**3GPP TSG RAN meeting #96 RP-220XXX**

**Budapest, Hungary, June 6-9, 2022**

## Status Report to TSG

**Agenda item:** 10.4.1 NB-IoT/eMTC support for Non-Terrestrial Networks (NTN)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WI / SI Name** |  | | | | |
| included in this status report | Study Item:  No | Core part:  Yes | Performance part:  No | | Testing part:  - |
| **Acronym** | LTE\_NBIOT\_eMTC\_NTN | | | | |
| **Unique ID** | 920069 | | | | |
| **TSG Tdoc of latest approved WI/SI description (if any)** | RP-211601 | | | | |
| **Target Completion Date**  **(indicate if changed)** | Study Item: | Core part:  06/2022 | Performance part: | Testing part: - | |
| **Overall Completion level** | Study Item: | Core part:  Overall: 100%  For information  RAN1: 100%  RAN2: 100%  RAN3: 100% | Performance Part: | 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** | | | RAN1 |
| **Rapporteur** | | **Name** | Gilles Charbit |
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| **Secondary WG** | | | RAN2 |
| **Rapporteur** | **Name** | | René Faurie |
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| **Email** | | [rfaurie-ls@sfr.fr](mailto:rfaurie-ls@sfr.fr) |
| **Secondary WG** | | | RAN3 |
| **Rapporteur** | | **Name** | Jiren Han |
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| **Email** | han.jiren@zte.com.cn |

## 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:**

## 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#109-e, May 9th – 20th, 2022, e-meeting**

**Agreements on “8.14 Enhancements to time and frequency synchronization”**

**Agreement**

Conclusions and agreements for the following issues as discussed in 8.4 NR NTN can be re-used for IoT NTN

* SFN indicating Epoch time
* Negative TACommonDriftVariation values
* Common Delay formula in TS 36.213
* Reference Frame for Ephemeris Set 2 – Orbital parameters

**Agreement**

* The single UE capability that governs UE behavior w.r.t gaps between segments for PUSCH, PUCCH and NPUSCH, when the UE performs segmented pre-compensation, is as follows:
* When a single capability is signalled: UE drops one or more of the following durations of uplink transmission between segments (indicated by the capability):
  + 1 slot (applicable to eMTC)
  + 1 subframe (applicable to eMTC)
  + 1 slot (applicable to NB-IoT)
  + 2 slots (applicable to NB-IoT)
  + 1 symbol (applicable to both eMTC and NB-IoT)
  + UE follows legacy behaviour at slot boundaries due to TA adjustment
* When capability is NOT signalled: UE follows legacy behaviour at slot boundaries due to TA adjustment

**Agreement**

* TP#1 (for TS36.211 v17.1.0, clause 5.3.4) in section 5.1 of R1-2203388 is endorsed in principle, with the following note to the editor: the TP proposes entirely new text, the strikeout text is not a deletion of existing text, and the bold text is not intended to be bold.
* TP#2 (for TS36.211 v17.1.0, clause 5.4.3) in section 5.1 of R1-2203388 is endorsed in principle, with the following note to the editor: the TP proposes entirely new text, the strikeout text is not a deletion of existing text, and the bold text is not intended to be bold.
* TP#3 (for TS36.211 v17.1.0, clause 10.1.3.6) in section 5.1 of R1-2203388 is endorsed in principle, with the following note to the editor: the TP proposes entirely new text, the strikeout text is not a deletion of existing text, and the bold text is not intended to be bold.

The 3 TPs agreed above are provided in clean editorial form (according to the “note to the editor above”) in section 5.3 of R1-2205484, with updated “reason for change”, “summary of change” and “consequences if not approved”, provided for information to the TS36.211 specification editor.

**Agreements on “Timing relationship enhancements”**

**Agreement**

The four text proposals below are endorsed. The “reason for change”, “summary of change” and “consequence if not approved” are provided for information to the specification editor.

* TP#5 rev1 (for TS36.213 v17.1.0, clauses 16.4.2) in section 2.4.3 of R1-2205200
* TP#7 rev1 (for TS36.213 v17.1.0, clauses 16.5.1) in section 2.4.3 of R1-2205200
* TP#8 rev1 (for TS36.213 v17.1.0, clauses 10.2) in section 2.4.3 of R1-2205200
* TP#9 rev1 (for TS36.213 v17.1.0, clauses 10.2) in section 2.4.3 of R1-2205200
* Reason for change: As TDD was not treated during the IoT NTN WI, TDD clauses in the spec should not be changed because of NTN.
* Summary of change: Remove all references to Koffset from all TDD clauses.
* Consequence if not approved: Release 17 IoT NTN does not support TDD so clauses would wrongly imply that it does and potentially confuse implementers.

R1-2205503 FL summary 3 of AI 8.14: Maintenance on Timing Relationships for IoT-NTN Moderator (Sony)

R1-2205620 FL summary 4 of AI 8.14: Maintenance on Timing Relationships for IoT-NTN Moderator (Sony)

**Agreement**

The two text proposals below are endorsed. The “reason for change”, “summary of change” and “consequence if not approved” are provided for information to the specification editor in section 1.1 of R1-2205620.

* TP#1rev2 (for TS36.213 v17.1.0, clauses 16.6) in section 1.1 of R1-2205620
* TP#2rev3 (for TS36.213 v17.1.0, clauses 16.6) in section 1.1 of R1-2205620

#### Remaining Open issues

Complete maintenance phase for 8.14

## 2.2 RAN2

#### 2.2.1 Agreements

**RAN2#118-e, May 9th – 20th, 2022, e-meeting**

Agreements from AI 7.2.1: General

* For NB-IoT, no (new) solution in Rel-17 for the UE to provide location information.
* LS on updated Rel-17 RAN1 UE features list for LTE (R1-2202924; contact: NTT DOCOMO, AT&T) to be taken into account for the UE caps discussion.
* On IOT NTN ASN1 RIL List for RRC, except X601, O305, RAN2 confirm the propAgree and propReject states
* On list of RRC Editor's Notes and proposed handling, P4, 5, 6-1, 7, 9, 10 are agreed; P8: Signalling of SIB31 in RRCConnectionReconfiguration not for HO is supported (but no further specification effort is expected due to this, e.g. up to network impl when to provide this).
* On Report of RRC CR 36331
  + 1.1: Clarify in SIB31 and SIB32 that the SIBs are only signaled in a NTN cell.
  + 1.2: Agree to clarify the applicability of the requirements on SIB31 acquisition.
  + 1.3: Replace ‘BL UE or a UE in CE or a NB-IoT UE’ with ‘NTN capable UE’ or ‘UEs connected to NTN’ according to the outcome of Proposal 1.2 in NTN specific statements.
  + 1.5: Update the status of RILs H001, H002, H003, H004, H005 to ‘PropAgree’ with the resolution as per proposals 1.1, 1.2 and 1.3.
  + 2: Wait for the conclusion of [offline-057] w.r.t to t-ServiceStart and follows the same approach for the signaling of t-Service in SIB3.
  + 3: Implicit signalling of epochTime in SIB31 in broadcast signalling is supported. Change the status of RIL C501 to PropReject.
  + 4-1: T317 expiry is not moved under 5.2.2 system information.
  + 1-4bis: Clarify the applicability of the requirements on SIB31 acquisition by using ‘NTN capable UE’ – TP in annex 1 is agreed as a baseline.
  + 4-2bis: T317 expiry is moved to a new section 5.3.X. RIL X601 status is changed to ConcModify.

Agreements from AI 7.2.2: Open Issues

**Discontinuous coverage**

* RAN2 will use SGP4 mean elements (Type 4) for sharing mean ephemeris, to support discontinuous coverage in IoT-NTN
  + Go for a single format / type of mean parameters for prediction of coverage (overrides earlier agreement).
* Include Satellite footprint reference location (coordinates) and coverage radius (for earth-fixed cells).
* Discuss further during R2 118-e for earth moving beams, and also clarify details for earth fixed cells (if needed)
* RAN2 will explicitly use the epoch for sharing the mean ephemeris elements (of serving satellite, as well as the neighbour satellites) in IoT-NTN. RAN2 will discuss the possible format of epoch time as part of the new SIB.
* RAN2 will not discuss use of dedicated RRC signalling to share neighbour satellites’ ephemeris information, required for discontinuous coverage of IoT-NTN, in Rel-17.
* RAN2 will not discuss any further details of AS-NAS interaction for Discontinuous Coverage in IoT-NTN.
* Network is not needed to explicitly indicate support of Discontinuous Coverage per PLMN by SIB1.
* The reference frame for SGP4 propagator and SGP4 parameter generation is TEME as per the NORAD Space Track standard.
* Define SGP4 parameters according to table 2 in [R2-2206538](file:///C:\Users\mtk65284\Documents\3GPP\tsg_ran\WG2_RL2\TSGR2_118-e\Docs\R2-2206538.zip).   
  (Attention: Rapporteur removed number of revolutions at epoch)
* UEs should obtain an UTC reference via GNSS (if SIB16 is provided the UE could also use this, but SIB16 is not mandatory).
* Define the Epoch parameter as a time offset between the beginning of the current week and the actual SGP4 Epoch. Range of +/- 1048575 seconds and granularity of 1 sec
* Define the t-serviceStart-r17 parameter as a time-offset since the beginning of the current week. Range of 0 to 1048575 seconds and granularity of 1 sec. ASN.1 type: “INTEGER (0..1048575)
* Define “reference point and radius” as optional footprint parameter for (Quasi-) Earth-fixed cell case: See table 3 in [R2-2206538](file:///C:\Users\mtk65284\Documents\3GPP\tsg_ran\WG2_RL2\TSGR2_118-e\Docs\R2-2206538.zip).
* Define “elevation angles” and “radius” as optional footprint parameter for Earth-moving cell case: See table 4 and table 5 in [R2-2206538](file:///C:\Users\mtk65284\Documents\3GPP\tsg_ran\WG2_RL2\TSGR2_118-e\Docs\R2-2206538.zip).
* Define an mandatory satelliteID parameter ranging from 0-255.
* Once a UE receives a SIB32, the UE is allowed to estimate out of coverage and to not do Idle mode tasks when out of coverage.
* The prediction error limit is up to UE implementation (it is up to UE impl when to consider a stored SIB32 obsolete).
* Leave it to UE implementation to store old SIB32s and keep track of known ephemerides, even when new SIB32s are received.
* UE is expected to re-acquire SIB32 based on its own decision (regardless SI modification state). Can CB next meeting if needed

**GNSS Validity duration report**

* A new parameter for remaining GNSS validity duration is introduced in Msg5, e.g. RRCConnectionResumeComplete, RRCConnectionSetupComplete and RRCreestablishmentComplete messages, and the parameter refers to the time of message transmission.
* The value range of the remaining GNSS validity duration should include the values proposed by RAN1 , i.e. {10s, 20s, 30s, 40s, 50s, 60s, 5 min, 10 min, 15 min, 20 min, 25 min, 30 min, 60 min, 90 min, 120 min, infinity}.
* The new parameter for remaining GNSS validity duration is introduced in the following Msg5 messages: RRCConnectionResumeComplete, RRCConnectionSetupComplete, RRCreestablishmentComplete RRCConnectionResumeComplete-NB, RRCConnectionSetupComplete-NB, RRCreestablishmentComplete-NB.
* The new parameter for remaining GNSS validity duration is introduced in RRCConnectionReconfigurationComplete for MTC Handover.
* No new RRC release cause “GNSS invalidity” is introduced in RRC Release.
* This mechanism is not configurable, and the UE always reports.

Agreements from AI 7.2.3.1: Corrections for User Plane:

* No changes are needed to sr-ProhibitTimerExt.
* Add the cancelling of the TA reporting procedure in the MAC reset section.
* The changes 2 and 3 in R2-2205724 are in principle OK, with some small updates to finalise in the TP review.
* Similar to NR, RRC indicates to lower layers to trigger a Timing Advance Report if:
  + 1: ta-Report is configured with value enabled, upon initiation of RRC connection establishment (5.3.3) and RRC connection re-establishment (5.3.7) procedures.
  + 2 ta-Report with value enabled is indicated in the handover command and Random Access is initiated due to handover.
* Update MAC text as “- if triggered by upper layers;
* Proposals 6 and 7 in R2-2205996 are agreed, with some small updates to finalise in the TP review
* Change the definition of UE-eNB RTT and update the text according to the TPs in R2-2205996
* Above changes to be captured in 36.331 and 36.321 rapporteur correction CRs.

Agreements from AI 7.2.3.2: Corrections for RRC:

* When T317 expires in RRC\_CONNECTED, the UE assumes that the scheduling information of SIB31 is unchanged and only re-acquires SIB31.
* Wait for RAN1 decision on whether and how to clarify the position corresponding to the (startSFN, startSubframe) values in epochTime (if configured) in SIB31.
* There is no need to move t-Service for the serving cell from SIB3 to SIB31/SIB31-NB.
* There is no need to further clarify the UE behavior (e.g., to release the dedicated SIB31, if previously configured) in case of handover to a TN cell.
* The current RRC description for maintenance of UL Synchronization is correct and no need of change.
* There is no need to add reference to the section “5.3.3.1d Condition for establishing RRC Connection in NTN” in RRC procedure. RIL Z303 status is changed to PropReject.
* There is no need to add a note of “The interaction with GNSS receiver is up to UE implementation” in section 5.3.3.21.
* There is no need to add “from upper layer” in the title of section 5.3.3.21.
* There is no need to add a note of “The interaction with NAS to handle the GNSS position fix delay is up to UE implementation” in section 5.3.3.1d.
* To group the NTN specific configuration parameters in ntn-ConfigCommon and ntn-ConfigDedicated respectively. RILs H012, H013, H016 and H017 status are changed to PropAgree.
* The changes in [R2-2205330] with removing the item PRACH-Config-v1700 in PRACH-Config are agreed as baseline for further review.
* There is no need to introduce a new indication to indicate that the UE is allowed to perform RRC reestablishment from TN to NTN or NTN to TN.
* Update to parameters of k-MAC and k-Offset in SIB31 (and all other parameters in SIB31) does not affect the system information value tag and does not trigger System information modification procedure.
* length of T318 can be separately configured in SIB (as baseline same range as T310)
* Agree MAC TP in Proposal 7.2 (in R1-2206529)

Agreements from AI 7.2.3.2: Corrections for Idle Inactive mode:

* T-service includes inter-RAT measurements.
* No specification change for NTN-only IoT UE in Rel-17.
* Editor’s note on NTN-only UE is removed.
* Add clarifications in cellBarred-NTN field descriptions: “E-UTRA always includes cellBarred-NTN and sets cellBarred to ‘barred’ in an NTN cell”.
* Merged, TP in R2-2204711 is agreed, where Squal is excluded from NB-IoT conditions and changing “should” to “shall” perform the measurements.

Agreements from AI 7.2.4: UE capabilities

* For NB-IoT, UE capability provided is only valid in the network type [TN, NTN] where it was provided.
* For eMTC, UE capability provided is only valid in the network type [TN, NTN] where it was provided.
* For eMTC, Inter [TN, NTN] - redirection can work. For inter [TN, NTN] - HO, the target node will not know the UE caps of target network type. R2 will not specify that HO is disallowed, but expect it can only work in restricted way (if at all). R2 does not expect to work further on inter [TN, NTN] – HO in Rel-17.
* Need LS to SA2
* For IOT NTN, capture the two feature groups ‘Basic IoT over NTN support’ and ‘Segmented UL transmission’ under the existing ntn-Connectivity-EPC-r17.
* For IOT NTN, introduce a new capability ntn-OffsetTimingEnh-r17 for the support of timing relationships enhancement using a time offset.
* For IOT NTN, introduce a new capability ntn-Scenario-r17 {GSO, NGSO}, conditional to support of ntn-Connectivity-EPC-r17. If a UE does not include the capability, the UE supports all indicated NTN features for both GSO and NGSO scenarios.
* Introduce a new optional feature without capability reporting ‘Support of discontinuous coverage’. If the UE supports discontinuous coverage, then it should support the reception of SystemInformationBlockType32 as specified in TS 36.331 [5].
* As baseline update the description of the existing capabilities as proposed in the draft TP (details for further discussion offline).

#### 2.2.2 Remaining Open issues

Complete maintenance phase for 7.2

## 2.3 RAN3

#### 2.3.1 Agreements:

**RAN3#116-e, May 9th – 19th, 2022, e-meeting**

**Agreement**

* The LTE-M Satellite Indication in S1AP UE CAPABILITY INFO INDICATION message is removed.
* Align latest Stage 2 and Stage 3 agreements with NR NTN.
* Add the criticality of RAT Restrictions IE in the table.
* Send the reply LS to simply inform RAN2 and SA2 that the LTE-M Satellite Indication has been removed over S1.
* Add Stage 2 clarification to support NB-IoT UEs.

#### 2.3.2 Remaining Open issues:

100% of the items defined in the RAN3 WID objectives have been accomplished.

## 2.4 RAN4

#### 2.4.1 Agreements: N/A (RAN4 is not involved in the SI)

#### 2.4.2 Remaining Open issues: N/A

## 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#109-e, May 9th – 20th, 2022, e-meeting**

Submitted TDocs to AI 8.14

* R1-2203089 Maintenance on NB-IoT/eMTC support for Non-Terrestrial Network Huawei, HiSilicon
* R1-2203232 Remaining issues on IoT-NTN ZTE
* R1-2203316 Maintenance on NB-IoT/eMTC support for Non-Terrestrial Network Spreadtrum Communications
* R1-2203386 Maintenance on NB-IoT/eMTC to support NTN MediaTek Inc.
* R1-2203632 On IoT NTN maintenance issues Ericsson Limited
* R1-2203722 Maintenance of IoT-NTN Sony
* R1-2203769 Remaining issues on IoT NTN xiaomi
* R1-2203839 Maintenance on NB-IoT/eMTC support for Non-Terrestrial Network Nokia, Nokia Shanghai Bell
* R1-2203991 Discussion on remaining issues for NB-IOT/eMTC NTN OPPO
* R1-2204217 On remaining issues of IoT NTN Apple
* R1-2204934 Timing Relationship Enhancements Mavenir
* R1-2204997 Maintenance on IoT-NTN Qualcomm Incorporated
* R1-2205110 Moderator Summary for preparation phase on maintenance of Rel-17 WI on NB-IoT/eMTC support for Non-Terrestrial Network Moderator (MediaTek)
* R1-2203388 "Summary #1 of AI 8.14 Maintenance on NB-IoT/eMTC to support NTN: time and frequency synchronization" Moderator (MediaTek Inc.)
* R1-2205578 DRAFT LS on UL Segmented Transmission for UL synchronization for IoT NTN Moderator (MediaTek)
* R1-2205642 LS on UL Segmented Transmission for UL synchronization for IoT NTN RAN1, MediaTek
* R1-2205484 Maintenance on NB-IoT/eMTC to support NTN: time and frequency synchronization Moderator (MediaTek)
* R1-2205485 List of RAN1 agreements for Rel-17 IoT NTN (Post RAN1#109-e) Moderator (MediaTek)
* R1-2205199 FL summary 1 of AI 8.14: Maintenance on Timing Relationships for IoT-NTN Moderator (Sony)
* R1-2205200 FL summary 2 of AI 8.14: Maintenance on Timing Relationships for IoT-NTN Moderator (Sony)
* R1-2205503 FL summary 3 of AI 8.14: Maintenance on Timing Relationships for IoT-NTN Moderator (Sony)
* R1-2205620 FL summary 4 of AI 8.14: Maintenance on Timing Relationships for IoT-NTN Moderator (Sony)

## 4.2 RAN2

**RAN2#118-e, May 9th – 20th, 2022, e-meeting**

Submitted TDocs to AI 7.2.1.1: Organizational

* R2-2204428 LS on IoT-NTN TP for TS 36.300 (R1-2202931; contact: MediaTek) RAN1
* R2-2204437 LS Response to LS on UE providing Location Information for NB-IoT (S2-2201333; contact: Qualcomm) SA2
* R2-2204451 Reply LS on UE providing Location Information for NB-IoT (C1-222100; contact: Apple)
* R2-2204495 Reply LS on UE providing Location Information for NB-IoT (R3-222858; contact: Ericsson, RAN3
* R2-2204458 Reply LS on security concerns for UE providing Location Information for NB-IoT (S3-220544; contact: Xiaomi) SA3
* R2-2204509 Emergency services and UE rejected with "PLMN not allowed to operate in the country of the UE’s location" (C1-223045; contact: OPPO) CT1
* R2-2204518 Reply LS on opens issues for NB-IoT and eMTC support for NTN (S2-2203064; contact: Qualcomm) SA2
* R2-2204457 Reply LS on opens issues for NB-IoT and eMTC support for NTN (S3-220543; contact: Xiaomi, SA3
* R2-2204426 LS on updated Rel-17 RAN1 UE features list for LTE (R1-2202924; contact: NTT DOCOMO, AT&T) RAN1

Submitted TDocs to AI 7.2.1.2: CR Rapporteur Resolutions

* R2-2205326 Report of [Pre118-e][012][IoT-NTN] 36331 CR and rapporteur resolutions (Huawei) Huawei, HiSilicon report Rel-17 LTE\_NBIOT\_eMTC\_NTN Late
* R2-2206089 IOT NTN ASN1 RIL List Huawei, HiSilicon report Rel-17 LTE\_NBIOT\_eMTC\_NTN
* R2-2205327 List of RRC Editor's Notes and proposed handling Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN Late
* R2-2205325 Corrections to support of Non-Terrestrial Network in NB-IoT and eMTC Huawei, HiSilicon CR Rel-17 36.331 17.0.0 4798 - F LTE\_NBIOT\_eMTC\_NTN Late
* R2-2206526 Report of [AT118-e][056][IOT NTN] RRC CR 36331 Huawei, HiSilicon
* R2-2205864 IoT NTN Stage 2 corrections Ericsson, Eutelsat draftCR Rel-17 36.300 17.0.0 LTE\_NBIOT\_eMTC\_NTN Late
* R2-2206629 IoT NTN Stage 2 corrections         Ericsson, Eutelsat             CR           Rel-17   36.300   17.0.0    1226       -                F LTE\_NBIOT\_eMTC\_NTN

Submitted TDocs to AI 7.2.2: Open Issues:

Discontinuous coverage

* R2-2205933 Email Discussion Report [Post117-e][906][IoT-NTN] Non-Continuous Converge Mediatek India Technology Pvt. Report
* R2-2206538 Report of [AT118-e][057][IOT NTN] Discontinuous coverage (Gatehouse) Gatehouse
* R2-2206115 ASN.1 proposal for satellite assistance information for prediction of discontinuous coverage, GateHouse, Sateliot (Revised in R2-2206160)
* R2-2206160 ASN.1 proposal for satellite assistance information for prediction of discontinuous coverage GateHouse, Sateliot, MediaTek discussion
* R2-2205860 Open issues on discontinuous coverage Ericsson discussion LTE\_NBIOT\_eMTC\_NTN
* R2-2205723 On discontinuous coverage and GNSS position validity Nokia, Nokia Shanghai Bell
* R2-2205033 Discussion on open issues for support of Non continuous coverage CMCC
* R2-2204593 Discussion on the Open issues for IoT over NTN Transsion Holdings

Enhanced spatial coverage prediction

* R2-2204653 Beam information for the discontinuous coverage prediction Qualcomm Incorporated
* R2-2205373 Remaining issues on discontinuous coverage Xiaomi
* R2-2204753 Discussion on the remaining issue of enhanced spatial coverage prediction Spreadtrum Communications
* R2-2204965 Further consideration on additional satellite assistance for discontinuous coverage. Lenovo

Epoch time

* R2-2204710 [O308][O310] Discussion on the system information for discontinuous coverage in IoT-NTN, OPPO
* ASNAS interaction
* R2-2204751 Discussion on AS-NAS interaction while the UE is out of coverage, Spreadtrum Communications

CR proposals

* R2-2205143 FFS and RILZ302, H000, O302 etc for SIB32 ZTE Corporation, Sanechips
* R2-2205598 Assistance Information for Predicting the Discontinuous Coverage, Google Inc.
* R2-2205238 [C503] Correction on ephemerisOrbitalParameters of SatelliteInfor in 36.331 CATT

GNSS Validation report:

* R2-2205153 FFS on provision of remaining GNSS duration, ZTE Corporation, Sanechips
* R2-2205761 Details of GNSS position validity report for NB-IoT, NEC Telecom MODUS Ltd.
* R2-2206626 Report from [AT118-e][058][IOT NTN] GNSS Validity duration report (NEC)
* R2-2204727 Discussion on the signaling for reporting remaining GNSS validity duration, OPPO
* R2-2204752 Discussion on the remaining issue of GNSS Position Validity, Spreadtrum Communications
* R2-2205031 Details on GNSS Validity duration reporting, CMCC
* R2-2205399 Discussion on the signaling of GNSS validity duration, Xiaomi
* R2-2204655 Reporting remaining GNSS position validity duration, Qualcomm Incorporated (R2-2202560)

CR proposals

* R2-2205400 FFS issues related to GNSS outdate indication, Xiaomi

Location report

* R2-2205398 Discussion on location report for IOT NTN, Xiaomi
* R2-2205600 On remaining issues for Location Reporting, Nokia, Nokia Shanghai Bells

General

* R2-2205862 Other control plane open issues Ericsson discussion LTE\_NBIOT\_eMTC\_NTN
* R2-2206420 Report of [AT118-e][048][IoT-NTN] New Issues (OPPO) – 1st round OPPO

MAC Msg3 repetitions

* R2-2204740 Discussion on mac-ContentionResolutionTimer in IoT NTN OPPO discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN
* R2-2205725 Alignment with NR NTN for Msg3 blind retransmission Nokia, Nokia Shanghai Bell discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

TA report

* R2-2204741 Discussion on TA report in IoT NTN OPPO discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Submitted TDocs to AI 7.2.3.1: Corrections - User Plane

* R2-2206533 Report of [AT118-e][049][IoTNTN] User Plane (Interdigital) Interdigital inc.
* R2-2205161 Correction on sr-ProhibitTimerExt for IoT NTN ZTE Corporation, Sanechips
* R2-2205328 Correction on 36.321, Huawei, HiSilicon draftCR
* R2-2205724 36.321 corrections for IoT NTN, Nokia, Nokia Shanghai Bell CR
* R2-2205959 TA Reporting during Random Access, InterDigital
* R2-2205996 IoT NTN Uplink synchronisation and UE-eNB RTT modelling, Ericsson

Submitted TDocs to AI 7.2.3.2: Corrections - RRC

* R2-2206529 Report of [AT118-e][050][IoTNTN] RRC Miscellaneous (ZTE) ZTE
* R2-2204712 [O300][O301][O302][O303][O304][O306][O307][O311][O312][O313] Correction on the handing of SIB31 OPPO draftCR, Rel-17 36.331 17.0.0 F
* R2-2205140 FFS and RILO301 etc for SIB31 ZTE Corporation, Sanechips
* R2-2205145 FFS and RILO305, X501 etc for dedicatedSIB31 ZTE Corporation, Sanechips
* R2-2205595 IoT-NTN System Information Validity Interdigital, Inc.

Miscellanous

* R2-2205146 RILZ303 Reference to GNSS validation check ZTE Corporation, Sanechips, CR Rel-17 36.331 17.0.0 4787-F
* R2-2205330 RIL H012, H013, H016, H017 : Signalling of NTN specific configuration parameters, Huawei, HiSilicon
* R2-2205830 Clarification on System Information acquistion and GNSS Fix related actions for IoT-NTN Nokia Solutions & Networks (I) CR Rel-17 36.331 17.0.0 4807-F
* R2-2204652 Clarification on GNSS fix Qualcomm Incorporated CR Rel-17 36.331 17.0.0 4786-F
* R2-2205329 Adressing RRC Editor’s notes Huawei, HiSilicon
* R2-2204654 RRC reestablishment between TN and NTN for NB-IoT Qualcomm Incorporated

Submitted TDocs to AI 7.2.3.3: Idle Inactive mode

* R2-2205331 Adressing 36.304 Editor’s notes Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN
* R2-2205861 IoT NTN idle mode issues Ericsson discussion LTE\_NBIOT\_eMTC\_NTN
* R2-2204711 Correction on Measurement rules for cell re-selection in IoT-NTN OPPO CR Rel-17 36.304 17.0.0 0846 - F LTE\_NBIOT\_eMTC\_NTN
* R2-2205250 36.304 R17 editorial corrections Nokia, Nokia Shanghai Bell CR Rel-17 36.304 17.0.0 0847 - F LTE\_NBIOT\_eMTC\_NTN-Core, TEI17
* R2-2204651 Clarification on TN NTN barring Qualcomm Incorporated CR Rel-17 36.331 17.0.0 4785 - F FS\_LTE\_NBIOT\_eMTC\_NTN

Submitted TDocs to AI 7.2.4: UE capabilities

* R2-2206471 LS on updated Rel-17 RAN1 UE features list for LTE (R1-2205326; contact: NTT DOCOMO, AT&T)
* R2-2205863 On IoT NTN UE capabilities Ericsson discussion LTE\_NBIOT\_eMTC\_NTN
* R2-2205601 On Capability Indication of existing IoT-Features for NTN connectivity Nokia, Nokia Shanghai Bells discussion Rel-17
* R2-2205333 TN-NTN differentiation for NB-IoT Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN
* R2-2205332 Discussion on UE capabilities Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN
* R2-2204650 NTN UE capability signaling for eMTC and NB-IoT Qualcomm Incorporated CR Rel-17 36.331 17.0.0 4784 - F FS\_LTE\_NBIOT\_eMTC\_NTN
* R2-2205374 Remaining issues on UE capability Xiaomi discussion
* R2-2205594 IoT-NTN-only UE Interdigital, Inc. discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

## 4.3 RAN3

* R3-223015 Reply LS on opens issues for NB-IoT and eMTC support for NTN RAN2
* R3-223030 Reply LS on opens issues for NB-IoT and eMTC support for NTN SA2
* R3-223098 Remove unnecessary LTE-M Satellite Indication Qualcomm, Huawei
* R3-223235 Correction to NTN-IoT Huawei, Qualcomm, DT
* R3-223255 Clarifications for NB-IOT UE Nokia, Nokia Shanghai Bell, Huawei
* R3-223340 LTE-M Capability Indication for NTN Ericsson
* R3-223344 Correction to NTN tabular mistake Huawei
* R3-223733 Removing the unnecessary LTE-M satellite indication Ericsson
* R3-223342 [DRAFT] Reply LS on open issues for NB-IoT and eMTC support for NTN Ericsson
* R3-223398 Left Issues on NB-IoT and eMTC Support for NTN ZTE
* R3-223399 Stage 2 Correction on NB-IoT and eMTC Support for NTN ZTE
* R3- 223400 Removal of LTE-M Satellite Indication over S1 ZTE
* R3-223401 [DRAFT] Reply LS on open issues for NB-IoT and eMTC support for NTN ZTE
* R3-223614 Discussion on reply LS to RAN2 and SA2 CATT
* R3-223616 Correction on stage2 for IoT over NTN CATT
* R3-223615 Correction on 36.413 for IoT over NTN CATT

# 5 Others

***END***