC issues Huawei, HiSilicon
* R2-2202421 MAC operation about the validity timer expiry Spreadtrum Communications
* R2-2202773 Remaining MAC Open Issues for NR NTN vivo
* R2-2203194 Remaining MAC issues of NR NTN Xiaomi
* R2-2203076 Discussion on Left Open Issues of Other MAC Aspects CATT
* R2-2203203 CG enhancements in NTN Sony
* R2-2203481 Remaining issues for RLC and PDCP in NTNs Ericsson
* R2-2202394 On reporting of UE location information ZTE corporation, Sanechips
* R2-2202235 WF for UE location during initial access in NTN THALES, Leonardo, Avanti, ESA, Sateliot, Omnispace, Novamint, Hispasat, Gatehouse, Hughes network systems, Inmarsat, Viasat, CTTC, Intelsat, Kepler, Ligado, Magister solutions, SES, Airbus
* R2-2202422 Discussion on the SIBX acquiring procedure Spreadtrum Communications
* R2-2202423 Acquiring the ephemeris of neighbour cell Spreadtrum Communications
* R2-2202466 Remaining Rel-17 NTN open issues for IDLE mode Nokia, Nokia Shanghai Bell
* R2-2203386 Report of [Pre117-e][102][NTN] Idle mode open issues (ZTE) ZTE corporation,Sanechips
* R2-2202548 NTN-TN idle mode mobility Apple
* R2-2203049 Measurements and cell reselection Samsung Research America
* R2-2203004 Discussion on measurement rules for cell re-selection in NTN OPPO
* R2-2202774 Remaining issues on location-based cell reselection vivo
* R2-2202586 Epoch time and validity time for neighbour satellite ephemeris Lenovo, Motorola Mobility
* R2-2202566 Assistance information for IDLE mode measurements Qualcomm Incorporated
* R2-2202587 Consideration on open issues for CHO Lenovo, Motorola Mobility
* R2-2202565 Open issues in CHO Qualcomm Incorporated
* R2-2202467 Remaining Rel-17 NTN open issues for CONNECTED mode Nokia, Nokia Shanghai Bell
* R2-2202424 Discussion on SIB X Spreadtrum Communications
* R2-2202775 Open issues on CHO for R17 NR NTN vivo
* R2-2202886 Remaining issues on CHO Huawei, HiSilicon
* R2-2203005 Discussion on the RRC open issues in NTN OPPO
* R2-2203051 Remaining NTN CHO issues LG Electronics France
* R2-2203301 Open issues on RRC aspects Samsung Research America
* R2-2203236 Remaining open issues of CHO NEC Telecom MODUS Ltd.
* R2-2203077 Further Discussion on the Open Issues of CHO CATT
* R2-2203067 Discussion on RRC open issues for NTN Xiaomi Communications
* R2-2203153 Remaining connected mode aspects for NTN Ericsson
* R2-2203154 [Pre117-e][NTN][101] RRC open issues Ericsson
* R2-2203422 Remaining RRC open issues in NTN InterDigital
* R2-2203190 Location report for TA report and LCS support in connected mode Xiaomi
* R2-2203191 Remaining issues relating to SIBxx and the RRC delay for RRC Release Xiaomi
* R2-2203066 Further consideration of initial access Samsung Research America
* R2-2203006 Discussion on remaining open issues in connected mode OPPO
* R2-2202853 Measurement Gap Issues in NTN Google Inc.
* R2-2202850 Discussion on assistance information for SMTC ASUSTeK
* R2-2202840 Network-Based SMTC Configuration in NTN Google Inc.
* R2-2202776 Discussion on the signaling design for NTN specific information vivo
* R2-2202455 Discussion on NR NTN measurement gaps Intel Corporation
* R2-2202588 Contents of UE assistance for measurement window and gap configuration in NTN Lenovo, Motorola Mobility
* R2-2202564 SMTC and MG configuration Qualcomm Incorporated
* R2-2202614 Further discussion on intra-NTN mobility CMCC
* R2-2203485 NR NTN UE capabilities Ericsson
* R2-2202725 Remaining Issues of Set2 on NR NTN UE Capabilities CMCC
* R2-2202454 Report of email discussion [Pre117-e][104][NTN] UE caps open issues (Intel) Intel Corporation
* R2-2202459 Discussion on the difference between GSO and GEO Intel Corporation
* R2-2202887 Discussion on capabilities for gaps and HARQ Huawei, HiSilicon

## 4.3 RAN3

* **RAN3#114-bis-e, 17th – 25th January 2022, e-meeting**

Submitted TDOCs:

* R3-220998 Updated NR-NTN-solutions work plan THALES
* R3-220010 Clarification of NAS Node Selection Function for NTN nodes providing access over multiple countries Qualcomm Incorporated, Nokia, Nokia Shanghai Bell, Huawei, Thales
* R3-220011 Support of NTN RAT identification and NTN RAT restrictions Qualcomm Incorporated, Huawei, Thales, , Ericsson, Nokia, Nokia Shanghai Bell, CATT
* R3-220029 Support of NTN RAT identification and NTN RAT restrictions Qualcomm Incorporated, Huawei, Thales, , Ericsson, Nokia, Nokia Shanghai Bell, CATT
* R3-220071 Support Non-Terrestrial Networks Huawei, Thales, Ericsson, ZTE, Qualcomm Incorporated
* R3-220127 Reply LS on UE location aspects in NTN SA3
* R3-220125 Reply LS on NTN specific User Consent SA3
* R3-220126 Reply LS on UE location aspects in NTN SA3
* R3-220112 Reply LS on extended NAS supervision timers at satellite access RAN2
* R3-220108 Reply LS on UE location aspects in NTN RAN2
* R3-220465 Clean-up definition and abbreviation Huawei
* R3-220466 Further discuss on multiple TAC issues Huawei
* R3-220394 Multi TAC handling and reporting in NTN China Telecommunication
* R3-220713 (TP for NTN BL CR 38.413) TAI reporting in ULI CATT
* R3-220121 LS on TAC reporting in ULI and support of SAs and FAs for NR Satellite Access SA2
* R3-220283 (TP for TS38.413 BL CR on NTN) Handling TA reporting in ULI Qualcomm Incorporated
* R3-220284 [DRAFT] Reply LS on LS on TAC reporting in ULI and support of SAs and FAs for NR Satellite Access (R3-220121/S2-2109337) Qualcomm Incorporated
* R3-220895 (TP for BL CR 38.413) TAC Reporting in ULI for NTN ZTE
* R3-220629 TAC Reporting in ULI for NTN Ericsson LM
* R3-220826 (TP for BL CR for TS 38.300) mapped cell ID determination after AS security and TAC reporting Nokia, Nokia Shanghai Bell
* R3-220827 (TP for BL CR for TS 38.413) TAC reporting for support multiple TAC broadcast over the air Nokia, Nokia Shanghai Bell
* R3-220628 Country Routing and Cause Value for UE Context Release Ericsson LM
* R3-220896 (TP for BL CR 38.413) Country-specific Routing for NTN ZTE
* R3-220860 Discussion on Country-Specific Routing CMCC
* R3-220285 (TP for BL CR for 38.300) Final aspects of country border crossing Qualcomm Incorporated
* R3-220714 (TP for NTN BL CR 38.413) On Cause Value for Cross-country Scenario CATT
* R3-220464 New paging cause for UE Context Release Request Huawei
* **RAN3#115-e, 21st February – 3rd March 2022, e-meeting**

Submitted TDOCs:

* R3-221921 UE location report during initial access Huawei
* R3-221922 [DRAFT] Relpy LS on UE location during initial access in NTN Huawei
* R3-221797 CHO for NTN - Possible RAN3 Impacts of Ongoing RAN2 Discussion Ericsson LM, Thales
* R3-221662 Reply LS on NTN specific User Consent RAN2
* R3-221742 (TP for TS 38.300 BL CR on NTN) Discussion of the RAN2 LS on absence of UE location information at RRC Setup Qualcomm Incorporated
* R3-221743 (TP for TS38.413 BL CR on NTN) LS Response Analysis: Handling TA reporting in ULI Qualcomm Incorporated
* R3-221786 UE Location Information and NTN Ericsson LM
* R3-221787 [DRAFT] Reply LS on UE location during initial access in NTN Ericsson LM
* R3-221508 Clarification of NAS Node Selection Function for NTN nodes providing access over multiple countries Qualcomm Incorporated, Nokia, Nokia Shanghai Bell, Huawei, Thales
* R3-221509 Introduction of NTN Qualcomm Incorporated, Huawei, Thales, , Ericsson, Nokia, Nokia Shanghai Bell, CATT
* R3-221524 Introduction of NTN Qualcomm Incorporated, Huawei, Thales, , Ericsson, Nokia, Nokia Shanghai Bell, CATT
* R3-221609 Support Non-Terrestrial Networks Huawei, Thales, Ericsson, ZTE, Qualcomm Incorporated

## 4.1 RAN4

* **RAN4#101-bis-e, 17th – 25th January 2022, e-meeting**

Submitted TDOCs:

* R4-2201991 Considerations for TS 38.101-5 development MediaTek (Chengdu) Inc.
* R4-2201170 Draft text proposal to update TR 38.863 Samsung
* R4-2203081 Draft text proposal to update TR 38.863 Samsung
* R4-2203080 Way Forward on NTN\_solutions\_Part1 THALES
* R4-2203086 Draft skeleton for TS 38.101-5 Samsung
* R4-2203087 Skeleton for TS 38.108 NR Satellite Access Node radio transmission and reception v0.0.1 THALES
* R4-2203132 Draft TR 38.863 update v0.2.0 Samsung
* R4-2202969 Email discussion summary for [101-bis-e][306] NTN\_Solutions\_Part1 Moderator (THALES)
* R4-2203111 Email discussion summary for [101-bis-e][306] NTN\_Solutions\_Part1 Moderator (THALES)
* R4-2203082 TP to TR 38.863 on channel raster and sync raster CATT
* R4-2203083 NTN - Regulatory information - TP to TR 38.863 Ericsson
* R4-2203084 TP to TR 38.863 on regulatory aspects for HAPS Nokia, Nokia Shanghai Bell
* R4-2203085 TP to TR 38.863 on general aspects Nokia, Nokia Shanghai Bell
* R4-2201257 TP for 38.863 on system parameters to clarify “NTN satellite bands” Huawei, HiSilicon
* R4-2201074 On NTN System parameters Nokia, Nokia Shanghai Bell
* R4-2200478 TP to TR 38.863 on operating bands and channel bandwidth CATT
* R4-2200479 TP to TR 38.863 on transmitter characteristics for satellite access node CATT
* R4-2200162 On remaining open issue for NTN system parameters CATT
* R4-2200163 TP to TR 38.863 on channel raster and sync raster CATT
* R4-2201989 NTN system parameters remaining issues for n255 MediaTek (Chengdu) Inc.
* R4-2201465 Further discussion on NTN gNB class ZTE Corporation
* R4-2200165 Satellite Access Node Class/Type CATT
* R4-2201075 TP to TR 38.863 on regulatory aspects for HAPS Nokia, Nokia Shanghai Bell
* R4-2201314 NTN - Regulatory information - TP to TR 38.863 Ericsson
* R4-2203129 NTN - Regulatory information - TP to TR 38.863 Ericsson
* R4-2201315 NTN - General aspects related to BS and UE requirements Ericsson
* R4-2201288 Draft skeleton for TS 38.101-5 Samsung
* R4-2201830 Skeleton for TS 38.108 NR Satellite Access Node radio transmission and reception v0.0.1 THALES
* R4-2201838 Draft proposal to update TR 38.863 NTN related RF and co-existence aspects THALES
* R4-2201076 TP to TR 38.863 on general aspects Nokia, Nokia Shanghai Bell
* R4-2201263 Draft skeleton for TS 38.101-5 Samsung
* R4-2200363 Considerations on HAPS specific technical requirements SoftBank Corp., KDDI Corporation, Intelsat
* R4-2202988 Draft Text Proposal for TR 38.863 Chapter 6.3 and 6.4 Samsung
* R4-2202970 Email discussion summary for [101-bis-e][307] NTN\_Solutions\_Part2 Moderator (Samsung)
* R4-2202990 WF on [307] NTN\_Solutions\_Part2 Samsun
* R4-2202991 Simulation assumptions for NTN co-existence Samsung, CATT
* R4-2202992 Simulation assumptions for HAPS co-existence Nokia
* R4-2202993 Summary of NTN co-existence study Samsung
* R4-2202994 Summary of HAPS co-existence study Nokia
* R4-2203112 Email discussion summary for [101-bis-e][307] NTN\_Solutions\_Part2 Moderator (Samsung)
* R4-2203130 WF on [307] NTN\_Solutions\_Part2 Samsung
* R4-2200164 NTN coexistence simulations CATT
* R4-2201255 NR NTN co-existence simulation Results Huawei, HiSilicon
* R4-2201262 NTN coexistence results and observations MediaTek (Chengdu) Inc.
* R4-2201222 Simulation result for coexistence study on NR to support non-terrestrial networks Xiaomi
* R4-2201124 Collected NR-NTN co-ex results Samsung
* R4-2201072 NR-NTN co-ex study results Samsung
* R4-2200781 Coexistence simulation results for TN-NTN Qualcomm Incorporated
* R4-2201842 NTN Simulation Assumptions THALES
* R4-2201843 NTN coexistence calibration data - THALES 28\_09\_2021 THALES
* R4-2201852 NR-NTN coexistence results - THALES updates 10\_01\_2022 THALES
* R4-2201316 NTN - Coexistence simulation results Ericsson
* R4-2201466 Simulation results for NTN coexistence study ZTE Corporation
* R4-2200782 Coexistence simulation restuls for HAPS Qualcomm Incorporated
* R4-2201077 HAPS simulation assumptions for coexistence study Nokia, Nokia Shanghai Bell
* R4-2201078 TP to TR 38.863 on HAPS coexistence study Nokia, Nokia Shanghai Bell
* R4-2201254 Discussion on HAPS requirements Huawei, HiSilicon
* R4-2201256 Discussion on ACLR and ACS for NR NTN Huawei, HiSilicon
* R4-2201126 NR-NTN co-ex results analysis and ACLR ACS proposal Samsung
* R4-2201127 Draft Text Proposal for TR 38.863 Chapter 6.3 and 6.4 Samsung
* R4-2201079 ACLR and ACS proposal for HAPS Nokia, Nokia Shanghai Bell
* R4-2200166 ACLR/ACS proposal CATT
* R4-2201467 Discussion on ACLR and ACS requirements for NTN ZTE Corporation
* R4-2201317 NTN - ACLR/ACS proposals Ericsson
* R4-2201839 TN-NTN Coexistence Results Updates THALES, Magister Solutions Ltd
* R4-2200167 Remaining issue for satellite access node RF requirement - Tx part CATT
* R4-2200168 Remaining issue for satellite access node RF requirement - Rx part CATT
* R4-2203124 WF on BS RF requirements for SAN type 1-H CATT
* R4-2203113 Email discussion summary for [101-bis-e][308] NTN\_Solutions\_Part3 Moderator (Huawei)
* R4-2202971 Email discussion summary for [101-bis-e][308] NTN\_Solutions\_Part3 Moderator (Huawei)
* R4-2203033 WF on BS RF requirements for SAN type 1-H CATT
* R4-2203034 WF on Tx RF requirement for SAN type 1-O ZTE
* R4-2203035 WF on Rx RF requirement for SAN type 1-O Ericsson
* R4-2203036 WF on UE RF requirement for NTN UE Huawei
* R4-2203040 TP to TR 38.863 on transmitter characteristics for satellite access node CATT
* R4-2203037 TP for 38.863 on UE transmission characteristics for satellite access Huawei
* R4-2203039 TP for 38.863 on UE Receiver characteristics for satellite access Huawei
* R4-2203038 TP for 38.863 on maximum input level for NTN UE Xiaomi
* R4-2202406 UE Array, EIRP level and Spherical Coverage at 60 GHz Sony, Ericsson
* R4-2200169 Discussion on NTN BS RF requriement for type 1-O - Tx part CATT
* R4-2201258 Discussion on UE Tx requirements for satellite access Huawei, HiSilicon
* R4-2201260 TP for 38.863 on UE transmitter characteristics for satellite access Huawei, HiSilicon
* R4-2201816 Discussion on Satellite Access Node radiated RF requirements: Tx Huawei
* R4-2201318 NTN - Satellite Node Access - Tx requirements Ericsson
* R4-2201468 Discussion on radiated Tx requirements of satellite access node ZTE Corporation
* R4-2201469 Discussion on radiated Rx requirements of satellite access node ZTE Corporation
* R4-2201319 NTN - Satellite Node Access - Rx requirements Ericsson
* R4-2201817 Discussion on Satellite Access Node radiated RF requirements: Rx Huawei
* R4-2201261 TP for 38.863 on UE Receiver characteristics for satellite access Huawei, HiSilicon
* R4-2201259 Discussion on UE Rx requirements for satellite access Huawei, HiSilicon
* R4-2200170 Discussion on NTN BS RF reqruiement for type 1-O - Rx part CATT
* R4-2201818 Discussion on Satellite Access Node conducted RF requirements: Tx Huawei
* R4-2201819 Discussion on 64QAM support for the Satellite Access Node operation in FR1 Huawei, HiSilicon
* R4-2201320 NTN - Satellite Node Access - OTA Tx requirements Ericsson
* R4-2201470 Discussion on conducted Tx requirements of satellite access node ZTE Corporation
* R4-2201471 Discussion on conducted RF requirements from satellite network perspective ZTE Corporation
* R4-2201321 NTN - Satellite Node Access - OTA Rx requirements Ericsson
* R4-2201820 Discussion on Satellite Access Node conducted RF requirements: Rx Huawei
* R4-2201322 NTN - UE - Tx requirements Ericsson
* R4-2201310 Discussion on UE Tx requirements for satellite access Huawei, HiSilicon
* R4-2201312 TP for 38.863 on UE transmitter characteristics for satellite access Huawei, HiSilicon
* R4-2201472 Discussion on NTN UE Tx RF requirements ZTE Corporation
* R4-2200073 Further discussion on UE Tx RF requirements for NTN CATT
* R4-2200331 Discussion on UE TX requirements for NTN Mediatek India Technology Pvt.
* R4-2200783 Considerations on NTN UE Tx requirements Qualcomm Incorporated
* R4-2200784 Considerations on NTN UE Rx requirements Qualcomm Incorporated
* R4-2201223 TP for 38.863 on maximum input power for NTN UE Xiaomi
* R4-2201224 Discussion on Maximum input level for NTN UE Xiaomi
* R4-2200332 Discussion on UE RX requirements for NTN Mediatek India Technology Pvt.
* R4-2200074 Further discussion on UE Rx RF requirements for NTN CATT
* R4-2201473 Discussion on NTN UE Rx RF requirements ZTE Corporation
* R4-2201313 TP for 38.863 on UE Receiver characteristics for satellite access Huawei, HiSilicon
* R4-2201311 Discussion on UE Rx requirements for satellite access Huawei, HiSilicon
* R4-2201323 NTN - UE - Rx requirements Ericsson
* R4-2201520 On the SMTC windows Nokia, Nokia Shanghai Bell
* R4-2201587 Reply LS to RAN1: LS on open loop closed loop dual correction of timing Ericsson
* R4-2201627 Discussion on general issues for NTN RRM Huawei, Hisilicon
* R4-2201628 CR on general issues for NTN Huawei, Hisilicon
* R4-2202563 Email discussion summary for [101-bis-e][212] NR\_NTN\_solutions\_RRM\_1 Moderator (Intel)
* R4-2200075 Further discussion on RRM requirements for NTN CATT
* R4-2200419 General and RRM requirements impacts Qualcomm Incorporated
* R4-2200564 Discussion on NTN general requirements LG Electronics Inc.
* R4-2201141 Discussion on general RRM requirements for NTN OPPO
* R4-2200737 Discussion on General RRM Requirements for NTN UE ZTE Corporation
* R4-2200890 General requirements for NTN Ericsson
* R4-2200930 Discussion on general RRM requirements in NTN MediaTek inc.
* R4-2202729 Email discussion summary for [101-bis-e][212] NR\_NTN\_solutions\_RRM\_1 Moderator (Intel)
* R4-2202637 WF on NR NTN RRM requirements Qualcomm
* R4-2202638 WF on GNSS-related and timing requirements for NR NTN Xiaomi
* R4-2202639 Reply LS on combination of open and closed loop TA control in NTN Qualcomm
* R4-2202730 Email discussion summary for [101-bis-e][213] NR\_NTN\_solutions\_RRM\_2 Moderator (Xiaomi)
* R4-2200804 Discussion on NTN GNSS related issues CMCC
* R4-2201142 Discussion on GNSS-related requirements for NTN OPPO
* R4-2200076 Further discussion on GNSS-related requirements CATT
* R4-2202564 Email discussion summary for [101-bis-e][213] NR\_NTN\_solutions\_RRM\_2 Moderator (Xiaomi)
* R4-2201631 Discussion on GNSS related issue for NTN Huawei, Hisilicon
* R4-2201629 Discussion on mobility requirements for NTN RRM Huawei, Hisilicon
* R4-2201630 CR on mobility requirements for NTN Huawei, Hisilicon
* R4-2200077 Further discussion on mobility requirements for NTN CATT
* R4-2200523 Discussion on the mobility aspects for NR NTN UE Intel Corporation
* R4-2200420 Mobility requirements Qualcomm Incorporated
* R4-2201159 Discussion on mobility requirements for NTN OPPO
* R4-2200679 Further discussion on mobility requirements for NR NTN Xiaomi
* R4-2200892 Mobility requirements for NTN Ericsson
* R4-2200864 Discussion on mobility requirement for NR NTN LG Electronics UK
* R4-2200931 Discussion on timing requirements in NTN MediaTek inc.
* R4-2200680 Further discussion on timing requirements for NR NTN Xiaomi
* R4-2200681 DraftCR on timing requirements for NR NTN Xiaomi
* R4-2200805 Discussion on NTN timing requirements CMCC
* R4-2200738 Discussion on timing requirements for NTN UE ZTE Corporation
* R4-2201160 Discussion on UL timing requirements for NTN OPPO
* R4-2200421 Timing requirements Qualcomm Incorporated
* R4-2200525 Discussion on the remaining issues for NTN timing requirements Intel Corporation
* R4-2200565 Discussion on NTN timing requirements LG Electronics Inc.
* R4-2200078 Further discussion on timing requirements for NTN CATT
* R4-2200297 Discussion on timing requirements for NR NTN Apple
* R4-2201610 Discussion on UE timing related requirements for NR NTN Huawei, Hisilicon
* R4-2201585 UE Timing requirements Ericsson
* R4-2201586 Reply LS to RAN1: LS on NTN UL time and frequency synchronization requirements (Timing) Ericsson
* R4-2201493 LS on Timing Advance control for Rel-17 NTN RRM Nokia, Nokia Shanghai Bell
* R4-2201445 On timing advance control Nokia, Nokia Shanghai Bell
* R4-2201632 Discussion on measurement requirements for NTN Huawei, Hisilicon
* R4-2200298 Discussion on measurement procedure requirements for NTN Apple
* R4-2200079 Further discussion on measurement procedure requirements for NTN CATT
* R4-2200524 Discussion on multiple SMTC and measurement gaps for NTN UE Intel Corporation
* R4-2200422 Measurement procedure requirements Qualcomm Incorporated
* R4-2201161 Discussion on measurement procedure requirements for NTN OPPO
* R4-2200682 Further discussion on measurement requirements for NR NTN Xiaomi
* R4-2200891 Measurement requirements for NTN Ericsson
* R4-2200865 Discussion on NTN measurement requirements LG Electronics UK
* R4-2202972 Email discussion summary for [101-bis-e][322] NR\_NTN\_Demod\_NWM Moderator (Qualcomm)
* R4-2203042 WF on general and NTN UE demodulation requirements Qualcomm Incorporated
* R4-2203043 WF on NTN SAN demodulation requirements Huawei, HiSilicon
* R4-2203114 Email discussion summary for [101-bis-e][322] NR\_NTN\_Demod\_NWM Moderator (Qualcomm)
* R4-2200475 Discussion on general issue for NTN NR Ericsson
* R4-2200476 Discussion on satellite access node demodulation requirement for NTN NR Ericsson
* R4-2200171 Discussion on Satellite Access Node demodulation requirements CATT
* R4-2201016 Discussion on satellite NTN demod Huawei,HiSilicon
* R4-2201785 Discussion on Satellite Access Node demodulation requirements for NR NTN Intel Corporation
* R4-2201786 Discussion on UE demodulation requirements for NR NTN Intel Corporation
* R4-2201420 Discussion on UE demodulation for NTN Ericsson
* R4-2201015 Discussion on UE NTN demod Huawei,HiSilicon
* **RAN4#102-e, 21st February – 3rd March 2022, e-meeting**

Submitted TDOCs:

* R4-2203964 UE feature for NTN CATT
* R4-2205232 TP TR 38.863 7.4.1 NTN UE Requirement (General) HUGHES Network Systems Ltd
* R4-2205554 On NTN System parameters Nokia, Nokia Shanghai Bell
* R4-2203953 TP for 38.108: clause 5.3&5.4 on system parameters CATT
* R4-2204507 TP on TS 38.101-5 for UE channel bandwidth and channel arrangement Qualcomm Incorporated
* R4-2203956 TP for 38.108: clause 9.3 OTA Satellite Access Node output power CATT
* R4-2205673 Draft text proposal for Clause 4.3 Requirement reference points - TS 38.108 THALES
* R4-2205730 Draft text proposal for Clause 4.4 Satellite Access Node classes - TS 38.108 THALES
* R4-2205048 NTN - SAN class Ericsson
* R4-2205111 TP for TR 38.863: Regulatory aspects for NTN satellite access nodes and UEs operating in UL1626.5-1660.5 MHz and DL 1525-1559 MHz frequencies ranges Ligado Networks
* R4-2205314 TP to TR 38.863 on Section 5.2 NTN Satellite band HUGHES Network Systems Ltd
* R4-2205733 Draft text proposal for Clause 4.5 Regional requirements - TS 38.108 THALES
* R4-2205555 TP to TR 38.863 Regulatory aspects for HAPS Nokia, Nokia Shanghai Bell
* R4-2205671 Draft text proposal for Clause 3 - TS 38.101-5 THALES
* R4-2205672 Draft text proposal for Clause 4 - TS 38.101-5 THALES
* R4-2205667 Draft text proposal for Annex B - TS 38.108 THALES
* R4-2205921 Draft text proposal for Clauses 7, 7.1, 7.2, 7.3 in TR 38.863 THALES
* R4-2205051 NTN - General aspect related to TS assumptions Ericsson
* R4-2204195 CR for TS 38.104: capturing HAPS requirements Softbank, Deutsche Telekom, Ericsson, NTT Docomo, KDDI, Nokia, Intelsat
* R4-2203952 TP for 38.108: clause 4.3 requirement reference point CATT
* R4-2203536 Considerations on HAPS operating band(s) SoftBank, Deutsche Telekom, Ericsson, NTT Docomo, KDDI, Nokia, Intelsat
* R4-2204333 Draft text proposal to update TR 38.863 Chapter 6 Samsung
* R4-2204329 TP for 38.101-5: clause 6.4 transmit signal qulity CATT
* R4-2205044 NTN - Coexistence simulation results Ericsson
* R4-2205924 On the ACIR selection and ACIR average computation between companies THALES
* R4-2205913 Draft text proposal for Clauses 6.4 and 6.5 in TR 38.863 to correct conclusions from simulation results based on AAS antenna assumption THALES
* R4-2205914 Draft text proposal for Clauses 6.4 and 6.5 in TR 38.863 to include simulation results based on Non-AAS antenna assumption THALES
* R4-2204502 Coexistence simulation results for TN-NTN case 1 Qualcomm Incorporated
* R4-2204503 Coexistence simulation results for HAPS Qualcomm Incorporated
* R4-2205556 HAPS coexistence simulation results Nokia, Nokia Shanghai Bell
* R4-2205557 TP to TR 38.863 on HAPS simulation update Nokia, Nokia Shanghai Bell
* R4-2205284 Discussion on HAPS requirements Huawei, HiSilicon
* R4-2205285 Discussion on ACS for NR NTN SAN Huawei, HiSilicon
* R4-2205045 NTN - SAN ACS and case 6 Ericsson
* R4-2205104 Discussion on GEO SAN ACLR Ligado Networks, Inmarsat
* R4-2205558 HAPS BS ACLR and ACS requirements Nokia, Nokia Shanghai Bell
* R4-2205925 On the applicability of rural SAN ACS requirements for urban TN deployment in the case of GEO THALES
* R4-2205976 TP to TS 38.108: section 4 Huawei, HiSilicon
* R4-2205476 TP for TS 38.108: Genera(5.1) and Operating Band(5.2) ZTE Corporation
* R4-2205054 pCR to TS 38.108 - Scope and general Ericsson
* R4-2205437 TP to TR 38.108 on 4.5 Regional Requirement HUGHES Network Systems Ltd
* R4-2206121 TP to TS 38.108: section 3 Huawei, HiSilicon
* R4-2205057 pCR to TS 38.108 -Radiated Tx general and transmit power Ericsson
* R4-2205477 TP for TS 38.108 OTA output power dynamics(9.4) ZTE Corporation
* R4-2205977 Further discussion on Satellite Access Node radiated RF requirements: Tx Huawei, HiSilicon
* R4-2205978 Discussion on the AAS architecture and consideration of the emissions scaling Huawei, HiSilicon
* R4-2205979 TP to TS 38.108: 9.5 (OTA Tx ON/OFF), 9.6 (OTA TX signal quality) and 9.8 (OTA Tx IMD) Huawei, HiSilicon
* R4-2205886 Draft text proposal for Clause 9.7.3 OTA Adjacent Channel Leakage Power Ratio (ACLR) - TS 38.108 THALES
* R4-2205848 Draft text proposal for Clause 7.3.4.7.3 OTA ACLR in TR 38.863 THALES
* R4-2205878 Draft text proposal for Clause 9.3 OTA Satellite Access Node output power - TS 38.108 THALES
* R4-2205880 Draft text proposal for Clause 9.6 OTA transmitted signal quality - TS 38.108 THALES
* R4-2203957 TP for 38.108: clause 9.7 OTA unwanted emissions CATT
* R4-2203948 Open issue for Tx RF requriements for SAN type 1-O CATT
* R4-2203949 Open issue for Rx RF requriements for SAN type 1-O CATT
* R4-2203958 TP for 38.108: clause 10.5 OTA in-band selectivity and blocking CATT
* R4-2205851 Draft text proposal for Clause 7.3.5.6 OTA Out-of-band blocking in TR 38.863 THALES
* R4-2205897 Draft text proposal for Clause 10.5 OTA in-band selectivity (ACS) and OTA in-band blocking - TS 38.108 THALES
* R4-2205899 Draft text proposal for Clause 10.6 OTA out-of-band blocking - TS 38.108 THALES
* R4-2205980 Further discussion on Satellite Access Node radiated RF requirements: Rx Huawei, HiSilicon
* R4-2205981 TP to TS 38.108: section 10.7 (OTA Rx spur) and 10.8 (OTA Rx IMD) Huawei, HiSilicon
* R4-2205478 TP for TS 38.108 OTA Rx requirements(10.3, 10.4,10.6 and 10.9) ZTE Corporation
* R4-2205058 pCR to TS 38.108 - Radiated Rx general and sensitivity Ericsson
* R4-2205049 NTN - SAN OTA RX requirement proposals Ericsson
* R4-2205055 pCR to TS 38.108 - Transmitter spurious emissions Ericsson
* R4-2205046 NTN - SAN TX requirement proposals Ericsson
* R4-2205479 TP for TS 38.108: Output power dynamics (6.3) ZTE Corporation
* R4-2205468 Discussion on conducted Tx requirements of satellite access node ZTE Corporation
* R4-2205445 TP to TS 38.108 on 6.0 Conducted transmitter characteristics HUGHES Network Systems Ltd
* R4-2205982 Further discussion on Satellite Access Node conducted RF requirements: Tx Huawei, HiSilicon
* R4-2205983 TP to TS 38.108: section 6.4 (Tx ON/OFF) and 6.5 (TX signal quality) Huawei, HiSilicon
* R4-2205984 TP to TS 38.108: section 6.7 (Tx IMD) Huawei, HiSilicon
* R4-2205827 Draft text proposal for Clause 7.3.2.2.4.1 ACLR in TR 38.863 THALES
* R4-2205813 Draft text proposal for Clause 6.1 and 6.2 Satellite Access Node output power - TS 38.108 THALES
* R4-2205825 Draft text proposal for Clause 6.6.3 Adjacent Channel Leakage Power Ratio - TS 38.108 THALES
* R4-2205823 Draft text proposal for Clause 6.5.2 Modulation quality - TS 38.108 THALES
* R4-2203954 TP for 38.108: clause 6.6.1&6.6.2&6.6.3 unwanted emissions CATT
* R4-2203950 Open issue for Tx RF requriements for SAN type 1-H CATT
* R4-2206117 Draft TP for TS 38.108 Section 6.6.4 Operating band unwanted emissions Inmarsat
* R4-2203951 Open issue for Rx RF requriements for SAN type 1-H CATT
* R4-2203955 TP for 38.108: clause 7.1&7.2 on Rx refsens sensitivity CATT
* R4-2205847 Draft text proposal for Clause 7.3.3.2.4 Out-of-band blocking in TR 38.863 THALES
* R4-2205864 Draft text proposal for Clause 7.4.1 Adjacent Channel Selectivity (ACS) and Clause 7.4.2 In-band blocking - TS 38.108 THALES
* R4-2205866 Draft text proposal for Clause 7.5 Out-of-band blocking - TS 38.108 THALES
* R4-2205985 Further discussion on Satellite Access Node conducted RF requirements: Rx Huawei, HiSilicon
* R4-2205986 TP to TS 38.108: section 7.6 (Rx spur) and section 7.7 (Rx IMD) Huawei, HiSilicon
* R4-2205987 TP to TS 38.108: annex A (FRC) Huawei, HiSilicon
* R4-2205922 Draft text proposal for Clauses 7.3.3.2.3.1 Adjacent Channel Selectivity (ACS) and 7.3.3.2.3.2 In-band blocking in TR 38.863 THALES
* R4-2205469 Discussion on conducted RF requirements from satellite network perspective ZTE Corporation
* R4-2205474 TP for TS 38.108 Annex B ZTE Corporation
* R4-2205475 TP for TS 38.108 Dynamic range(7.3) and In channel selectivity(7.8) ZTE Corporation
* R4-2205047 NTN - SAN RX requirement proposals Ericsson
* R4-2205056 pCR to TS 38.108 - In-band selectivity and blocking Ericsson
* R4-2205052 pCR to TS 38.101-5 - Scope Ericsson
* R4-2205608 TP to TS 38.101-5 on 7.3 Reference sensitivity HUGHES Network Systems Ltd
* R4-2205654 Selection of UE duplexer and REFSENS for band n256 in TS 38.101-5 HUGHES Network Systems Ltd
* R4-2204592 Draft TP to update TR 38.863 clause 7.4.3.2 on NTN UE ACS Mediatek India Technology Pvt.
* R4-2204593 Draft TP to update TR 38.863 clause 7.4.3.2 on Blocking characteristics Mediatek India Technology Pvt.
* R4-2204344 Draft text proposal to update TS 38.101-5 Chapter 1 Samsung R&D Institute UK
* R4-2204504 Discussion on NTN UE RF requirements Qualcomm Incorporated
* R4-2204505 TP on TS 38.101-5 for general part of transmitter characteristics Qualcomm Incorporated
* R4-2204506 TP on TR 38.863 for NTN UE Tx requirements Qualcomm Incorporated
* R4-2204807 TP for TS38.101-5 on section 6.2 transmitter power Xiaomi
* R4-2204808 TP for 38.863 on MPR and A-MPR requirement for NTN UE Xiaomi
* R4-2204809 Discussion on MPR and A-MPR requirements for NTN UE Xiaomi
* R4-2203959 TP for 38.101-5: clause 6.3 output power dynamics CATT
* R4-2203960 TP for 38.863: clause 7.3.2 Conducted transmission characteristics CATT
* R4-2203926 Further discussion on UE Tx RF requirements for NTN CATT
* R4-2203863 Discussion on NTN TX spurious emission for UE co-existence Mediatek India Technology Pvt.
* R4-2205472 TP for TS 38.101-5: Genera(5.1) and Operating Band(5.2) ZTE Corporation
* R4-2205470 Discussion on NTN UE Tx RF requirements ZTE Corporation
* R4-2205050 NTN - UE RF Tx requirements Ericsson
* R4-2205110 TP for TR 38.863: Updates to UE Maximum Output Power for n255 Ligado Networks, Inmarsat
* R4-2205043 TP for TR 38.863: Unwanted emissions for NTN satellite UEs transmitting in 1626.5 to 1660.5 MHz Ligado Networks
* R4-2205286 Discussion on UE Tx requirements for satellite access Huawei, HiSilicon
* R4-2205290 TP for 38.101-5 on Output RF spectrum emissions for satellite UE Huawei, HiSilicon
* R4-2205288 TP for 38.863 on UE transmitter characteristics for satellite access Huawei, HiSilicon
* R4-2205235 pCR for TS 38.101-5: NS value and additional spurious requirements for n255 Ligado Networks
* R4-2205289 TP for 38.863 on UE Receiver characteristics for satellite access Huawei, HiSilicon
* R4-2205291 TP for 38.101-5 on Rx Spurious emissions and spurious response for satellite UE Huawei, HiSilicon
* R4-2205287 Discussion on UE Rx requirements for satellite access Huawei, HiSilicon
* R4-2205053 pCR to TS 38.101-5 - Receiver requirements general Ericsson
* R4-2204169 TP to TS 38.101-5 on clause 7.5 NTN UE ACS Mediatek India Technology Pvt.
* R4-2204170 TP to TS 38.101-5 on clause 7.6 Blocking characteristics Mediatek India Technology Pvt.
* R4-2205471 Discussion on NTN UE Rx RF requirements ZTE Corporation
* R4-2205473 TP for TS 38.101-5: Maximum input level (7.4) ZTE Corporation
* R4-2203864 Discussion on UE RX REFSENS for NTN Mediatek India Technology Pvt.
* R4-2203927 Further discussion on UE Rx RF requirements for NTN CATT
* R4-2204810 TP for TS38.101-5 on section 7.8 Intermodulation characteristics Xiaomi
* R4-2204811 TP for 38.863 on Intermodulation characteristics for NTN UE Xiaomi
* R4-2204812 TP for 38.863 on spurious response for NTN UE Xiaomi
* R4-2204722 General requirements for NTN Ericsson
* R4-2204725 draft CR on signaling characteristics for NTN Ericsson
* R4-2204520 Discussion on NTN general requirements LG Electronics UK
* R4-2203928 Further discussion on general RRM requirements for NTN CATT
* R4-2203929 Requirements for RRC connected state mobility for NTN CATT
* R4-2203853 General and RRM requirements impacts Qualcomm Incorporated
* R4-2203854 draft Cat-B CR (R17) MDT in NTN Qualcomm Incorporated
* R4-2204185 Discussion on general RRM requirements in NTN MediaTek inc.
* R4-2204295 Discussion on general RRM requirements for NTN OPPO
* R4-2205374 Discussion on general issues for NTN RRM Huawei, HiSilicon
* R4-2205422 Reply LS to RAN1: LS on open loop closed loop dual correction of timing Ericsson
* R4-2205375 Discussion on mobility requirements for NTN RRM Huawei, HiSilicon
* R4-2205376 CR on IDLE mode mobility requirements for NTN Huawei, HiSilicon
* R4-2205228 NTN CHO timeline considerations Nokia, Nokia Shanghai Bell
* R4-2204296 Discussion on mobility requirements for NTN OPPO
* R4-2204236 Further discussion on mobility requirements for NR NTN Xiaomi
* R4-2204237 DraftCR on maximum interruption in paging reception for NR NTN Xiaomi
* R4-2203855 Mobility requirements Qualcomm Incorporated
* R4-2203930 Further discussion on mobility requirements for NTN CATT
* R4-2203793 Discussion on CHO for NR NTN Apple
* R4-2204522 Discussion on NTN Mobility requirements LG Electronics UK
* R4-2204474 Draft CR for idle mode UE meausrement capability in NTN. LG Electronics UK
* R4-2204418 Discussion on CHO delay requirements for NTN UE Intel Corporation
* R4-2204421 DraftCR for serving cell evaluation and intra-frequency measurements of NTN UE cell reselections Intel Corporation
* R4-2204724 Mobility requirements for NTN Ericsson
* R4-2204419 Discussion on the remaining issues for NTN timing requirements Intel Corporation
* R4-2204530 Discussion on NTN timing requirements CMCC
* R4-2203794 Discussion on timing requirements for NR NTN Apple
* R4-2203931 Further discussion on timing requirements for NTN CATT
* R4-2203856 Timing requirements Qualcomm Incorporated
* R4-2204238 Further discussion on timing requirements for NR NTN Xiaomi
* R4-2204239 DraftCR on UE timer accuracy for NR NTN Xiaomi
* R4-2204186 Discussion on timing requirements in NTN MediaTek inc.
* R4-2204187 Introduction of Timing advance requirement for NTN MediaTek inc.
* R4-2204160 Discussion on timing requirements for NTN UE ZTE Corporation
* R4-2204316 Discussion on NTN timing requirements LG Electronics Inc.
* R4-2205420 UE Timing requirements Ericsson
* R4-2205421 Reply LS to RAN1: LS on NTN UL time and frequency synchronization requirements (Timing) Ericsson
* R4-2205329 Discussion on NTN UE timing related requirements Huawei, HiSilicon
* R4-2205330 DraftCR on UE transmit timing requirements for NTN Huawei, HiSilicon
* R4-2205377 Discussion on measurement requirements for NTN Huawei, HiSilicon
* R4-2205378 CR on intra-frequency measurement requirements for NTN Huawei, HiSilicon
* R4-2205230 Discussions on SMTC and measurement gaps Nokia, Nokia Shanghai Bell
* R4-2204297 Draft CR to general measurement requirement for NTN OPPO
* R4-2204240 Further discussion on measurement requirements for NR NTN Xiaomi
* R4-2204241 DraftCR on inter-frequency measurement requirements for NR NTN Xiaomi
* R4-2205958 Draft CR on L1-RSRP measurements for Reporting in NTN Apple
* R4-2203857 Measurement procedure requirements Qualcomm Incorporated
* R4-2203932 Further discussion on measurement procedure requirements for NTN CATT
* R4-2203795 Discussion on measurement procedure requirements for NTN Apple
* R4-2204545 Discussion on NTN measurement requirements LG Electronics UK
* R4-2204420 Discussion on multiple SMTC and measurement gaps for NTN UE Intel Corporation
* R4-2204723 Measurement requirements for NTN Ericsson
* R4-2204027 Discussion on general issue of NTN demodulation Ericsson
* R4-2205763 Discussion on NTN general issues Huawei,HiSilicon
* R4-2206003 Discussion on Satellite Access Node demodulation requirements for NR NTN Intel Corporation
* R4-2205764 Discussion on satellite NTN demod PUSCH Huawei,HiSilicon
* R4-2204028 Discussion on NTN PUSCH demodulation Ericsson
* R4-2204029 Discussion on NTN PUCCH demodulation Ericsson
* R4-2205765 Discussion on satellite NTN demod PUCCH Huawei,HiSilicon
* R4-2205766 Discussion on satellite NTN demod PRACH Huawei,HiSilicon
* R4-2204030 Discussion on NTN PRACH demodulation Ericsson
* R4-2206004 Discussion on UE demodulation requirements for NR NTN Intel Corporation
* R4-2205767 Discussion on UE NTN demod PDSCH Huawei,HiSilicon
* R4-2205430 Discussion on PDSCH requirements for NTN Ericsson
* R4-2206123 Views on NTN UE PDSCH Requirements Qualcomm CDMA Technologies
* R4-2205432 Discussion on PDCCH and PBCH requirements for NTN Ericsson
* R4-2205768 Discussion on UE NTN demod PDCCH&PBCH Huawei,HiSilicon
* R4-2205769 Discussion on UE NTN CSI Huawei,HiSilicon
* R4-2205431 Discussion on CSI reporting requirements for NTN Ericsson
* R4-2206126 Views on NTN UE CSI Tests Qualcomm CDMA Technologies

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