3GPP TSG-RAN WG2 Meeting #119bis electronic R2-2210801

Online, 10th-19th October, 2022

**Agenda item: 10.2**

**Source: Vice Chairman (ZTE Corporation)**

**Title: Report from Break-out session on NR-NTN and IoT-NTN**

**Document for: Approval**

General

Recording of voice or video at meetings is not used in 3GPP. This applies also to this e-Meeting. At this e-Meeting, no specific actions are taken to prevent the recording of web conferences. Companies that have concerns related to recordings, if any, may express those by email in the main meeting organizational thread [AT119bis-e][000]

Organizational

1. All organization emails and notes will be shared over the following email discussion throughout the meeting:

* [AT119bis-e][100] Organizational – NR-NTN and IoT-NTN session (RAN2 VC)

Scope:

* + - Share plans for the meeting and list of ongoing email discussions for the sessions related to NR-NTN and IoT-NTN
    - Share meetings notes and agreements for review and endorsement

Schedule/Plan

WEEK 1:

|  |  |  |  |
| --- | --- | --- | --- |
| **Time Zone UTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Monday** |  |  |  |
| 12:30-13:30 | NR17 General, inc LS for early disc (if any) (Johan)  NR17 feMIMO (Johan)  NR17 ePowSav (Johan)  NR17 TEI (Johan)  NR18 Inc LS for early disc (if any, if time allows) | **(12:30-14:00)**  **EUTRA 17 IoT NTN (Sergio)**  **- 7.2.1**  **- 7.2.3**  **- 7.2.4.1**  **- 7.2.4.2**  **- 7.2.5**  **NR 17 NR NTN (Sergio)**  **- 6.2.1**  **- 6.2.2**  **- 6.2.3**  **- 6.2.4.1**  **- 6.2.4.2**  **- 6.2.5** | NR17 Pos (Nathan)  - 6.11.2.2 RRC (R2-2209429, R2-2210480)  - 6.11.2.3 LPP (AI summary R2-2210784)  - 6.11.2.4 MAC (R2-2209427, R2-2210311, R2-2210607)  - 6.11.2.5 UE capabilities (R2-2209428, R2-2210310)  - 6.11.2.1 Stage 2 if time |
| 13:30-14:30 | NR17 SL Relay (Nathan)  - 6.7.2.2 Control plane (AI summary R2-2210890)  - 6.7.2.3 User plane (AI summary R2-2210770)  - 6.7.2.4 Discovery/(re)selection (AI summary R2-2210777)  - 6.7.2.1 Stage 2 if time |
| (14:00 – 15:30)  NR 17 DCCA (Tero)  - 6.2.1: Outcome of [Post119-e][224] [R2-2210177](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210177.zip)  - 6.2.2: BWP handling for deactivated SCG ([R2-2210674](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210674.zip))  - 6.2.3: skipped measIDs ([R2-2210457](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210457.zip), [R2-2210719](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210719.zip), [R2-2210720](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210720.zip)), UE requirements for CPC ([R2-2210718](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210718.zip))  NR17 upto 71GHz (Tero)  - 6.20.1/2: Channel access LS from RAN1 ([R2-2209318](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209318.zip)/[R1-2208231](http://3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_110/Docs/R1-2208231.zip)) + RAN2 input documents ([R2-2209862](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209862.zip))  - 6.20.2: Inter-RAT TCI state ([R2-2209863](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209863.zip))  NR17 NR18 Slicing Inc LSes (Tero)  NR17 NR18 Slicing Inc LSes (Tero)  - 6.8: SA2 LS [R2-2209358](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209358.zip), LS reply ([R2-2210750](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210750.zip))  - 8.18: SA2 LS [R2-2209355](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209355.zip) |
| 14:30-15:30 | NR17 MBS (Dawid)  - 6.1.1: LSin, Stage-2 CR (R2-2209866)  - 6.1.3: FG 33-1-1 (R2-2209909, R2-2210029, R2-2210714)  - 6.1.4: HARQ buffers (R2-2209416, R2-2210594), MRB type changes (R2-2210052, R2-2210519), PDCP state variables (R2-2209551, R2-2209746) | NR17 SL enh (6.15) (Kyeongin)  NR18 SL enh (8.15) (if time allows) |
| **Tuesday** |  |  |  |
| 12:30-13:30 | NR18 Mobile IAB (or NR18 Other TBD) (Johan) | NR18 Dual TxRx MUSIM (Tero)  - 8.17.1: Work plan ([R2-2210388](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210388.zip))  - 8.17.2.1: Scenarios ([R2-2209734](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209734.zip), [R2-2210389](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210389.zip), [R2-2210392](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210392.zip))  IF time allows:  - 8.17.2.1: MUSIM gap coordination in NR-DC ([R2-2210738](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210738.zip)) | NR18 Enh Pos (Nathan)  - 8.2.2 Sidelink positioning (R2-2209607, R2-2210363, R2-2210167) |
| 13:30-14:30 | NR18 UAV (Diana) | NR18 Dual TxRx MUSIM (Tero)  - 8.17.2.2: Solutions ([R2-2209575](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209575.zip), [R2-2210514](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210514.zip))  IF time allows:  - 8.17.3: Other ([R2-2210485](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210485.zip), [R2-2210391](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210391.zip)) | NR18 Enh Pos (Nathan)  - 8.2.2 Sidelink positioning continued  - 8.2.3 RAT-dependent integrity (AI summary R2-2210892) |
| 14:30-15:30 | NR18 Network Energy Saving (Diana) | NR18 SONMDT (HuNan) | NR18 MBS (Dawid)  - 8.11.1: LSin  - 8.11.3: R2-2210385  - 8.11.2: Report of [Post119-e][610] (R2-2210068) |
| **Wednesday** |  |  |  |
| 12:30-13:30 | NR18 Mobility (Johan) | NR18 XR (Tero)  - 8.5.1: SA2/SA4 progress ([R2-2209553](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209553.zip), [R2-2209554](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209554.zip))  - 8.5.2.1: PDU sets and data bursts ([R2-2210201](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210201.zip), [R2-2209777](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209777.zip), [R2-2209450](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209450.zip))  IF time allows:  - 8.5.2.2: PDU prioritization ([R2-2210649](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210649.zip)) | NR18 Enh SL relay (Nathan)  - 8.9.4 Multi-path (R2-2210027, R2-2209375 section 3 only) |
| 13:30-14:30 | NR18 Mobility (Johan) | NR18 XR (Tero)  - 8.5.2.2: PDU prioritization ([R2-2210649](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210649.zip), [R2-2209778](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209778.zip), [R2-2209646](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209646.zip))  - 8.5.2.3: PDU discard ([R2-2210559](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210559.zip), [R2-2210687](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210687.zip), [R2-2209557](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209557.zip), P2 from [R2-2210375](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210375.zip)) | NR18 Enh SL relay (Nathan)  - 8.9.4 Multi-path continued  - 8.9.2 UE-to-UE (AI summary R2-2210893) |
| 14:30-15:30 | NR18 Mobility (Johan) | NR18 XR (Tero)  - 8.5.3.1: DRX enhancements ([R2-2210186](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210186.zip), [R2-2210651](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210651.zip), P5 from [R2-2209453](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209453.zip))  - 8.5.4.1: Feedback enhancements ([R2-2209558](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209558.zip))  - 8.5.4.2: Scheduling enhancements ([R2-2210483](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210483.zip), [R2-2210541](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210541.zip)) | NR18 Enh SL relay (Nathan)  - 8.9.2 UE-to-UE continued  - 8.9.3 Service continuity (AI summary R2-2210782) |
| **Thursday** |  |  |  |
| 13:00-14:00 | NR18 AIML air interface (Johan) | **NR18 NTN (Sergio)**  **- 8.7.3: outcome of [102]**  **- 8.7.4** | NR18 SL Enh (8.15) (Kyeongin) |
| 14:00-15:00 | NR18 AIML air interface (Johan) | **EUTRA18 IoT NTN (Sergio)**  **- 8.6.3**  **- 8.6.2.1 (if time allows)** | NR18 Enh Pos (Nathan)  - 8.2.4 LPHAP (R2-2209405) |
| **Friday** |  |  |  |
| 03:30-04:30 | NR18 Other (or NR18 Mobile IAB TBD) (Johan) | **NR18 NR NTN (Sergio)**  **- 8.7.4**  **- 8.7.2: outcome of [103]** | NR18 Enh Pos (Nathan)  - 8.2.4 LPHAP continued (if needed)  - 8.2.5 RedCap (R2-2209963, R2-2209563)  - 8.2.3 RAT-dependent integrity continued |
| 04:30-05:30 | NR18 NC repeater (Sasha) | **EUTRA IoT NTN (Sergio)**  **- 8.6.2.1**  **- 8.6.2.2: outcome of [101]** | NR18 QoE (Tero)  - 8.14.4: QoE with NR-DC ([R2-2209844](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209844.zip),  [R2-2210752](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210752.zip))  - 8.14.3: R17 leftovers: Report of [204] ([R2-2210813](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210813.zip)) |

WEEK 2:

|  |  |  |  |
| --- | --- | --- | --- |
| **Time Zone UTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Monday** |  |  |  |
| 12:30-13:30 | NR17 feMIMO,  NR17 TEI  NR17 Other  NR17 General, ePowsav, Inc LS, (if needed) (Johan) | **EUTRA18 IoT NTN CB (Sergio)**  **outcome of:**  **- [105] Capability signalling**  **- [106] UP corrections**  **- [107] RRC corrections**  **NR 17 NR NTN CB (Sergio)**  **Outcome of:**  **- [115] RRC corrections**  **- [114] Validity of assistance info**  **- [111] UP corrections**  **(for some issues the discussion will likely need to continue during the Tuesday or Wednesday CB sessions)** | NR17 CB (6.15) Kyeongin  NR17 CB Nathan |
| 13:30-14:30 | NR17 CB Tero  - Report of [201]: [R2-2210810](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210810.zip) (if needed)  - Report of [202]: [R2-2210811](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210811.zip) (if needed)  - Report of [203]: [R2-2210812](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210812.zip) (if needed) |
| 14:30-15:30 | NR18 Mobility (Johan) | NR18 XR (Tero)  - 8.5.3.2: Other enhancements ([R2-2209455](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209455.zip))  - Additional topics and comebacks from 1st week (TBA) | NR18 SONMDT (HuNan) |
| **Tuesday** |  |  |  |
| 12:30-13:30 | NR17 MBS CB (Dawid)  NR18 MBS CB (Dawid)  NR18 NCR CB if needed (Sasha)  NR18 CB (Johan) if time | NR18 Network Energy Saving (Diana) | NR18 CB (8.15) (Kyeongin)  NR18 CB (Nathan) |
| 13:30-14:30 | NR18 NES CB (Diana) |
| 14:30-15:30 | **(14:30-15:00)**  **NR 17 NR NTN CB (Sergio)**  **Outcome of:**  **- [113] Epoch time and validity timer**  **- [116] UE capabilities**  NR18 CB (Tero) |
| **Wednesday** |  |  |  |
| 03:30-04:30 | TBD CB Johan | (03:30-04:00)  TBD CB Tero  **(04:00-05:30)**  **EUTRA18/NR18 NTN CB (Sergio)**  **- outcome of [118]**  **- outcome of [102]: LS to SA/1SA2 on latency for NW verified UE location**  **- outcome of [120]**  **- outcome of [117]**  **- outcome of [119]**  **NR17/EUTRA17 NR NTN CB (Sergio)**  **- outcome of [109]**  **- outcome of [105]: IoT NTN Capability signalling (R2-2210867)**  **- outcome of: [107]: Assistance information for neighbor cells** | TBD CB Nathan  TBD CB HuNan |
| 04:30-05:30 | TBD |

List and status of offline email discussions

NOTE: No offline email discussions will be kicked off before Sunday Oct 9th, 19:00 UTC

* [AT119bis-e][101][IoT NTN Enh] GNSS operation (CATT)

Initial scope: Discuss the proposals in the submitted contributions in AI 8.6.2.2

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Thursday 2022-10-13 1200 UTC

Initial deadline (for rapporteur's summary in R2-2210840): Thursday 2022-10-13 1400 UTC

Status: Closed

* [AT119bis-e][102][NR NTN Enh] NW verified UE location (Thales)

Updated scope: Discuss the possible content of an LS to SA1/SA2 (CC: RAN1, RAN3, RAN) based on p11 in [R2-2210841](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210841.zip))

Updated intended outcome: Draft LS to SA1/SA2

Updated deadline (for companies' feedback): Wednesday 2022-10-19 02:00 UTC

Updated deadline (for draft LS in R2-2211044): Wednesday 2022-10-19 04:00 UTC

Status: Ongoing

* [AT119bis-e][103][NR NTN Enh] Coverage enhancements (Qualcomm)

Initial scope: Discuss the proposals in the submitted contributions in AI 8.7.2 (apart from those on msg3 repetition enhancements)

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Thursday 2022-10-13 1600 UTC

Initial deadline (for rapporteur's summary in R2-2210842): Thursday 2022-10-13 1800 UTC

Status: Closed

* [AT119bis-e][104][IoT NTN] AS deactivation (Qualcomm)

Initial scope: Discuss the reply LS to SA2/CT1 and check whether a clarification is needed in 38.304

Initial intended outcome: offline summary and draft reply LS

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210843 and draft LS in R2-2210844): Thursday 2022-10-13 22:00 UTC

Status: Closed

* [AT119bis-e][105][IoT NTN] Capability signalling (Nokia)

Updated scope: Continue the discussion to understand what we need to achieve in terms of NTN-TN connected mode mobility in Rel-17 and, if needed, prepare a corresponding updated list of proposals. Also attempt to draft a reply LS to SA2 accordingly

Updated intended outcome: offline summary and draft reply LS

Updated deadline (for companies' feedback): Tuesday 2022-10-18 10:00 UTC

Updated deadline (for rapporteur's summary in R2-2210867 and draft LS in R2-2210846): Tuesday 2022-10-18 12:00 UTC

Status: Ongoing

* [AT119bis-e][106][IoT NTN] UP corrections (Ericsson)

Initial scope: Discuss UP corrections in AI 7.2.3

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210847): Thursday 2022-10-13 22:00 UTC

Proposals marked "for agreement" in R2-2210847 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

Status: Closed

* [AT119bis-e][107][IoT NTN] RRC corrections (Huawei)

Initial scope: Discuss RRC corrections in AI 7.2.4.1

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 14:00 UTC

Deadline (for rapporteur's summary in R2-2210848): Thursday 2022-10-13 16:00 UTC

Proposals marked "for agreement" in R2-2210848 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

Status: Closed

* [AT119bis-e][108][IoT NTN] UE capabilities (Mediatek)

Initial scope: Discuss proposals in AI 7.2.5 (apart from those on capability signalling for IoT-NTN)

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210849): Thursday 2022-10-13 22:00 UTC

Proposals marked "for agreement" in R2-2210849 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

Status: Closed

* [AT119bis-e][109][NR NTN] cell reselection requirements (Huawei)

Updated scope: Discuss a reply LS to RAN4

Updated intended outcome: Draft reply LS

Updated deadline (for companies' feedback): Tuesday 2022-10-18 0600 UTC

Updated deadline (for draft LS in R2-2210866): Tuesday 2022-10-18 0800 UTC

Status: Ongoing

* [AT119bis-e][110][NR NTN] Stage-2 corrections (Thales)

Initial scope: Discuss the CRs/TPs in AI 6.10.2

Initial intended outcome: Summary of the offline discussion and corresponding draft CR:

Deadline (for companies' feedback): Tuesday 2022-10-18 16:00 UTC

Deadline (for rapporteur's summary in R2-2210851 and draft CR in R2-2210852): Tuesday 2022-10-18 20:00 UTC

Status: Ongoing

* [AT119bis-e][111][NR NTN] UP corrections (Interdigital)

Updated scope: Prepare a rapporteur CR based on the meeting decisions

Updated intended outcome: Agreeable 38.321 CR

Updated deadline (for companies' feedback): Tuesday 2022-10-18 22:00 UTC

Updated deadline (for rapporteur's CR in R2-2210868): Wednesday 2022-10-19 04:00 UTC

Status: Ongoing

* [AT119bis-e][112][NR NTN] idle mode corrections (ZTE)

Updated scope: Prepare a rapporteur CR based on the meeting decisions

Updated intended outcome: Agreeable 38.304 CR

Updated deadline (for companies' feedback): Tuesday 2022-10-18 22:00 UTC

Updated deadline (for rapporteur's CR in R2-2210869): Wednesday 2022-10-19 04:00 UTC

Status: Ongoing

* [AT119bis-e][113][NR NTN] epoch time and validity timer (Samsung)

Initial scope: Discuss proposals on Epoch time and validity timer handling, apart from those handled in offline 114

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 14:00 UTC

Deadline (for rapporteur's summary in R2-2210855): Thursday 2022-10-13 16:00 UTC

Proposals marked "for agreement" in R2-2210855 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

Status: Closed

* [AT119bis-e][114][NR NTN] Validity of assistance information (Oppo)

Updated scope: Discuss the content of an LS to RAN1 based on the outcome of the online discussion

Updated intended outcome: Draft LS to RAN1

Updated deadline (for companies' feedback): Tuesday 2022-10-18 22:00 UTC

Updated deadline (for draft LS in R2-2210857): Wednesday 2022-10-19 02:00 UTC

Status: Ongoing

* [AT119bis-e][115][NR NTN] RRC corrections (Ericsson)

Initial scope: Discuss remaining RRC corrections

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210858): Thursday 2022-10-13 22:00 UTC

Proposals marked "for agreement" in R2-2210858 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

Status: Closed

* [AT119bis-e][116][NR NTN] UE capabilities (Mediatek)

Initial scope: Discuss proposals in AI 6.10.5

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210859): Thursday 2022-10-13 22:00 UTC

Proposals marked "for agreement" in R2-2210859 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

Status: Closed

* [AT119bis-e][117][NR NTN Enh] cell reselection enhancements (Intel)

Scope: Discuss NTN-NTN and NTN-TN cell reselection enhancements based on remaining proposals in [R2-2209578](file:///C:\Data\3GPP\Extracts\R2-2209578%20Discussion%20on%20NTN%20cell%20reselection%20enhancements.docx) and [R2-2210353](file:///C:\Data\3GPP\Extracts\R2-2210353%20Further%20view%20on%20Idle-%20and%20Connected-mode%20NTN%20mobility%20in%20Rel-18.docx)

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Tuesday 2022-10-18 0600 UTC

Initial deadline (for rapporteur's summary in R2-2210860): Tuesday 2022-10-18 0800 UTC

Status: Closed

* [AT119bis-e][118][IoT NTN Enh] Mobility enhancements (ZTE)

Scope: Discuss mobility enhancements, based on remaining proposals in [R2-2209836](file:///C:\Data\3GPP\Extracts\R2-2209836%20Further%20discussion%20on%20mobility%20enhancements.docx), [R2-2209443](file:///C:\Data\3GPP\Extracts\R2-2209443_Mobility%20Enhancements%20in%20IoT-NTN.docx) and [R2-2209411](file:///C:\Data\3GPP\Extracts\R2-2209411.docx)

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Tuesday 2022-10-18 1000 UTC

Initial deadline (for rapporteur's summary in R2-2210861): Tuesday 2022-10-18 1200 UTC

Status: Closed

* [AT119bis-e][119][NR NTN Enh] HO enhancements (Nokia)

Scope: Discuss possible CHO-based approach (p6 in [R2-2210353](file:///C:\Data\3GPP\Extracts\R2-2210353%20Further%20view%20on%20Idle-%20and%20Connected-mode%20NTN%20mobility%20in%20Rel-18.docx)) and “same PCI” approach (p5 in [R2-2210405](file:///C:\Data\3GPP\Extracts\R2-2210405%20Discussion%20on%20NTN%20mobility%20enhancements.doc)) for connected mode mobility enhancements in NTN

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Tuesday 2022-10-18 1600 UTC

Initial deadline (for rapporteur's summary in R2-2210862): Tuesday 2022-10-18 1800 UTC

Status: Closed

* [AT119bis-e][120][IoT NTN Enh] HARQ enhancements (CMCC)

Scope: Continue the discussion on p4, p5 from [R2-2210152](file:///C:\Data\3GPP\Extracts\R2-2210152%20Discussion%20on%20the%20HARQ%20enhancement%20for%20IoT-NTN.docx) as well as p6 and p8 from [R2-2210036](file:///C:\Data\3GPP\Extracts\R2-2210036%20Discussion%20on%20disabling%20of%20HARQ%20feedback.doc)

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Tuesday 2022-10-18 1000 UTC

Initial deadline (for rapporteur's summary in R2-2210863): Tuesday 2022-10-18 1200 UTC

Status: Closed

* [AT119bis-e][121][NR NTN Enh] LS on RACH-less HO (Oppo)

Scope: Draft LS to RAN1 on RACH-less HO

Intended outcome: draft reply LS

Deadline (for companies' feedback): Tuesday 2022-10-18 0600 UTC

Deadline (for Draft LS in R2-2210864): Tuesday 2022-10-18 0800 UTC

Status: Closed

* [AT119bis-e][122][IoT NTN] idle mode corrections (Ericsson)

Updated scope: Prepare a rapporteur CR based on the meeting decisions

Updated intended outcome: Agreeable 36.304 CR

Updated deadline (for companies' feedback): Tuesday 2022-10-18 22:00 UTC

Updated deadline (for rapporteur's CR in R2-2211016): Wednesday 2022-10-19 08:00 UTC

Status: Ongoing

## 6.10 NR Non-Terrestrial Networks (NTN)

(NR\_NTN\_solutions-Core; leading WG: RAN2; REL-17; WID: [RP-211557](file:///C:\Data\3GPP\archive\RAN\RAN%2392\Tdocs\RP-211557.zip))

Tdoc Limitation: 5 tdocs

### 6.10.1 Organizational

LSs, rapporteur inputs and other organizational documents. Rapporteur inputs and other pre-assigned documents in this AI do not count towards the tdoc limitation.

#### 6.10.1.1 LS in

For LSes that need action: one tdoc by contact company to address the LS and potential reply is considered.

Rapporteur input may be provided.

[R2-2209337](file:///C:\Data\3GPP\Extracts\R2-2209337_R4-2214472.docx) LS to RAN2 on Network indication for applying enhanced cell reselection requirements (R4-2214472; contact: Huawei) RAN4 LS in Rel-17 NR\_NTN\_solutions-Core To:RAN2

* Noted

[R2-2210408](file:///C:\Data\3GPP\Extracts\R2-2210408%20Discussion%20on%20enhanced%20cell%20reselection%20requirements%20for%20NTN.docx) Discussion on enhanced cell reselection requirements for NTN Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1: The enhancement of cell reselection measurement for LEO has been specified in RAN4, while RAN2 signalling is not supported yet.

Proposal 1: Introduce one indication for cell reselection requirement enhancement for LEO in SIB1.

* Oppo wonders whether this should be in SIB1 or SIB19
* Agree to have one indication for cell reselection requirement enhancement for LEO. FFS if in SIB1 or SIB19

Observation 2: The relaxation of cell reselection measurement for GEO has been specified in RAN4, while RAN2 signalling is not supported yet.

Proposal 2: Reuse the exiting relaxedMeasurement-r16 field to enable the relaxed cell reselection requirements for GEO.

* CATT has a concern with this. A new separate bit is better
* QC is not sure the requirement is the same and wonders whether we can reuse the r16 field
* Apple also prefer sot have a separate flag for this
* Nokia has similar view as CATT, Apple as there is nothing in the incoming LS saying that we could reuse the r16 field
* Samsung/Mediatek/ZTE/Lenovo thinks we could have two separate bits.
* Continue offline in offline 109

Proposal 3: Add the UE capability for relaxed monitoring in GEO scenario.

* Huawei acknowledges this is not needed as already covered in the specs.

Agreements:

1. Introduce one indication for cell reselection requirement enhancement for LEO. FFS if in SIB1 or SIB19

[R2-2210409](file:///C:\Data\3GPP\Extracts\R2-2210409%20CR%20on%20enhanced%20cell%20reselection%20requirements%20for%20NTN.docx) CR on enhanced cell reselection requirements for NTN Huawei, HiSilicon CR Rel-17 38.331 17.2.0 3544 - F NR\_NTN\_solutions-Core

* (After offline 109) change the parameter name into enhancedMeasurementLEO-r17.
* Revised in R2-2211045

R2-2211045 CR on enhanced cell reselection requirements for NTN Huawei, HiSilicon CR Rel-17 38.331 17.2.0 3544 1 F NR\_NTN\_solutions-Core

Moved here from 6.10.4

[R2-2210044](file:///C:\Data\3GPP\Extracts\R2-2210044%20-%20R17%20NR%20NTN%20on%20LS%20on%20cell%20reselection.docx) On LS Network indication for applying enhanced cell reselection requirements Ericsson discussion Rel-17

Proposal 1 Add parameter “cellReselectionRequirement” in SIB1 and discuss if LS to Ran4 is needed to ask if they have any objections

Proposal 2 RAN2 to discuss to add capability related to the enhanced or relaxed cell reselection requirements for LEO/GEO without capability signalling.

Moved here from 6.10.4.1

[R2-2210347](file:///C:\Data\3GPP\Extracts\R2-2210347%20NR%20RRC%20CR%20Introduction%20of%20enhanced%20and%20relaxed%20cell%20reselection%20for%20NTN.docx) NR RRC CR: Introduction of enhanced and relaxed cell reselection for NTN Nokia, Nokia Shanghai Bell CR Rel-17 38.331 17.2.0 3540 - F NR\_NTN\_solutions-Core

[R2-2210348](file:///C:\Data\3GPP\Extracts\R2-2210348%20NR%20IDLE-mode%20CR%20Introduction%20of%20enhanced%20and%20relaxed%20cell%20reselection%20for%20NTN.docx) NR IDLE-mode CR: Introduction of enhanced and relaxed cell reselection for NTN Nokia, Nokia Shanghai Bell CR Rel-17 38.304 17.2.0 0289 - F NR\_NTN\_solutions-Core

* (After offline 109) Not pursued
* [AT119bis-e][109][NR NTN] cell reselection requirements (Huawei)

Initial scope: Discuss the proposals for enhanced cell reselection requirements for NTN

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 14:00 UTC

Deadline (for rapporteur's summary in R2-2210850): Thursday 2022-10-13 16:00 UTC

Proposals marked "for agreement" in R2-2210850 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

Updated scope: Discuss a reply LS to RAN4

Updated intended outcome: Draft reply LS

Updated deadline (for companies' feedback): Tuesday 2022-10-18 0600 UTC

Updated deadline (for draft LS in R2-2210866): Tuesday 2022-10-18 0800 UTC

[R2-2210850](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210850.zip) [offline-109] cell reselection requirements Huawei discussion Rel-18 NR\_NTN\_solutions-Core

Proposal 1: Introduce one indication for cell reselection requirement enhancement for LEO in SIB1.

* Ericsson suggests to change the parameter name from ntn-LEO-MeasFlag-r17 to enhancedMeasurementLEO-r17.
* Agreed as “Introduce one indication for cell reselection requirement enhancement for LEO in SIB1. Parameter name is enhancedMeasurementLEO-r17”

Proposal 2: Reuse the exiting relaxedMeasurement-r16 field to enable the relaxed cell reselection requirements for GEO.

* Agreed

Proposal 3: Changes in R2-2210348 are not pursued.

* Agreed

Agreements via email (from offline 109):

1. Introduce one indication for cell reselection requirement enhancement for LEO in SIB1. Parameter name is enhancedMeasurementLEO-r17
2. Reuse the exiting relaxedMeasurement-r16 field to enable the relaxed cell reselection requirements for GEO.
3. Changes in R2-2210348 are not pursued.

R2-2210866 Reply LS on Network indication for applying enhanced cell reselection requirements Huawei LS out Rel-17 NR\_NTN\_solutions-Core To:RAN4

#### 6.10.1.2 Rapporteur inputs

CR Rapporteurs may provide baseline correction CRs containing smaller corrections, text clarifications, etc - please contact the CR rapporteurs before providing contributions on those aspects.

R2-2210868 MAC corrections for Rel-17 NR NTN Interdigital CR Rel-17 38.321 17.2.0 XXXX - F NR\_NTN\_solutions-Core

R2-2210869 Idle mode corrections for Rel-17 NR NTN ZTE Corporation CR Rel-17 38.304 17.2.0 XXXX - F NR\_NTN\_solutions-Core

R2-2211018 RRC corrections for Rel-17 NR NTN Ericsson CR Rel-17 38.331 17.2.0 XXXX - F NR\_NTN\_solutions-Core

### 6.10.2 Stage 2 corrections

[R2-2210567](file:///C:\Data\3GPP\Extracts\R2-2210567%20CR%20corrections%20for%2038300.docx) Corrections to TS 38.300 for Rel-17 NR NTN Samsung Research America CR Rel-17 38.300 17.2.0 0568 - F NR\_NTN\_solutions-Core

[R2-2210759](file:///C:\Data\3GPP\Extracts\R2-2210759%20-%20R17%20NR%20NTN%20Stage%202%20corrections.docx) R17 NR NTN Stage 2 corrections Ericsson discussion Rel-17 NR\_NTN\_solutions

Proposal 1 Replace “/or” with “ optionally NTN-specific parameters for” in NTN part of stage 2 section 7.3.1.

Proposal 2 In 16.14.2.1, change “kmac is a scheduling offset supported in NTN for MAC CE timing relationships enhancement.” to “kmac is a scheduling offset for MAC CE timing relationships enhancement and estimation of UE-gNB RTT.”

Proposal 3 In 16.14.2.2 change “As illustrated in the Figure 16.14.2.2-1, the UE computes the frequency Doppler shift by considering UE position and the satellite ephemeris.” To “The UE computes the frequency Doppler shift of the service link, and autonomously pre-compensates for it in the uplink transmissions, by considering UE position and the satellite ephemeris.”

Proposal 4 Change “While the pre-compensation of the instantaneous Doppler shift experienced on the service link is to be performed by the UE, the management of Doppler shift experienced over the feeder link and transponder frequency error is left to the satellite network implementation.” To “While the pre-compensation of the instantaneous Doppler shift experienced on the service link is to be performed by the UE, the management of Doppler shift experienced over the feeder link and transponder frequency error is outside 3GPP scope and left to the network implementation.”

[R2-2209539](file:///C:\Data\3GPP\Extracts\38300_CR0562_(Rel-17)_R2-2209539%20Correction%20on%20neighbor%20cells’%20satellite%20ephemeris%20information%20_v1.docx) Correction on neighbour cells’ satellite ephemeris information (38.300) MediaTek Inc. CR Rel-17 38.300 17.2.0 0562 - F NR\_NTN\_solutions-Core

[R2-2209658](file:///C:\Data\3GPP\Extracts\R2-2209658%20Discussion%20on%20user%20consent%20for%20UE%20coarse%20location%20request.docx) Correction on user consent for UE coarse location request Huawei, HiSilicon CR Rel-17 38.300 17.2.0 0563 - F NR\_NTN\_solutions-Core

[R2-2210086](file:///C:\Data\3GPP\Extracts\R2-2210086-%20NTN%20stage-2%20correction.docx) NTN stage-2 correction OPPO CR Rel-17 38.300 17.2.0 0565 - F NR\_NTN\_solutions-Core

[R2-2210634](file:///C:\Data\3GPP\Extracts\38300_CR0570_(Rel-17)_R2-2210634%20Corrections%20to%20the%20UE-Based%20SMTC%20Adjustment%20in%20NTN.docx) Corrections to the UE-Based SMTC Adjustment in NTN Google Inc. CR Rel-17 38.300 17.2.0 0570 - F NR\_NTN\_solutions-Core

[R2-2210742](file:///C:\Data\3GPP\Extracts\R2-2210742.docx) Corrections on CHO evaluation for NTN CATT CR Rel-17 38.300 17.2.0 0571 - F NR\_NTN\_solutions-Core Late

* [AT119bis-e][110][NR NTN] Stage-2 corrections (Thales)

Initial scope: Discuss the CRs/TPs in AI 6.10.2

Initial intended outcome: Summary of the offline discussion and corresponding draft CR:

Deadline (for companies' feedback): Tuesday 2022-10-18 16:00 UTC

Deadline (for rapporteur's summary in R2-2210851 and draft CR in R2-2210852): Tuesday 2022-10-18 20:00 UTC

R2-2210851 [offline-110] Stage-2 corrections Thales discussion Rel-18 NR\_NTN\_solutions-Core

R2-2210852 R17 NR NTN Stage 2 corrections Thales CR Rel-17 38.300 17.2.0 XXXX - F NR\_NTN\_solutions-Core

Withdrawn

R2-2210462 Corrections to TS 38.300 for Rel-17 NR NTN Samsung Research America draftCR Rel-17 38.300 17.2.0 F NR\_NTN\_solutions-Core Withdrawn

### 6.10.3 UP corrections

SR cancellation

[R2-2210087](file:///C:\Data\3GPP\Extracts\R2-2210087%20-%20Correction%20to%20TA%20report%20triggered%20SR%20and%20DRX.doc) Correction to TA report triggered SR and DRX OPPO CR Rel-17 38.321 17.2.0 1423 - F NR\_NTN\_solutions-Core

5.4.4

1> if this SR was triggered by Timing Advance report (see clause 5.4.8) and a MAC PDU is transmitted and the MAC PDU includes a Timing Advance Report MAC CE:

2> cancel the pending SR and stop the corresponding sr-ProhibitTimer, if running.

…

The MAC entity may stop, if any, ongoing Random Access procedure due to a pending SR for Timing Advance report, which has no valid PUCCH resources configured, if:

- a MAC PDU is transmitted using a UL grant other than a UL grant provided by Random Access Response or a UL grant determined as specified in clause 5.1.2a for the transmission of the MSGA payload, and this PDU includes a Timing Advance Report MAC CE.

* First change is agreed as a baseline (detailed wording can be fine-tuned in the offline discussion)
* IDC/CATT are ok with the second change (on DRX)
* Ericsson thinks the parameters should still be listed in 5.7 as they affect DRX but are ok with the change.
* Second change is agreed (to be merged in the rapporteur CR)

[R2-2210641](file:///C:\Data\3GPP\Extracts\R2-2210641%20Correction%20on%20SR%20cancellation%20and%20Random%20Access%20procedure%20stop%20for%20NTN.docx) Correction on SR cancellation and Random Access procedure stop for NTN Nokia, Nokia Shanghai Bell CR Rel-17 38.321 17.2.0 1438 - F NR\_NTN\_solutions-Core

5.4.4

1> if this SR was triggered by Timing Advance reporting (see clause 5.4.8) and all the triggered Timing Advance reports are cancelled:

2> cancel the pending SR and stop the corresponding sr-ProhibitTimer, if running.

…

The MAC entity may stop, if any, ongoing Random Access procedure due to a pending SR for Timing Advance Report MAC CE, which has no valid PUCCH resources configured, if:

- a MAC PDU is transmitted using a UL grant other than a UL grant provided by Random Access Response or a UL grant determined as specified in clause 5.1.2a for the transmission of the MSGA payload, and this PDU contains a Timing Advance Report MAC CE which includes the latest available estimate of the UE’s Timing Advance value prior to the MAC PDU assembly.

[R2-2210708](file:///C:\Data\3GPP\Extracts\38321_CR1442%20(Rel-17)_R2-2210708%20Correction%20on%20SR%20triggered%20by%20TAR.docx) Correction on SR triggered by TAR ZTE Corporation, Sanechips CR Rel-17 38.321 17.2.0 1442 - F NR\_NTN\_solutions-Core Late

5.4.4

1> if this SR was triggered by Timing Advance Report procedure (see clause 5.4.8) prior to the MAC PDU assembly and a MAC PDU containing the relevant Timing Advance Report MAC CE is transmitted:

2> cancel the pending SR and stop the corresponding sr-ProhibitTimer, if running.

…

The MAC entity may stop, if any, ongoing Random Access procedure due to a pending SR for Timing Advance report, which has no valid PUCCH resources configured, if:

- the Timing Advance Report MAC CE that triggers the SR corresponding to the Random Access procedure has already been cancelled.

[R2-2210768](file:///C:\Data\3GPP\Extracts\R2-2210768%20CR%20corrections%20for%2038321.docx) Corrections to TS 38.321 for Rel-17 NR NTN Samsung Research America draftCR Rel-17 38.321 17.2.0 F NR\_NTN\_solutions-Core

5.4.4

1> if the SR is triggered by Timing Advance Reporting (see clause 5.4.8) and the Timing Advance Report MAC CE that triggers the SR has already been cancelled; or

2> cancel the pending SR and stop the corresponding sr-ProhibitTimer, if running.

[R2-2209503](file:///C:\Data\3GPP\Extracts\R2-2209503%20On%20corrections%20to%20random%20access%20procedure%20in%20NR%20NTN.docx) On corrections on random access procedure in NR NTN vivo discussion

[R2-2209849](file:///C:\Data\3GPP\Extracts\R2-2209849%20Discussion%20on%20reported%20value%20for%20event-triggered%20TA%20report.docx) Discussion on reported value for event-triggered TA report ASUSTeK discussion Rel-17 38.321 NR\_NTN\_solutions-Core

* [AT119bis-e][111][NR NTN] UP corrections (Interdigital)

Initial scope: Discuss UP corrections in AI 6.10.3

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210853): Thursday 2022-10-13 22:00 UTC

Proposals marked "for agreement" in R2-2210853 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

Updated scope: Prepare a rapporteur CR based on the meeting decisions

Updated intended outcome: Agreeable 38.321 CR

Updated deadline (for companies' feedback): Tuesday 2022-10-18 22:00 UTC

Updated deadline (for rapporteur's CR in R2-2210868): Wednesday 2022-10-19 04:00 UTC

[R2-2210853](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210853.zip) [offline-111] UP corrections Interdigital discussion Rel-18 NR\_NTN\_solutions-Core

Proposal 1: The Alt1 text proposal from R2-2210641 on cancellation of pending SR for TA report is agreed and included in NR NTN MAC rapporteur CR. (13/17)

* Agreed

Proposal 2: The baseline text proposal from R2-2210087 on cancellation of RACH due to pending SR for TA report is agreed and included in NR NTN MAC rapporteur CR. (consensus)

* Agreed

Proposal 3: The following editorial correction to TS 38.321 Section 6.1.3.57 is agreed and included in NR NTN MAC rapporteur CR:

- Differential Koffset: This field ~~contains~~ indicates the differential Koffset in the number of subframes (see clause 4.2 in TS 38.213 [6]). The length of the field is 6 bits.

- QC thinks we should just use “number of slots” in p3 and p4. Xiaomi agrees

- Ericsson thinks we should use “subframes”. Samsung agrees

- ZTE thinks we could use slots, adding “using subcarrier spacing of 15 kHz.'' after slots, then there shall be no room for ambiguity, and is also aligned with RRC

* Continue online
* We stick to “slots”, adding “using subcarrier spacing of 15 kHz” after slots
* Agreed as: “The following editorial correction to TS 38.321 Section 6.1.3.57 is agreed and included in NR NTN MAC rapporteur CR:

- Differential Koffset: This field ~~contains~~ indicates the differential Koffset in the number of slots (see clause 4.2 in TS 38.213 [6]), using subcarrier spacing of 15 kHz. The length of the field is 6 bits.”

Proposal 4: The following editorial correction to TS 38.321 Section 6.1.3.56 is agreed and included in NR NTN MAC rapporteur CR:

- Timing Advance: In FR1, the Timing Advance field indicates the least integer number of ~~slots~~ subframes greater than or equal to the Timing Advance value (see TS 38.211 [8], clause 4.3.1). The length of the field is 14 bits.

* Continue online
* We stick to “slots”, adding “using subcarrier spacing of 15 kHz” after slots
* Agreed as: “The following editorial correction to TS 38.321 Section 6.1.3.56 is agreed and included in NR NTN MAC rapporteur CR:

- Timing Advance: In FR1, the Timing Advance field indicates the least integer number of slots, using subcarrier spacing of 15 kHz, greater than or equal to the Timing Advance value (see TS 38.211 [8], clause 4.3.1). The length of the field is 14 bits.”

Proposal 5: Editorial corrections to TS 38.321 Sections 5.4.8 and 5.7 from R2-2210768 are agreed and included in NR NTN MAC rapporteur CR. (consensus)

* Agreed

Agreements via email (from offline 111):

1. The Alt1 text proposal from R2-2210641 on cancellation of pending SR for TA report is agreed and included in NR NTN MAC rapporteur CR. (13/17)
2. The baseline text proposal from R2-2210087 on cancellation of RACH due to pending SR for TA report is agreed and included in NR NTN MAC rapporteur CR. (consensus)
3. Editorial corrections to TS 38.321 Sections 5.4.8 and 5.7 from R2-2210768 are agreed and included in NR NTN MAC rapporteur CR. (consensus)

Agreements online:

1. The following editorial correction to TS 38.321 Section 6.1.3.57 is agreed and included in NR NTN MAC rapporteur CR:

Differential Koffset: This field ~~contains~~ indicates the differential Koffset in the number of slots (see clause 4.2 in TS 38.213 [6]), using subcarrier spacing of 15 kHz. The length of the field is 6 bits.

1. The following editorial correction to TS 38.321 Section 6.1.3.56 is agreed and included in NR NTN MAC rapporteur CR:

Timing Advance: In FR1, the Timing Advance field indicates the least integer number of slots, using subcarrier spacing of 15 kHz, greater than or equal to the Timing Advance value (see TS 38.211 [8], clause 4.3.1). The length of the field is 14 bits.

Withdrawn

R2-2210463 Corrections to TS 38.321 for Rel-17 NR NTN Samsung Research America draftCR Rel-17 38.321 17.2.0 F NR\_NTN\_solutions-Core Withdrawn

[R2-2210568](file:///C:\Data\3GPP\Extracts\R2-2210568%20CR%20corrections%20for%2038321.docx) Corrections to TS 38.321 for Rel-17 NR NTN Samsung Research America CR Rel-17 38.321 17.2.0 1436 - F NR\_NTN\_solutions-Core Withdrawn

### 6.10.4 CP corrections

#### 6.10.4.1 Idle/inactive mode corrections

[R2-2209504](file:///C:\Data\3GPP\Extracts\R2-2209504%20Correction%20on%20the%20list%20of%20PLMNs%20not%20allowed%20to%20operate%20at%20the%20present%20UE%20location%20in%20TS%2038.304.docx) Correction on the list of "PLMNs not allowed to operate at the present UE location" in TS 38.304 vivo CR Rel-17 38.304 17.2.0 0283 - F NR\_NTN\_solutions-Core

* (After offline 112) Not pursued

[R2-2210569](file:///C:\Data\3GPP\Extracts\R2-2210569%20CR%20corrections%20for%2038304.docx) Corrections to TS 38.304 for Rel-17 NR NTN Samsung Research America CR Rel-17 38.304 17.2.0 0291 - F NR\_NTN\_solutions-Core

* (After offline 112) 2nd and 3rd changes are agreed. To be included in a rapporteur CR

[R2-2210584](file:///C:\Data\3GPP\Extracts\R2-2210584.docx) Correction on cell status for NTN Google Inc. CR Rel-17 38.304 17.2.0 0292 - F NR\_NTN\_solutions-Core

* (After offline 112) Not pursued

[R2-2210640](file:///C:\Data\3GPP\Extracts\38304_CR0293_(Rel-17)_R2-2210640%20Corrections%20to%20the%20Reselection%20Priority%20Handling%20for%20NTN.docx) Corrections to the Reselection Priorities Handling for NTN Google Inc. CR Rel-17 38.304 17.2.0 0293 - F NR\_NTN\_solutions-Core

* (After offline 112) Not pursued
* [AT119bis-e][112][NR NTN] idle mode corrections (ZTE)

Updated scope: Prepare a rapporteur CR based on the meeting decisions

Updated intended outcome: Agreeable 38.304 CR

Updated deadline (for companies' feedback): Tuesday 2022-10-18 22:00 UTC

Updated deadline (for rapporteur's CR in R2-2210869): Wednesday 2022-10-19 04:00 UTC

[R2-2210854](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210854.zip) [offline-112] Idle mode corrections ZTE discussion Rel-18 NR\_NTN\_solutions-Core

Proposal 1: The proposed changes in R2-2209504 are not pursued.

* Agreed

Proposal 2: Agree the 2nd an 3rd changes from R2-2210569:

- 2nd change: Add parameters introduced for NTN cell reselection in 5.2.4.7.0

- 3rd : Editorial changes in 5.2.4.2.

* Agreed

Proposal 3: The proposed change in R2-2210584 is not pursued.

* Agreed

Proposal 4: The proposed change in R2-2210640 is not pursued.

* Agreed

Agreements via email (from offline 112):

1. The proposed changes in R2-2209504 are not pursued.

2. The 2nd an 3rd changes from R2-2210569 are agreed

2nd change: Add parameters introduced for NTN cell reselection in 5.2.4.7.0

3rd : Editorial changes in 5.2.4.2.

3. The proposed change in R2-2210584 is not pursued.

4. The proposed change in R2-2210640 is not pursued.

Withdrawn

R2-2210464 Corrections to TS 38.304 for Rel-17 NR NTN Samsung Research America draftCR Rel-17 38.304 17.2.0 F NR\_NTN\_solutions-Core Withdrawn

#### 6.10.4.2 RRC corrections

Epoch time and validity timer handling

[R2-2210466](file:///C:\Data\3GPP\Extracts\R2-2210466%20discussion%20on%20epoch%20time.docx) Discussion on Epoch Time Samsung Research America discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: In the field description of epochTime, include RAN1’s agreement on the interpretation of the SFN indicating the epoch time for serving cell and neighbor cell.

* Oppo, Apple, ZTE, Intel agree
* Agreed

Proposal 2: How to interpret the SFN indicating the epoch time for the target cell received in dedicated RRC signaling needs to be clarified.

Proposal 3: It is up to NW and UE implementation that the epoch time of the next validity duration acquired in SIB19 is before the current T430 expiry.

* Oppo thinks we cannot yet agree on this for now because it’s related to other discussions. QC also agrees.
* Continue in offline 113

Agreements:

1. In the field description of epochTime, include RAN1’s agreement on the interpretation of the SFN indicating the epoch time for serving cell and neighbor cell

[R2-2209799](file:///C:\Data\3GPP\Extracts\R2-2209799_Clarification%20on%20validity%20of%20the%20UL%20sync%20info_v0.doc) Clarification on validity of the UL sync info Apple discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: Clarify the reference SFN and subframe of the epoch time for the serving cell and the neighbor cell in the RRC spec.

* Covered by p1 above

Proposal 2: For the CONNECTED UE, it’s up to NW implementation to ensure the UE’s NTN UL sync validity by providing the NTN UL sync info to UE via dedicated signaling.

* QC is fine with this. Huawei also agrees
* Oppo wonders about the implications (spec impact) of p2. Apple thinks there would be no spec impact for this.
* Mediatek agrees, provided that there is no spec impact.
* Ericsson thinks there is no need to send in dedicated signalling to each UE.
* HW thinks this is for UEs that cannot acquire SIB19 by themselves.
* Nokia thinks we can remove ‘via dedicated signalling’ for now. Mediatek agrees
* Continue in offline 113

Proposal 3: For the IDLE/INACTIVE UE, it’s up to UE implementation to acquire the SIB19 before T430 expiry.

* Continue in offline 113

Proposal 4: For handover case, the reference SFN/subframe of the epoch time for the target cell follows the interpretation of the neighbor cell, i.e., this frame to be the frame nearest to the frame where the message indicating the Epoch time is received.

* Continue in offline 113

[R2-2210411](file:///C:\Data\3GPP\Extracts\R2-2210411%20Disucssion%20on%20ecpoch%20time.doc) Discussion on epoch time Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: If both epoch time for serving cell and epoch time for neighbor cell are absent, the epoch time for neighbor cell is the end of SI window where this SIB19 is scheduled.

Proposal 2: If epoch time for neighbor cell is absent, and the serving cell epoch time is reused for neighbor cell, UE considers the indicated SFN to be current SFN or the next upcoming SFN after the frame where the message indicating the Epoch time is received.

Proposal 3: In case of handover, for the epoch time indicated explicitly by an SFN and subframe number, discuss the intended UE behaviour:

- Option 1: the UE considers this frame to be the current SFN or the next upcoming SFN after the frame where the MIB of target cell is firstly acquired.

- Option 2: the UE considers this frame to be the current SFN or the previous SFN before the frame where the MIB of target cell is firstly acquired

- Option 3: the UE considers this frame to be the frame nearest to the frame where the MIB of target cell is firstly acquired.

- Option 4: the UE directly read the SIB19 of the target cell and ignore the epoch time in HO command.

Proposal 4: In case of CHO, for the epoch time indicated explicitly by an SFN and subframe number, discuss the intended UE behaviour:

- Option 1: the UE considers this frame to be the current SFN or the next upcoming SFN after the frame where the MIB of target cell is firstly acquired.

- Option 2: the UE considers this frame to be the current SFN or the previous SFN before the frame where the MIB of target cell is firstly acquired

- Option 3: the UE considers this frame to be the frame nearest to the frame where the MIB of target cell is firstly acquired.

- Option 4: the UE directly read the SIB19 of the target cell and ignore the epoch time in HO command.

* Continue in offline 113

[R2-2210729](file:///C:\Data\3GPP\Extracts\R2-2210729_NTN%20Configuration%20at%20Handover%20and%20CHO.docx) NTN Configuration at Handover and CHO Sequans Communications discussion Rel-17 38.331 NR\_NTN\_solutions-Core R2-2208659

Proposal 1: UE should be able to use the target cell NTN-config IE from SIB19 for HO purpose

Proposal 2: It is up to NW/UE implementation to provide/keep SIB19 up to date so that the target NTN-config is valid at the time of CHO execution

Proposal 3: If target cell NTN-config from SIB19 is used, (re)start validity timer upon reception of CHO execution according to the target cell NTN-config EpochTime/validity duration

* Continue in offline 113

[R2-2209528](file:///C:\Data\3GPP\Extracts\R2-2209528%20-%20R17%20NR%20NTN%20On%20timer%20T430.docx) On timer T430 for Rel-17 NR NTN Ericsson discussion Rel-17

* Continue in offline 113

[R2-2209850](file:///C:\Data\3GPP\Extracts\R2-2209850%20Discussion%20on%20configuration%20of%20satellite%20information%20for%20handover.docx) Discussion on configuration of satellite information for handover ASUSTeK discussion Rel-17 38.331 NR\_NTN\_solutions-Core

* Continue in offline 113

[R2-2209851](file:///C:\Data\3GPP\Extracts\R2-2209851%20Discussion%20on%20T430%20handling%20upon%20going%20to%20RRC_IDLE.docx) Discussion on T430 handling upon going to RRC\_IDLE ASUSTeK discussion Rel-17 38.331 NR\_NTN\_solutions-Core

* Continue in offline 113

[R2-2209852](file:///C:\Data\3GPP\Extracts\R2-2209852%20Clarification%20on%20validity%20timer%20for%20serving%20cell.docx) Clarification on validity timer for serving cell ASUSTeK discussion Rel-17 38.331 NR\_NTN\_solutions-Core

* Continue in offline 113

[R2-2209507](file:///C:\Data\3GPP\Extracts\R2-2209507%20Correction%20on%20UE%20behavior%20on%20T430%20in%20TS%2038.331.docx) Correction on UE behavior on T430 in TS 38.331 vivo CR Rel-17 38.331 17.2.0 3490 - F NR\_NTN\_solutions-Core

[R2-2209527](file:///C:\Data\3GPP\Extracts\R2-2209527%20NTN%20RRC%20CR.docx) Correction for Release 17 NTN Ericsson CR Rel-17 38.331 17.2.0 3533 - F NR\_NTN\_enh-Core

[R2-2210091](file:///C:\Data\3GPP\Extracts\R2-2210091%20RRC%20correction%20on%20valid%20timer%20and%20SIB19%20acquisition.docx) RRC correction on valid timer and SIB19 acquisition OPPO CR Rel-17 38.331 17.2.0 3523 - F NR\_NTN\_solutions-Core

[R2-2210345](file:///C:\Data\3GPP\Extracts\R2-2210345%20NR%20RRC%20CR%20on%20epochTime%20and%20validity%20timer.docx) NR RRC CR on epochTime and validity timer Nokia, Nokia Shanghai Bell CR Rel-17 38.331 17.2.0 3538 - F NR\_NTN\_solutions-Core

[R2-2210410](file:///C:\Data\3GPP\Extracts\R2-2210410%20CR%20on%20validity%20duration.docx) CR on validity duration Huawei, HiSilicon CR Rel-17 38.331 17.2.0 3545 - F NR\_NTN\_solutions-Core

[R2-2210740](file:///C:\Data\3GPP\Extracts\R2-2210740.docx) Corrections on validity of SIB19 CATT CR Rel-17 38.331 17.2.0 3565 - F NR\_NTN\_solutions-Core Late

[R2-2210741](file:///C:\Data\3GPP\Extracts\R2-2210741.docx) Corrections on related issues of epoch time CATT CR Rel-17 38.331 17.2.0 3566 - F NR\_NTN\_solutions-Core Late

* [AT119bis-e][113][NR NTN] epoch time and validity timer (Samsung)

Initial scope: Discuss proposals on Epoch time and validity timer handling, apart from those handled in offline 114

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 14:00 UTC

Deadline (for rapporteur's summary in R2-2210855): Thursday 2022-10-13 16:00 UTC

Proposals marked "for agreement" in R2-2210855 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

[R2-2210855](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210855.zip) [offline-113] epoch time and validity timer Samsung discussion Rel-18 NR\_NTN\_solutions-Core

For agreement:

Proposal 1: (16) For the CONNECTED UE, if the UE cannot acquire SIB19 due to no configured common search space with an active BWP, it is up to the NW implementation to provide valid UL sync info to UE via dedicated signalling.

* Ericsson suggests to add “(no spec impacts)” to p1 and p8 (similarly to p4)
* Ericsson also suggests to reformulate as:“For UEs in RRC\_CONNECTED state ~~UE~~, if the UE cannot acquire SIB19 due to no configured common search space ~~with an~~ in the active BWP, it is up to the NW implementation to provide valid UL sync info to the UE via dedicated signalling (no spec impacts)”
* Agreed as “For UEs in RRC\_CONNECTED state UE, if the UE cannot acquire SIB19 due to no configured common search space with an in the active BWP, it is up to the NW implementation to provide valid UL sync info to the UE via dedicated signalling (no spec impacts)”

Proposal 2: (12/16) In TS 38.331 clause 5.2.2.4.21, clarification is needed that ntn-UlSyncValidityDuration and epochTime for the serving cell are applied for serving cell T430. TP in R2-2209852 is considered as the baseline for CR.

* Agreed

Proposal 4: (15/16) If both epoch time for serving cell and epoch time for neighbor cell are absent, the epoch time for neighbor cell is the implicit serving cell epoch time, i.e. the end of SI window where this SIB19 is scheduled. (no spec impact)

* Agreed

Proposal 5: (16/16) if epoch time for neighbor cell is absent, and the serving cell epoch time is reused for neighbor cell, UE considers the indicated SFN to be current SFN or the next upcoming SFN after the frame where the message indicating the Epoch time is received.

* For P5, P6, P7, Ericsson what is the exact agreed spec impact, if any?
* For P5, Samsung thinks this derives from the agreement to capture RAN1 agreement in epochTime field description and the existing text there, so it’s sufficient to follow the agreement, i.e. capture RAN1 agreement on the interpretation of the SFN indicating the epoch time for serving cell and neighbor cell.
* Agreed as: “if epoch time for neighbor cell is absent, and the serving cell epoch time is reused for neighbor cell, UE considers the indicated SFN to be current SFN or the next upcoming SFN after the frame where the message indicating the Epoch time is received. (implication of the agreement to include in epochTime field description the interpretation of the SFN indicating the epoch time for serving cell and neighbor cell, no other spec impact).”

Proposal 6: (13/16) In case of HO, the UE considers the target cell epoch time (i.e., indicated explicitly by a SFN and subframe number) to be the frame nearest to the target cell’s frame where the message indicating the Epoch time is received.

* For P6 and P7, Samsung thinks they can be captured in one sentence (i.e., no difference to HO and CHO) in epochTime field description, similar as we agreed for the serving/neighbor cell case.
* Agreed as: “In case of HO, the UE considers the target cell epoch time (i.e., indicated explicitly by a SFN and subframe number) to be the frame nearest to the target cell’s frame where the message indicating the Epoch time is received. (to be captured in epochTime field description)”

Proposal 7: (13/16) In case of CHO, the UE considers the target cell epoch time (i.e., indicated explicitly by a SFN and subframe number) to be the frame nearest to the target cell’s frame where the message indicating the Epoch time is received.

* Agreed as: “In case of CHO, the UE considers the target cell epoch time (i.e., indicated explicitly by a SFN and subframe number) to be the frame nearest to the target cell’s frame where the message indicating the Epoch time is received. (to be captured in epochTime field description)”

Proposal 8: (13/16) NW provides target cell validity duration in dedicated configuration by NW implementation.

* Agreed, with the addition of (“no spec impacts)” at the end

Proposal 9: (14/16) UE does not use the target cell NTN-config IE from SIB19 for HO or CHO.

* Ericsson wonders how this relates to Question 15 which is not summarized? Also isn’t this conflicting with Proposal 10 in Offline 115?
* Ericsson thinks the intention was: “The UE does not use the target cell NTN-config in NTN-NeighCellConfig-r17 IE from source cell SIB19 for HO or CHO.” However, they don’t agree to this proposal. The point is that a neighbor cell is a serving cell somewhere else. From an implementation perspective, the NCC has to make the calculations of the ephemeris with the same accuracy for all satellites anyways, i.e. the information is available, and we expect within a fairly close epoch time (parallel computing). The gNB needs to update SIB19 contents to refresh the serving cell ephemeris continuously. Thus, if an update is needed and information is available, we understand that the best is that everything is updated at once.
* Also Sequans does not agree with this proposal. They have the following comments on companies feedback:

1) It is argued that “target cell ntn-config from CHO configuration is invalid is rare” because validity duration is up to 900s and CHO time window up to 600s.

But 900s was added only for GEO: “Add one additional NTN validity duration value for GEO i.e. 900 seconds. X = 4 bits.”. For LEO max is 240s and typical values likely lower.

CHO is mostly useful for LEO, and the 600s was linked to the visibility time in LEO case.

2) The NW can indeed modify/update the CHO config.

But this means resending the whole RRCconfig to update an IE that was already available to the UE (when broadcasted in SIB19).

* Samsung thinks we need online discussion for this. Ericsson formulation can be used and the following proposals are added to be discussed together with P9.

Updated Proposal 9: The UE does not use the target cell NTN-config in NTN-NeighCellConfig-r17 IE from source cell SIB19 for HO or CHO.

* Continue online
* QC assumes that NTN-config is mandatory present in dedicated signalling and there is no intention to change this. MTK agrees
* Sequans thinks this is reverting previous agreements
* Nokia thinks for CHO the info from dedicated may expire, so allowing to use what is in SIB19 is important. Ericsson agrees
* Oppo thinks we should not have a UE requirement for this. MTK agrees
* Ericsson suggest to have “may use”
* Huawei prefers to leave this to implementation and not capture anything.
* Whether the UE uses the target cell NTN-config in NTN-NeighCellConfig-r17 IE from source cell SIB19 for HO or CHO is up to UE implementation (FFS on spec impact)

Proposal 9-1: If “The UE can use the target cell NTN-config in NTN-NeighCellConfig-r17 IE from source cell SIB19 for HO or CHO” is agreed, it is up to NW/UE implementation to provide/keep SIB19 up to date so that the target cell NTN-config in SIB19 is valid at the time of CHO execution. (no spec impact)

* Continue online

Proposal 9-2: If “The UE can use the target cell NTN-config in NTN-NeighCellConfig-r17 IE from source cell SIB19 for HO or CHO” is agreed, adopt TP in R2-2210729 as baseline for 5.3.5.5.2 with the consideration to combine the note into the normative text and the conclusion related to 5.3.5.5.2 in Offline-115.

* Continue online

Proposal 10: (11/15) When initiating the re-establishment procedure due to HO failure, UE does not stop the current T430.

* Ericsson wonders if this means same as “Do not pursue with R2-2209528” and no further spec changes are due, right?
* Samsung agrees that there is no spec change and to add that this means that “proposal in R2-2209528 regarding T430 stop upon RRC re-establishment is not pursued.”
* Agreed as “When initiating the re-establishment procedure due to HO failure, UE does not stop the current T430 (no spec change; proposal in R2-2209528 regarding T430 stop upon RRC re-establishment is not pursued)”

Proposal 12: (14/14) RAN2 to update the start and stop conditions in the timer table for T430 (FFS exact wording).

* Agreed

For discussion:

Proposal 3: (12/16) UE should not stop T430 upon going to RRC\_IDLE.

* Continue online
* Samsung thinks that based on the discussion we could leave this to UE implementation and the discussion is on whether to capture this
* Oppo thinks there is no value to run the timer in idle mode.
* It’s up to UE implementation what to do with T430 when going to IDLE.

Proposal 11: (8/15) added “NOTE: SIB19 is essential system information.” in 5.2.2.5.

* Ericsson thinks this is different from p4 in offline 115
* Samsung thinks the intention for discussion was to consider the conclusion in Offline-115. Since the conclusion is made not to pursue of this, we don’t need P11 anymore.
* No need to discuss this

Agreements via email (from offline 113):

1. For UEs in RRC\_CONNECTED state UE, if the UE cannot acquire SIB19 due to no configured common search space with an in the active BWP, it is up to the NW implementation to provide valid UL sync info to the UE via dedicated signalling (no spec impacts)
2. In TS 38.331 clause 5.2.2.4.21, clarification is needed that ntn-UlSyncValidityDuration and epochTime for the serving cell are applied for serving cell T430. TP in R2-2209852 is considered as the baseline for CR.
3. If both epoch time for serving cell and epoch time for neighbor cell are absent, the epoch time for neighbor cell is the implicit serving cell epoch time, i.e. the end of SI window where this SIB19 is scheduled. (no spec impact)
4. if epoch time for neighbor cell is absent, and the serving cell epoch time is reused for neighbor cell, UE considers the indicated SFN to be current SFN or the next upcoming SFN after the frame where the message indicating the Epoch time is received. (implication of the agreement to include in epochTime field description the interpretation of the SFN indicating the epoch time for serving cell and neighbor cell, no other spec impact).
5. In case of HO, the UE considers the target cell epoch time (i.e., indicated explicitly by a SFN and subframe number) to be the frame nearest to the target cell’s frame where the message indicating the Epoch time is received. (to be captured in epochTime field description)
6. In case of CHO, the UE considers the target cell epoch time (i.e., indicated explicitly by a SFN and subframe number) to be the frame nearest to the target cell’s frame where the message indicating the Epoch time is received. (to be captured in epochTime field description)
7. NW provides target cell validity duration in dedicated configuration by NW implementation (no spec impact)
8. When initiating the re-establishment procedure due to HO failure, UE does not stop the current T430 (no spec change; proposal in R2-2209528 regarding T430 stop upon RRC re-establishment is not pursued)
9. RAN2 to update the start and stop conditions in the timer table for T430 (FFS exact wording)

Agreements online:

1. Whether the UE uses the target cell NTN-config in NTN-NeighCellConfig-r17 IE from source cell SIB19 for HO or CHO is up to UE implementation (FFS on spec impact)
2. It’s up to UE implementation what to do with T430 when going to IDLE.

Validity of assistance information

[R2-2210092](file:///C:\Data\3GPP\Extracts\R2-2210092%20BP%20issue.doc) Discussion on validity issue of satellite assistance information OPPO discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1: The current RRC spec presumes that backward propagation of the orbit and Common TA is supported, which is however not agreed by RAN1 yet.

Observation 2: RRC spec might need to be changed no matter whether RAN1 decides to support BP or not.

Proposal 1 Send LS to RAN1 asking whether backword propagation is supported or not.

* Continue in offline 114

[R2-2210093](file:///C:\Data\3GPP\Extracts\R2-2210093%20draft%20LS%20to%20RAN1.docx) DRAFT LS on the support of backward propagation in NTN OPPO LS out Rel-17 NR\_NTN\_solutions-Core To:RAN1

Moved here from 6.10.3

[R2-2210760](file:///C:\Data\3GPP\Extracts\R2-2210760%20-%20R17%20NR%20NTN%20epoch%20time%20and%20validity.docx) R17 NR NTN epoch time and validity Ericsson discussion Rel-17 NR\_NTN\_solutions

Proposal 1 The UE should consider assistance information valid as soon as it is received.

Proposal 2 Consider the text proposals below for 38.331:

Proposal 3 Send an LS to RAN1 to inform them of the agreement that the UE should consider assistance information valid as soon as it is received. Due to parallel RAN1/RAN2 meetings, the LS should be sent as soon as possible during the RAN2 meeting.

* Continue in offline 114
* [AT119bis-e][114][NR NTN] Validity of assistance information (Oppo)

Initial scope: Discuss proposals in [R2-2210092](file:///C:\Data\3GPP\Extracts\R2-2210092%20BP%20issue.doc) and [R2-2210760](file:///C:\Data\3GPP\Extracts\R2-2210760%20-%20R17%20NR%20NTN%20epoch%20time%20and%20validity.docx)

Initial intended outcome: Summary of the offline discussion and possible draft LS to RAN1

Deadline (for companies' feedback): Thursday 2022-10-13 14:00 UTC

Deadline (for rapporteur's summary in R2-2210856 and draft LS in R2-2210857): Thursday 2022-10-13 16:00 UTC

Updated scope: Discuss the content of an LS to RAN1 based on the outcome of the online discussion

Updated intended outcome: Draft LS to RAN1

Updated deadline (for companies' feedback): Tuesday 2022-10-18 22:00 UTC

Updated deadline (for draft LS in R2-2210857): Wednesday 2022-10-19 02:00 UTC

[R2-2210856](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210856.zip) [offline-114] validity of assistance information Oppo discussion Rel-18 NR\_NTN\_solutions-Core

Proposal 1: (12/17) Send LS to RAN1 asking whether backword propagation is supported or not.

* Ericsson does not agree to send an LS asking “whether backword propagation is supported or not”. The LS shall at least state the RAN2 benefits and RAN2 implications of not supporting it.
* QC thinks it is not agreeable to include unnecessary details without agreement. The network can simply mitigate any delay issue by properly setting epoch time. No issue for UE as validity duration can be long. Network can just update the epoch time every SI window. This has nothing to do with SI window length, SI periodicity, these are as regular configuration. Furthermore, if backward propagation is used, at which SFN UE will start validity duration? Does it mean autonomously extending configured value of the validity duration length? If the issue is because the epoch time can only be indicated in future for serving cell (as you indicated the reason), then lets ask RAN1 to make it nearest frame so epoch time can also be in past.
* Oppo agrees with Qualcomm that the simplest way is to ask RAN1 to make epoch time the nearest frame for serving cell, which can resolve all concerns raised by Ericsson. Not sure if this can be agreed by all companies. We can also discuss this option during CB session.
* Huawei thinks RAN1 is already discussing the backward propagation issue in this meeting. The moderator’s recommendation in RAN1 is to not discuss this issue. Actually the issue was brought up in last RAN1 meeting, but so far no conclusion is made. RAN2 cannot force RAN1 to repeatedly discussing something they’re not interested in. We think either RAN2 discuss the issue ourselves, or at least we include in the LS RAN2 benefits and RAN2 implications of not supporting it (as suggested by Ericsson).
* Continue online
* VC suggests to send a LS to RAN1 saying that RAN2 thinks there could be an issue with latency (e.g. initial access) and ask them whether backwards propagation would be needed or whether the problem could be mitigated by making Epoch time the nearest frame for serving cell or if this can be addressed by simply setting the Epoch time properly (i.e. no spec changes)
* Nokia agrees with the suggestion from Chair - let's ask RAN1 if they think this scenario can be problematic
* Continue offline to draft a possible LS to RAN1 along the lines of the VC proposal above.

Proposal 2: The draft LS in R2-2210093 is taken as baseline.

* Continue online

R2-2210857 [DRAFT] LS on validity of assistance information OPPO LS out Rel-17 NR\_NTN\_solutions-Core To:RAN1

Neighbour cell list

[R2-2209526](file:///C:\Data\3GPP\Extracts\R2-2209526%20-%20On%20neighbor%20cell%20SI.docx) On neighbour cell SI Ericsson discussion Rel-17

Proposal 1 RAN2 does not enhance further the release 17 neighbour cell SI broadcasting

[R2-2210663](file:///C:\Data\3GPP\Extracts\R2-2210663_Further%20consideration%20on%20NTN%20neighbour%20cell%20list%20in%20SIB19.docx) Further consideration on NTN neighbour cell list in SIB19 ZTE Corporation, Sanechips discussion Rel-17

Proposal 1: The following interpretation of the ntn-NeighCellConfigList and ntn-NeighCellConfigListExt in SIB19 should be agreed to allow more flexible configuration.

SIB19 field descriptions

ntn-NeighCellConfigList, ntn-NeighCellConfigListExt

Provides a list of NTN neighbour cells including their ntn-Config, carrier frequency and PhysCellId. This set includes all elements of ntn-NeighCellConfigList (without suffix) and all elements of ntn-NeighCellConfigListExt-v1720. If ntn-Config is absent for an entry in ntn-NeighCellConfigList or ntn-NeighCellConfigListExt, the ntn-Config provided in the previous entry ~~at the same position~~ in ntn-NeighCellConfigList or ntn-NeighCellConfigListExt applies.

[R2-2210412](file:///C:\Data\3GPP\Extracts\R2-2210412%20Remaining%20issues%20on%20neighbour%20cell%20ephemeris.doc) Remaining issues on neighbour cell ephemeris Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: Add the carrier frequency list and the neighbour cell list in SIB19.

Proposal 2: The neighbour cells not included in SIB19 can be neglected by UE implementation when performing measurements.

Proposal 3: Capture in Stage 2 spec that UE can use assistance information of neighbour cells in SIB19 for mobility purposes in all RRC states.

[R2-2209538](file:///C:\Data\3GPP\Extracts\38331_CR3492_(Rel-17)_R2-2209538%20Correction%20on%20neighbor%20cells’%20satellite%20ephemeris%20information_v1.docx) Correction on neighbour cells’ satellite ephemeris information (38.331) MediaTek Inc. CR Rel-17 38.331 17.2.0 3492 - F NR\_NTN\_solutions-Core

[R2-2210346](file:///C:\Data\3GPP\Extracts\R2-2210346_NR%20RRC%20CR%20on%20neighbour%20cell%20ephemeris%20signalling.docx) NR RRC CR on neighbour cell ephemeris signalling Nokia, Nokia Shanghai Bell CR Rel-17 38.331 17.2.0 3539 - F NR\_NTN\_solutions-Core

[R2-2210664](file:///C:\Data\3GPP\Extracts\R2-2210664_REL-17_38.331_CR3559_Clarification%20on%20the%20NTN%20neighbour%20cell%20list%20in%20SIB19.docx) Clarification on the NTN neighbour cell list in SIB19 ZTE Corporation, Sanechips CR Rel-17 38.331 17.2.0 3559 - F NR\_NTN\_solutions-Core

SMTC

[R2-2209505](file:///C:\Data\3GPP\Extracts\R2-2209505%20Correction%20on%20UE%20behavior%20on%20SMTC%20in%20TS%2038.331.docx) Correction on UE behavior on SMTC in TS 38.331 vivo CR Rel-17 38.331 17.2.0 3488 - F NR\_NTN\_solutions-Core

* (After offline 115) Not pursued

[R2-2210646](file:///C:\Data\3GPP\Extracts\38331_CR3555_(Rel-17)_R2-2210646%20Corrections%20to%20the%20SMTC%20Field%20Description%20in%20System%20Information.docx) Corrections to the SMTC Field Description in System Information Google Inc. CR Rel-17 38.331 17.2.0 3555 - F NR\_NTN\_solutions-Core

UE behaviour if not able to acquire SIB19

Moved here from 6.10.4.1

[R2-2210034](file:///C:\Data\3GPP\Extracts\R2-2210034%20Discussion%20on%20not%20being%20able%20to%20acquire%20SIB%2019%20for%20NR%20NTN.doc) Discussion on not being able to acquire SIB 19 for NR NTN Xiaomi, CAICT discussion Rel-17

[R2-2210035](file:///C:\Data\3GPP\Extracts\R2-2210035%20Correction%20on%20the%20action%20upon%20not%20being%20able%20to%20acquire%20SIB19%20for%20NR%20NTN.docx) Correction on the action upon not being able to acquire SIB19 for NR NTN Xiaomi, CAICT CR Rel-17 36.331 17.2.0 4875 - F NR\_NTN\_solutions-Core

[R2-2210484](file:///C:\Data\3GPP\Extracts\R2-2210484_38.331CR3547_(Rel-17)_Clarification%20on%20the%20necessity%20of%20SIB19%20in%20NTN%20cell_v0.docx) Clarification on the necessity of SIB19 in NTN cell Apple CR Rel-17 38.331 17.2.0 3547 - F NR\_NTN\_solutions-Core

Ephemeris

[R2-2209537](file:///C:\Data\3GPP\Extracts\38331_CR3491_(Rel-17)_R2-2209537%20Correction%20on%20the%20coincidence%20of%20ECI%20and%20ECEF_v1.docx) Correction on the coincidence of ECI and ECEF MediaTek Inc. CR Rel-17 38.331 17.2.0 3491 - F NR\_NTN\_solutions-Core

* (After offline 115) Content is agreed. To be included in a rapporteur CR

[R2-2209981](file:///C:\Data\3GPP\Extracts\R2-2209981%20Discussion%20on%20the%20ephemeris%20information%20in%20CHO%20procedure.doc) Discussion on the ephemeris information in CHO procedure Spreadtrum Communications discussion Rel-17

* (After offline 115) No further discuss this

Measurement gap configuration

[R2-2209800](file:///C:\Data\3GPP\Extracts\R2-2209800_38.331CR3508_(Rel-17)_Clarification%20on%20the%20concurrent%20measurement%20gap%20configuration_v0.docx) Clarification on the concurrent measurement gap configuration Apple CR Rel-17 38.331 17.2.0 3508 - F NR\_NTN\_solutions-Core

* (After offline 115) Not pursued

Coarse UE location

[R2-2209506](file:///C:\Data\3GPP\Extracts\R2-2209506%20Correction%20on%20UE%20coarse%20location%20reporting%20in%20TS%2038.331.docx) Correction on UE coarse location reporting in TS 38.331 vivo CR Rel-17 38.331 17.2.0 3489 - F NR\_NTN\_solutions-Core

* (After offline 115) Not pursued

Misc

[R2-2210197](file:///C:\Data\3GPP\Extracts\R2-2210197%20(R17%20NTN%206.10.4.2)%20331%20CR%20for%20Measurement%20events.docx) Draft 331 CR – Addition of missing descriptions of Event D1 and CondEvent T1 Interdigital, Inc. draftCR Rel-17 38.331 17.2.0 NR\_NTN\_solutions-Core

* (After offline 115) Agreed to add event descriptions and use CR in R2-2210197

[R2-2210570](file:///C:\Data\3GPP\Extracts\R2-2210570%20CR%20corrections%20for%2038331.docx) Corrections to TS 38.331 for Rel-17 NR NTN Samsung Research America CR Rel-17 38.331 17.2.0 3554 - F NR\_NTN\_solutions-Core

* (After offline 115) Third change is agreed

[R2-2210743](file:///C:\Data\3GPP\Extracts\R2-2210743.docx) Discussion on leftover issues CATT discussion Rel-17 NR\_NTN\_solutions-Core Late

* [AT119bis-e][115][NR NTN] RRC corrections (Ericsson)

Initial scope: Discuss remaining RRC corrections

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210858): Thursday 2022-10-13 22:00 UTC

Proposals marked "for agreement" in R2-2210858 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

[R2-2210858](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210858.zip) [offline-115] RRC corrections Ericsson discussion Rel-18 NR\_NTN\_solutions-Core

Proposal 1 Discuss online whether CR R2-2210412 (HW proposal) is adopted or no further enhancements are made to neighbor cell SI.

* Although it is kept for online discussion, MediaTek would like to say that they do not understand how to link SIB3/4/measobject and SIB19, especially when PCI is not configured. That is what they explained in our CR (R2-2209538) with pretty minor changes and specification impacts. They don’t see this in R2-2210664.
* Continue online
* MTK thinks what they suggested is a correction, not an enhancement and this needs to be address somehow
* QC thinks MTK clarification would be good to have
* Ericsson is ok to go for MTK proposal if we don’t have other corrections
* Google thinks the MTK proposal is not needed
* Samsung thinks we don’t need further clarification
* HW thinks that for the frequency part it’s obvious; for the PCI part the UE will use all possible PCIs so they prefer not to mention PCI. Nokia agrees.
* RAN2 understands that the NW needs to configure the NTN neighbour cell frequencies in SIB19 if it wants the UE to measure them
* Come back in the next meeting to see whether we can converge on some enhancements (e.g as in R2-2210412)

Proposal 2 Do not pursue with R2-2209505

* Agreed

Proposal 3 Discuss online CR R2-2210646.

* Continue online
* Come back in the next meeting

Proposal 4 Do not pursue with R2-2210034, R2-2210035, R2-2210484 or R2-2210743. Consider capturing in chairnotes a note on SIB19 being essential for NTN access.

* Xiaomi has a different view and would like to consider the alternative proposals:

Proposal: TS38.331 shall say in somewhere that SIB19 is essential.

Proposal: Clarification in the spec that if UE is not be able to acquire SIB19, it is up to UE implementation whether to bar the cell or reselect to another cell.

* Ericsson thinks we can discuss online this whether SIB19 is essential SI or not. Actually, during the release they tried to bring this up and have proper discussion which items of NTN should be in SIB1 and which in NTN SIB. Companies wanted all NTN items in one SIB. (That is not true now as there is some in SIB2/4 btw). Anyhow, there are many parameters in SIB19 that are not essential SI.
* Continue online
* Nokia thinks we should have normative text for this.
* Come back in the next meeting to see whether we can have a note or some normative text

Proposal 5 Agree R2-2209537

* Agreed

Proposal 6 Do not discuss further R2-2209981

* Agreed

Proposal 7 Do not pursue with R2-2209800

* Agreed

Proposal 8 Do not pursue with R2-2209506

* Agreed

Proposal 9 Agree to add event descriptions and use CR in R2-2210197. Modify further in final RRC CR review.

* Agreed

Proposal 10 Agree second change modified and third change of CR R2-2210570

* Ericsson thinks the second change in P10 needs to be discussed online due to having conflicting outcome in Offline 113.
* Agree third change of CR R2-2210570
* Continue online on second change of CR R2-2210570
* Continue to discuss in online 113

Proposal11 RAN2 may discuss CR R2-2210740 online or postpone to next meeting

* Continue online (if time allows)
* Come back in the next meeting

Agreements via email (from offline 115):

1. Do not pursue with R2-2209505
2. Agree R2-2209537
3. Do not discuss further R2-2209981
4. Do not pursue with R2-2209800
5. Do not pursue with R2-2209506
6. Agree to add event descriptions and use CR in R2-2210197. Modify further in final RRC CR review.
7. Agree third change of CR R2-2210570

Agreements online:

1. RAN2 understands that the NW needs to configure the NTN neighbour cell frequencies in SIB19 if it wants the UE to measure them

* [POST119bis-e][115][NR NTN] RRC CR (Ericsson)

Scope: Prepare a rapporteur CR based on the meeting decisions

Intended outcome: Agreeable 38.331 CR

Deadline (for companies' feedback): Thursday 2022-10-20 16:00 UTC

Deadline (for rapporteur's CR in R2-2211018): Friday 2022-10-21 10:00 UTC

Withdrawn

R2-2209803 Clarification on the necessity of SIB19 in NTN cell Apple discussion Rel-17 38.331 NR\_NTN\_solutions-Core Withdrawn

R2-2210465 Corrections to TS 38.331 for Rel-17 NR NTN Samsung Research America draftCR Rel-17 38.331 17.2.0 F NR\_NTN\_solutions-Core Withdrawn

### 6.10.5 UE capabilities corrections

IOT bit for inter-satellite measurements

Moved here from 6.10.4.1

[R2-2209540](file:///C:\Data\3GPP\Extracts\38331_CR3493_(Rel-17)_R2-2209540%20IOT%20bit%20for%20inter%20satellite%20measurement_v1.docx) IOT bit for inter satellite measurement (38.331) MediaTek Inc. CR Rel-17 38.331 17.2.0 3493 - F NR\_NTN\_solutions-Core

[R2-2209541](file:///C:\Data\3GPP\Extracts\38306_CR0807_(Rel-17)_R2-2209541%20IOT%20bit%20for%20inter%20satellite%20measurement_v1.docx) IOT bit for inter satellite measurement (38.306) MediaTek Inc. CR Rel-17 38.306 17.2.0 0807 - F NR\_NTN\_solutions-Core

* Intel thinks this should be a mandatory feature, possibly with signalling
* QC wonders if this related to RAN4 agreements
* Nokia also wonders where this comes from and think it would be a large limitation is the UE relies on a single satellite.
* Continue in offline 116

Capability event forD1

[R2-2209707](file:///C:\Data\3GPP\Extracts\38331_CR3501_(Rel-17)_R2-2209707%20eventD1.docx) Missing UE capability for eventD1 Qualcomm Incorporated CR Rel-17 38.331 17.2.0 3501 - F NR\_NTN\_solutions-Core

* Intel/Mediatek/Apple/Ericsson/Nokia agree
* Agreed (to be merged with the rapporteur CR)

[R2-2209708](file:///C:\Data\3GPP\Extracts\38306_CR0810_(Rel-17)_R2-2209708%20eventD1.docx) Missing UE capability for eventD1 Qualcomm Incorporated CR Rel-17 38.306 17.2.0 0810 - F NR\_NTN\_solutions-Core

* Agreed (to be merged with the rapporteur CR)

[R2-2209801](file:///C:\Data\3GPP\Extracts\R2-2209801_Capability%20of%20the%20UE%20coarse%20location%20report_v0.doc) Capability of the UE coarse location report Apple discussion Rel-17 NR\_NTN\_solutions-Core

* Continue in offline 116
* (After offline 116) Not pursued

[R2-2209802](file:///C:\Data\3GPP\Extracts\R2-2209802_Clarification%20on%20the%20support%20of%20DCCA%20in%20NTN%20network_v0.doc) Clarification on the support of DCCA in NTN network Apple discussion Rel-17 NR\_NTN\_solutions-Core

* Continue in offline 116
* RAN2 understands that CA and DC are not supported in NTN
* [AT119bis-e][116][NR NTN] UE capabilities (Mediatek)

Initial scope: Discuss proposals in AI 6.10.5

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210859): Thursday 2022-10-13 22:00 UTC

Proposals marked "for agreement" in R2-2210859 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

[R2-2210859](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210859.zip) [offline-116] UE capabilities Mediatek discussion Rel-18 NR\_NTN\_solutions-Core

For Agreements

Proposal 2 (6/7): The changes in R2-2209801, regarding introducing tUE specific capability for the UE coarse location report, are not pursued.

* Agreed

Proposal 3 (9/11): RAN2 captures in Chairman Notes that CA and DC are not supported in NTN

* Agreed

For Further Discussion

Proposal 1 (7/10): RAN2 to further discuss regarding the capability interSatMeas-r17 for 38.331 and in 38.306.

* Continue online
* Ericsson does not agree to it, even if CY
* MTK thinks this will pose limitations to the initial deployments
* Huawei thinks this comes late and RAN4 is not discussing this. Inter-satellite mobility is an essential feature. Nokia agrees: if there are not enough satellites, the UE measures only on those available. But no need to define a separate capability.
* No agreement to introduce a separate capability for now (but we can come back in the next meeting)

Agreements via email (from offline 116):

1. The changes in R2-2209801, regarding introducing tUE specific capability for the UE coarse location report, are not pursued.
2. RAN2 understands that CA and DC are not supported in NTN

## 7.2 NB-IoT and eMTC support for NTN

Tdoc Limitation: 5 tdocs

### 7.2.1 Organizational

LSs, rapporteur inputs and other organizational documents. CR Rapporteurs may provide baseline correction CRs containing smaller corrections, text clarifications, etc - please contact the CR rapporteurs before providing contributions on those aspects.

Deactivation of access stratum

Moved from 6.10.1.1

[R2-2209354](file:///C:\Data\3GPP\Extracts\R2-2209354_S2-2207420.doc) Reply LS on the deactivation of access stratum due to discontinuous coverage (S2-2207420; contact: Qualcomm) SA2 LS in Rel-17 IoT\_SAT\_ARCH\_EPS To:CT1, RAN2 Cc:SA1

* Noted

[R2-2209715](file:///C:\Data\3GPP\Extracts\R2-2209715%20draft%20LS%20reply%20on%20DC.docx) [Draft] Reply LS on the deactivation of access stratum due to discontinuous coverage Qualcomm Incorporated LS out Rel-17 LTE\_NBIOT\_eMTC\_NTN To:SA2, CT1 Cc:SA1

[RAN2 comment]: Support of discontinuous coverage while being in RRC\_IDLE is an optional feature without capability signaling to the network. The UE is not required to perform any IDLE mode tasks during discontinuous coverage. RAN2 would like to clarify that it depends on UE implementation whether Access Stratum functions due to DC applies to satellite E-UTRAN access only.

* QC thinks this is up to UE implementation. Mediatek agrees
* Samsung thinks the text itself would imply that all the AS function would be deactivated
* Nokia thinks it should be up to UE implementation for TN related AS functions.
* Huawei has a different view and think we could have an indication whether there is TN coverage in discontinuous NTN coverage but can accept to go for the majority view. CATT thinks we can have optimizations in Rel-18
* ZTE thinks it would be better to deactivate all the AS functions. Samsung agrees. ZTE wonders what happens when coverage is resumed if we completely leave this to UE implementation
* QC thinks that also for satellite coverage there is no requirement (the text says the UE “is not required to…”)
* ZTE can accept to go for the majority view
* Continue in offline 104 to draft a reply LS indicating that this would be up to UE implementation and to check whether a clarification is needed in 38.304

[R2-2210246](file:///C:\Data\3GPP\Extracts\R2-2210246.docx) Discussion on SA2 LS on the deactivation of access stratum due to discontinuous coverage Samsung R&D Institute UK discussion

Proposal 1: RAN2 to send a reply LS to SA2/CT1 indicating that in discontinuous coverage UE may:

- Completely deactivate all AS functions including other RATs, which incorporate functions such as searching for terrestrial or inter-RAT frequencies, or

Moved from 7.2.4.2

[R2-2210763](file:///C:\Data\3GPP\Extracts\R2-2210763%20-%20Deactivation%20of%20access%20stratum%20due%20to%20discontinuous%20coverage.docx) Deactivation of access stratum due to discontinuous coverage Ericsson discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN-Core

Proposal 1 RAN2 replies to CT1 and SA2 that the text below is captured in TS 36.304 indicating that the deactivation of the Access Stratum functions due to discontinuous coverage applies only to satellite E-UTRAN access.

{…}

The UE behaviour regarding the deactivation of the Access Stratum functions is not explicitly captured for any other types of accesses, leaving it up to UE implementation.

[R2-2209659](file:///C:\Data\3GPP\Extracts\R2-2209659%20Discussion%20of%20the%20LS%20on%20the%20deactivation%20of%20AS%20functions.doc) Discussion of the LS on the deactivation of AS functions Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Proposal 1：If there is TN coverage in the discontinuous coverage of NTN, UE doesn’t stop the AS function of TN.

Proposal 2：Band information of the neighbor cells included in the system information can be used to determine whether there is TN coverage in the discontinuous coverage of NTN. FFS on other methods.

[R2-2210525](file:///C:\Data\3GPP\Extracts\R2-2210525%20Applicable%20cases%20of%20AS%20functions%20deactivation%20due%20to%20DC.docx) Applicable cases of AS functions deactivation due to DC ZTE Corporation, Sanechips discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN-Core

Proposal 1: At least for Rel-17, RAN2 can confirm a common assumption that deactivation of the Access Stratum functions due to DC is a complete deactivation of the AS functions for all the RATs supported by the UE. RAN2 needs to inform this assumption to SA2 and CT1 in the response LS.

Moved from 7.2.4.2

[R2-2209716](file:///C:\Data\3GPP\Extracts\36304_CR0854_(Rel-17)_R2-2209716%20discontinuous%20coverage.docx) Clarification on RAT search during discontinuous coverage Qualcomm Incorporated CR Rel-17 36.304 17.2.0 0854 - F LTE\_NBIOT\_eMTC\_NTN

* [AT119bis-e][104][IoT NTN] AS deactivation (Qualcomm)

Initial scope: Discuss the reply LS to SA2/CT1 and check whether a clarification is needed in 38.304

Initial intended outcome: offline summary and draft reply LS

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210843 and draft LS in R2-2210844): Thursday 2022-10-13 22:00 UTC

[R2-2210843](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210843.zip) [offline-104] AS deactivation Qualcomm Incorporated discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN-Core

Proposal 1 Use the draft LS in R2-2210844 to reply SA2 and CT1.

* Agreed

Proposal 2 (12/15) Add clarification in the description of discontinuous coverage in TS 36.304 as “… but the UE need not perform any idle mode tasks, including performing intra-frequency, inter-frequency or inter-RAT measurements”

* Agreed. Text to be included in the 36.304 rapporteur CR

Agreements via email (from offline 104):

1. Use the draft LS in R2-2210844 to reply SA2 and CT1.
2. Add clarification in the description of discontinuous coverage in TS 36.304 as “… but the UE need not perform any idle mode tasks, including performing intra-frequency, inter-frequency or inter-RAT measurements”

[R2-2210844](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210844.zip) [Draft] Reply LS on the deactivation of access stratum due to discontinuous coverage Qualcomm Incorporated LS out Rel-17 LTE\_NBIOT\_eMTC\_NTN To:SA2, CT1 Cc:SA1

* Remove Draft, put RAN2 as Source
* Revised in [R2-2210865](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210865.zip)

[R2-2210865](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210865.zip) Reply LS on the deactivation of access stratum due to discontinuous coverage Qualcomm Incorporated LS out Rel-17 LTE\_NBIOT\_eMTC\_NTN To:SA2, CT1 Cc:SA1

* Approved

Capability signalling for IoT-NTN

[R2-2209359](file:///C:\Data\3GPP\Extracts\R2-2209359_S2-2207839.doc) Reply to LS on UE capability signalling for IoT-NTN (S2-2207839; contact: Vodafone) SA2 LS in Rel-17 LTE\_NBIOT\_eMTC\_NTN To:RAN2 Cc:CT1, RAN3

* Noted

[R2-2210075](file:///C:\Data\3GPP\Extracts\R2-2210075_IoT-NTN-Capabilities.docx) Analysis on the CN impacts for TN and NTN capabilities based on SA2 LS Nokia, Nokia Shanghai Bell discussion Rel-17

Observation 1: Single container for TN and NTN capability requires high specification efforts for Rel-17 where TN-NTN mobility optimization was not considered in the work..

Observation 2: MME can acquire the UE capability for the current serving cell based on the cell type information (NTN or TN) received from gNB by using the available methods for re-acquiring UE capability in the new cell.

Observation 3: Separate Radio paging capabilities for TN and NTN is not required for Rel-17 as the paging scenario covering both TN and NTN is not addressed in Rel-17.

Observation 4: No connected mode impacts are foreseen for UE having separate capabilities for TN and NTN. In this case, MME can replace the latest capability obtained from UE in the target cell.

Proposal 1: It is possible for IoT-NTN UE can have separate UE capability for TN and NTN without additional impacts to MME for Rel-17 using Network configuration for TA across TN and NTN cells. Draft LS response to SA2 in line with the above proposal is provided in [2].

* VDF thinks the MME only requests the RAC in a TAU procedure if it doesn't have a RAC stored, so some changes would be needed in the CN
* QC also think there are some issues in this proposal, as UE triggering TAU doesn’t mean that capabilities are included.
* Mediatek agrees with Nokia: already agreed in RAN2. Option 2 in SA2 LS will work with low spec impacts
* HW thinks there is no time in R17 to adopt an NR NTN based solution. Intel agrees with Huawei, prefer the less optimal solution, and it's NBC to revert previous agreements
* VDF wonders if a change in the CN would also be NBC
* Ericsson also think that alternative solutions (as in [R2-2209712](file:///C:\Data\3GPP\Extracts\R2-2209712%20UE%20capability%20for%20NTN.docx)) are too late and it’s better to fix this on the NW side.
* VDF thinks RAN 4 specs are not yet available for IoT NTN and it’s not fair to ask the CN to solve this problem.
* QC thinks this can be done in an ASN.1 BC way.
* Continue in offline 105

Moved here from 7.2.5

[R2-2209712](file:///C:\Data\3GPP\Extracts\R2-2209712%20UE%20capability%20for%20NTN.docx) Discussion on SA2 LS reply on UE capability for IoT NTN Qualcomm Incorporated discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Observation 1. Current specification does not guarantee the UE triggering TAU update with capability update indication. So it is not current behavior.

Observation 2. If MME does not store two different TN and NTN containers for a UE, then we have no choice but to update the specification which can lead to inter-operability issue.

Proposal 1 For eMTC, introduce a new RAT type “eutra-ntn” to be used for the EUTRA NTN container. CR is provided in [3].

Proposal 2 For NB-IoT, extended UECapabilityInformation-NB to include the NTN UE capabilities. CR is provided in [4].

Proposal 3 For NB-IoT, ask SA2 if RACS can be used for NB-IoT.

Proposal 4 For eMTC and NB-IoT, extend the ue-RadioPagingInfo to include NTN capabilities for IDLE mode paging.

Moved here from 7.2.5

[R2-2210734](file:///C:\Data\3GPP\Extracts\R2-2210734%20-%20UE%20capability%20signalling%20in%20IoT%20NTN.docx) UE capability signalling in IoT NTN Ericsson discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Proposal 1 RAN2 prefers option 2 (no specification impact is expected).

Moved here from 7.2.5

[R2-2210414](file:///C:\Data\3GPP\Extracts\R2-2210414%20UE%20capability%20signalling%20for%20IoT-NTN.DOCX) UE capability signalling for IoT-NTN Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Proposal 1: Stick to previous RAN2 agreements on UE capabilities reporting.

[R2-2210076](file:///C:\Data\3GPP\Extracts\R2-2210076-Draft-LS-Reply-SA2.doc) [draft] Reply to LS on SA2 Nokia, Nokia Shanghai Bell LS out Rel-17 LTE\_NBIOT\_eMTC\_NTN To:SA2 Cc:CT1, RAN3

[R2-2210528](file:///C:\Data\3GPP\Extracts\R2-2210528%20%5bDRAFT%5d%20Reply%20LS%20on%20RAN%20feedback%20for%20UE%20capabilities%20signalling%20for%20IoT%20NTN.docx) [DRAFT] Reply LS on RAN feedback for UE capabilities signalling for IoT NTN ZTE Corporation, Sanechips LS out Rel-17 LTE\_NBIOT\_eMTC\_NTN-Core To:SA2 Cc:RAN3

Moved here from 7.2.4.1

[R2-2210744](file:///C:\Data\3GPP\Extracts\R2-2210744.docx) Corrections on HandoverPreparationInformation in 36.331 CATT CR Rel-17 36.331 17.2.0 4881 - F LTE\_NBIOT\_eMTC\_NTN Late

* [AT119bis-e][105][IoT NTN] Capability signalling (Nokia)

Initial scope: Continue the discussion on the different alternatives and attempt to draft a reply LS to SA2 accordingly

Initial intended outcome: offline summary and draft reply LS

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210845 and draft LS in R2-2210846): Thursday 2022-10-13 22:00 UTC

Updated scope: Continue the discussion to understand what we need to achieve in terms of NTN-TN connected mode mobility in Rel-17 and, if needed, prepare a corresponding updated list of proposals. Also attempt to draft a reply LS to SA2 accordingly

Updated intended outcome: offline summary and draft reply LS

Updated deadline (for companies' feedback): Tuesday 2022-10-18 10:00 UTC

Updated deadline (for rapporteur's summary in R2-2210867 and draft LS in R2-2210846): Tuesday 2022-10-18 12:00 UTC

[R2-2210845](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210845.zip) [offline-105] Capability signalling Nokia discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN-Core

Proposals for Agreement

Proposal 1: Based on overall specification impact analysis, RAN2 concludes that specification impacts to implement option 2 are lesser compared to option 1.

Proposal 2: From RAN2’s perspective option 2 does not have impacts on idle mode mobility. With option 2 connected mode mobility works but with the additional interruption which RAN 2 earlier agreed not to optimize in Rel-17. (7/9).

Proposal 4: Option 2 indicated in SA2 as feasible for implementation from the SA2 perspective is also aligned with previous RAN2 agreements without RAN specification impacts. (2/3)

Proposal 5: Option 2 is preferred as the overall specification impacts are lower compared to Option 1 and the basic functionality is not impacted for option 1. (7/12)

* QC still has concerns on option 2 (for the reasons already captured in the report)
* For option 2, Nokia adds one comment to one of the open issues: How the new capability of UE in new cell be obtained when UE switches across TN and NTN as part of tracking area update?

For this issue two possibilities are proposed in contribution and the discussion

* + Option 1: MME to trigger the UE capability enquiry at RAN when it receives TAU for TN-NTN cell change. This requires spec change at MME for MME to trigger this procedure in this case. (Comments from Nokia).
  + Option 2:  It is possible for UE to trigger capability enquiry when it detects capability change in E-UTRA. This is specified in 36.331 for UE capability enquiry procedure. If this part is clarified that UE may also trigger it when it changes from TN to NTN cell. (Comments from ZTE).

For option 2, in Nokia’s understanding it is sufficient if it is clarified in AS specification. The fields to support this is already available in NAS messages.

* Continue online

Proposal for Further discussion

Proposal 3: For the solution proposed for RRC changes for option 1 following issue needs to be addressed for further consideration.(7/12)

• Use of the parameter meant for RAT for Feature differentiation is not appropriate and not sustainable in long run.

• Signaling overload to execute UE capability inquiry procedure two times for TN and NTN in this option.

• The changes will impact the legacy TN ENB implementation to acquire NTN capability from the UE. Otherwise, the solution will not work for TN to NTN mobility scenario.

Updated proposals for online discussions:

New Proposal 2: From RAN2’s perspective connected mode mobility for eMTC-NTN will work with option 2. The interruption time for the target node to retrieve the UE capability for TN-NTN mobility need not be optimised in Rel-17.

* QC still wonders how the capability signalling would work e.g. for the source to know which bands the UE supports. Also thinks that 2B would have CT1 impact, it’s not only RAN2 change
* VDF agrees with QC and thinks that at least RAN (3) changes are needed for connected mode mobility
* Oppo thinks that it’s clear that option 1 only impacts RAN2 and wonders how much time we would need to fix this if we go for option 2. Samsung tends to agree.
* ZTE thinks the impacts on other groups are unclear and we should focus on RAN2. MTK agrees
* Ericsson thinks the impact on RAN2 it’s not simply about signalling.
* VDF wonders from RAN2 perspective, how does the NTN eNB get measurement reports from the TN eNBs? ZTE wonders why NTN eNB needs to get measurement reports from the TN eNBs?
* HW thinks that even if we go for option 1 we still needs to discuss all the details
* HW thinks it’s still possible to configure measurement reports on other networks
* QC thinks this means that this implies the NW configures something randomly for the UE, even if it does not support it.
* MTK thinks TN-NTN connected mode mobility is not in scope of R-17
* Continue offline to understand what we need to achieve in terms of NTN-TN connected mode mobility in Rel-17 and then, if needed, prepare a corresponding updated list of proposals

New Proposal 3: When UE changes across TN and NTN cells in idle mode in option 2, it is possible to retrieve the UE capability corresponds to new cell in any of the following way.

2A :MME can trigger the UE capability enquiry procedure from RAN by not including the UE capability container in the context setup message. This implementation is followed in MME for other RAT switching scenarios. This option requires SA2 specification changes.

2B: UE detecting the tracking area change between TN and NTN cells, UE can initiate the capability enquiry procedure as specified in 36.331 clause for UE capability enquiry procedure. In this case the NAS message from UE will include parameter to trigger ‘capability enquiry’ from MME. This option requires minor specification changes to UE behaviour in RRC specification.

New Proposal 4: RAN2 to indicate to SA2 that:

Option 2 is preferred based on RAN2 analysis as it is aligned to previous RAN2 agreements and overall lesser specification impacts.

For capability retrieval during idle mode mobility between TN and NTN, From the RAN2 perspective two options are possible (2A and 2B) as indicated above. SA2 to confirm one of the options. For option 2B some RAN2 specification changes will be required.

R2-2210867 [offline-105] Capability signalling – second round Nokia discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN-Core

Proposal: R2 will not specify that HO is disallowed but expect it can only work in a restricted way (if at all). R2 need not work further on inter [TN, NTN] – HO in Rel-17 as it is not scope of Rel-17 WID.

For reference: RAN2-118e Agreements for UE capability for TN and NTN:

• 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 the target network type. R2 will not specify that HO is disallowed but expect it can only work in a restricted way (if at all). R2 does not expect to work further on inter [TN, NTN] – HO in Rel-17.

VC suggests to check whether, based on the discussion so far, companies would like go for “Option 1” (include both TN and NTN capabilities) or “Option 2” (use different TAs for TN and NTN) from the SA2 LS

If we go for Option 2, we also need to take a RAN2 agreement whether:

A) we want to further work on eMTC NTN-TN connected mode mobility in Rel-17: in this case we might need to ask CT1, RAN3, SA2 to check the impacts on their specification?

B) we don’t want to further work on eMTC NTN-TN connected mode mobility in Rel-17 (meaning that it will work in a restricted way): in this case we might need to ask only CT1 to check the impacts on their specification (new trigger for TAU)?

R2-2210846 [Draft] Reply LS on UE capability signalling for IoT-NTN Nokia, Nokia Shanghai Bell LS out Rel-17 LTE\_NBIOT\_eMTC\_NTN To:SA2 Cc:CT1, RAN3

### 7.2.2 Stage 2 corrections

[R2-2209661](file:///C:\Data\3GPP\Extracts\R2-2209661%20Discussion%20on%20user%20consent%20for%20UE%20coarse%20location%20request.docx) Correction on user consent for UE coarse location request Huawei, HiSilicon CR Rel-17 36.300 17.2.0 1370 - F LTE\_NBIOT\_eMTC\_NTN

### 7.2.3 UP corrections

Impacts to 36.321, 36.322, 36.323, 37.324

drx-RetransmissionTimer start / HARQ RTT timer value

[R2-2209660](file:///C:\Data\3GPP\Extracts\R2-2209660%20Discussion%20on%20the%20retransmission%20timer%20in%20IoT%20NTN.docx) Discussion on the retransmission timer handling in IoT NTN Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Proposal 1: Leave it to the NW implementation to solve the misalignment issue caused by early start of retransmission timer.

[R2-2210642](file:///C:\Data\3GPP\Extracts\R2-2210642%20Discussion%20on%20DRX%20HARQ%20RTT%20timer%20for%20IoT%20NTN.docx) Discussion on DRX HARQ RTT timer for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Observation 1: UE may start the drx-RetransmissionTimer earlier than expected due to the gap between the cell-specific Koffset and UE-eNB RTT, which will waste UE’s power consumption.

And proposed the following:

Proposal 1: For IoT NTN, the HARQ RTT timer value should be updated to Koffset + Kmac + legacy HARQ RTT timer in MAC specification.

* Ericsson support this.
* QC still thinks this is not needed.
* Ericsson thinks this is a small change that fixes a current definition which is wrong. Google agrees
* ZTE agrees with Nokia and Ericsson
* Nokia thinks we should also discuss whether this applies to NB-IoT as well.
* Continue in offline 106

[R2-2210756](file:///C:\Data\3GPP\Extracts\R2-2210756%20-%20R17%20IoT%20NTN%20User%20Plane%20issues.docx) R17 IoT NTN User Plane issues Ericsson discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Observation 1 For UL, the start of UL HARQ RTT Timer is in the subframe of the last PUSCH transmission of the (scheduled/configured) grant. This is like the start of drx-HARQ-RTT-TimerUL in NR NTN.

Observation 2 For DL, the UE start HARQ RTT Timer in the subframe of the last received PDSCH transmission of the (scheduled/configured) assignment. This is different compared to NR NTN where drx-HARQ-RTT-TimerDL is started based on when the HARQ feedback is transmitted.

Observation 3 The agreement “An offset equal to UE-eNB RTT is added to the formula used for calculating the (UL) HARQ RTT timer in IoT NTN.” has not been implemented in UL HARQ RTT Timer for eMTC.

Observation 4 In NTNs for BL and CE UEs, the start of drx-RetransmissionTimer is independent of Koffset.

Observation 5 In NTNs for NB-IoT UEs, the start of drx-InactivityTimer depends on Koffset. In NR NTN, the start of drx-RetransmissionTimerDL depends on Koffset.

Observation 6 UE specific Koffset shall never be lower than TA to ensure sufficient UE processing time between receiving a grant and the PUSCH transmission and between receiving PDSCH and the HARQ feedback transmission.

Observation 7 The UE specific Koffset must always be configured larger or equal to reported TA + 1.

Observation 8 To support all UEs, including UEs without TA reporting capability, the HARQ RTT Timer needs to be updated as in Proposal 3.

Proposal 1 Add RTToffset to the UL HARQ RTT Timer for BL UEs and UEs in enhanced coverage, see text proposal below

Proposal 2 For BL UEs and UEs in enhanced coverage in NTNs, RAN2 acknowledge that the start of drx-RetransmissionTimer does not minimize the monitoring of PDCCH.

Proposal 3 In NTNs for BL UEs and UEs in enhanced coverage, the offset added to the formula used for calculating the HARQ RTT timer shall be Koffset+Kmac instead of RTToffset, see text proposal below

[R2-2210699](file:///C:\Data\3GPP\Extracts\R2-2210699%2036321CR_Correction%20on%20HARQ%20RTT%20timer%20with%20Koffset.docx) Correction on HARQ RTT timer with Koffset ZTE Corporation, Sanechips CR Rel-17 36.321 17.2.0 1552 - F LTE\_NBIOT\_eMTC\_NTN-Core

[R2-2210755](file:///C:\Data\3GPP\Extracts\36321_CR1553_(Rel-17)_R2-2210755%20-%20Correction%20to%20(UL)%20HARQ%20RTT%20Timer%20for%20eMTC%20in%20NTNs.docx) Correction to (UL) HARQ RTT Timer for eMTC in NTNs Ericsson CR Rel-17 36.321 17.2.0 1553 - F LTE\_NBIOT\_eMTC\_NTN

[R2-2210571](file:///C:\Data\3GPP\Extracts\R2-2210571%20Correction%20on%20UE-eNB%20RTT%20calculation.docx) Correction on UE-eNB RTT calculation MediaTek Inc. CR Rel-17 36.321 17.2.0 1550 - F LTE\_NBIOT\_eMTC\_NTN-Core

[R2-2210094](file:///C:\Data\3GPP\Extracts\R2-2210094%20IoT%20NTN%20DRX%20correction.docx) DRX correction for IoT NTN OPPO CR Rel-17 36.321 17.2.0 1549 - F LTE\_NBIOT\_eMTC\_NTN

* (after offline 106) Content is agreed. To be included in a rapporteur CR

[R2-2210697](file:///C:\Data\3GPP\Extracts\R2-2210697.docx) Clarifications for IoT NTN MAC CEs Samsung R&D Institute UK CR Rel-17 36.321 17.2.0 1551 - F LTE\_NBIOT\_eMTC\_NTN

* (after offline 106) Content is agreed. To be included in a rapporteur CR
* [AT119bis-e][106][IoT NTN] UP corrections (Ericsson)

Initial scope: Discuss UP corrections in AI 7.2.3

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210847): Thursday 2022-10-13 22:00 UTC

Proposals marked "for agreement" in R2-2210847 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

[R2-2210847](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210847.zip) [offline-106] UP corrections Ericsson discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN-Core

For agreement

Proposal 2 (10/10) The CR R2-2210697 is agreed to be included in a rapporteur CR (modifying TAR and Differential Koffset MAC CEs).

* Agreed

Proposal 3 (11/11) The CR R2-2210094 is agreed to be included in a rapporteur CR (update Active Time for mpdcch-UL-HARQ-ACK-Feedback).

* Agreed

Proposal 4 (11/11) RTToffset is added to the UL HARQ RTT Timer for eMTC. “Except for NB-IoT and for HARQ processes scheduled using Short Processing Time and for short TTI, UL HARQ RTT Timer length is set to 4 + RTToffset subframes for FDD and Frame Structure Type 3, and set to kULHARQRTT + RTToffset subframes for TDD, where kULHARQRTT equals to the kPHICH value indicated in Table 9.1.2-1 of TS 36.213 [2] if the UE is not configured with upper layer parameter symPUSCH-UpPts for the serving cell, otherwise the kPHICH value is indicated in Table 9.1.2-3.”

* Agreed

Proposal 6 (9/11) The HARQ RTT Timer for NB-IoT does not need further updates in NTNs.

* Agreed

Need further discussion

Proposal 1 (6/10) The calculation of UE-eNB RTT is updated according to R2-2210571.

* Continue online
* Not pursued (Can come back depending on the outcome of the discussion in the next meeting on details for p5)

Proposal 5 (7/11) The eMTC HARQ RTT Timer is updated by changing the offset added from RTToffset to Koffset + k-Mac where Koffset is the UE specific Koffset defined in 36.213 section 4.2 and k-Mac is a RRC configured parameter.

* Continue online
* QC still thinks this is not needed and think we should rather change the definition of the start of the HARQ RTT timer
* MTK can agree p5 now
* Ericsson thinks we could also fix it as suggested by QC but it would require more changes.
* RAN2 agrees to align the behaviour to NR NTN, either by agreeing p5 or by changing the start of the HARQ RTT timer (to be based on UL feedback transmission timing, as for NR NTN). Come back in next meeting on the exact solution.

Agreements via email (from offline 106):

1. The CR R2-2210697 is agreed to be included in a rapporteur CR (modifying TAR and Differential Koffset MAC CEs).
2. The CR R2-2210094 is agreed to be included in a rapporteur CR (update Active Time for mpdcch-UL-HARQ-ACK-Feedback).
3. RTToffset is added to the UL HARQ RTT Timer for eMTC. “Except for NB-IoT and for HARQ processes scheduled using Short Processing Time and for short TTI, UL HARQ RTT Timer length is set to 4 + RTToffset subframes for FDD and Frame Structure Type 3, and set to kULHARQRTT + RTToffset subframes for TDD, where kULHARQRTT equals to the kPHICH value indicated in Table 9.1.2-1 of TS 36.213 [2] if the UE is not configured with upper layer parameter symPUSCH-UpPts for the serving cell, otherwise the kPHICH value is indicated in Table 9.1.2-3.”
4. The HARQ RTT Timer for NB-IoT does not need further updates in NTNs.

Agreements online:

1. RAN2 agrees to align the behaviour of eMTC HARQ RTT Timer to NR NTN, either by changing the offset added (from RTToffset to Koffset + k-Mac, where Koffset is the UE specific Koffset defined in 36.213 section 4.2 and k-Mac is a RRC configured parameter) or by changing the start of the HARQ RTT timer (to be based on UL feedback transmission timing, as for NR NTN). Come back in next meeting on the exact solution.

* [POST119bis-e][106][IoT NTN] MAC CR (Mediatek)

Scope: Prepare a rapporteur CR based on the meeting decisions

Intended outcome: Agreeable 36.321 CR

Deadline (for companies' feedback): Thursday 2022-10-20 16:00 UTC

Deadline (for rapporteur's CR in R2-2211019): Friday 2022-10-21 10:00 UTC

R2-2211019 MAC corrections for Rel-17 IoT NTN Mediatek CR Rel-17 36.321 17.2.0 XXXX - F LTE\_NBIOT\_eMTC\_NTN

Withdrawn

[R2-2209441](file:///C:\Data\3GPP\Extracts\R2-2209441%20Correction%20on%20UE-eNB%20RTT%20calculation.docx) Correction on UE-eNB RTT calculation MediaTek Inc. CR Rel-17 36.321 17.2.0 1548 - F LTE\_NBIOT\_eMTC\_NTN-Core

* Withdrawn

### 7.2.4 CP corrections

#### 7.2.4.1 RRC corrections

Impacts to 36.331

Clarifications/corrections for SIB31

[R2-2210736](file:///C:\Data\3GPP\Extracts\R2-2210736%20-%20Discussion%20on%20neighbour%20cell%20information.docx) Discussion on neighbour cell information Ericsson discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Observation 1 Neighbour cell information helps to perform measurements more efficiently.

Observation 2 RAN4’s UE RRM scope in IoT NTN is focused on Release 18 enhancements.

Observation 3 The maximum number of satellites for which assistance information can be provided in one SI is 3 for eMTC and 2 for NB-IoT, including serving cell satellite.

Proposal 1 Neighbour cell ephemeris information is not broadcast in Rel-17 IoT NTN.

* Oppo agrees. Nokia and ZTE agree as well
* Huawei/QC agree with MTK that neighbour cell ephemeris information need to be broadcast
* ZTE wonders about the RAN4 agreement mentioned by MTK
* Continue in offline 107

[R2-2209440](file:///C:\Data\3GPP\Extracts\R2-2209440%20Miscellaneous%20corrections%20to%20TS%2036.331%20for%20IoT%20NTN.docx) Miscellaneous corrections to TS 36.331 for IoT NTN MediaTek Inc. CR Rel-17 36.331 17.2.0 4872 - F LTE\_NBIOT\_eMTC\_NTN-Core

[R2-2210530](file:///C:\Data\3GPP\Extracts\R2-2210530%2036331CR_Clarification%20on%20epochTime%20in%20SIB31.docx) Clarification on epochTime in SIB31 ZTE Corporation, Sanechips CR Rel-17 36.331 17.2.0 4877 - F LTE\_NBIOT\_eMTC\_NTN-Core

[R2-2210531](file:///C:\Data\3GPP\Extracts\R2-2210531%20Clarification%20on%20dedicated%20SIB31.docx) Clarification on dedicated SIB31 ZTE Corporation, Sanechips discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN-Core

Proposal 1: We suggest to keep that, in the case of handover to a NTN cell, the dedicated SIB31 is mandatorily provided in RRC reconfiguration message.

Proposal 2: It’s suggest to confirm the understanding that, when receving dedicated SIB31 in RRC reconfiguration message, UE also considers SFN in epochTime to be the current SFN or the next upcoming SFN after the frame where RRC reconfiguration message is received.

[R2-2210747](file:///C:\Data\3GPP\Extracts\R2-2210747.docx) Discussion on the NTN configuration at CHO CATT discussion Rel-17 36.331 LTE\_NBIOT\_eMTC\_NTN Late

Proposal 1: In case of CHO, SystemInformationBlockType31 is always provided by the NW when handover to NTN cell.

Update of SIB32

[R2-2210413](file:///C:\Data\3GPP\Extracts\R2-2210413%20Discussion%20on%20the%20update%20of%20SIB32.docx) Discussion on the update of SIB32 Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Proposal 1: RAN2 to discuss which option is better to re-acquire SIB32.

- Option 1: Network uses the SI modification to update SIB32, but it is up to UE implementation whether to re-acquire the new SIB32.

- Option 2: Network does not use the SI modification to update SIB32. Network can update SIB32 at any time (not bound to BCCH modification period). The UE decides whether and when to re-acquire SIB32.

[R2-2210746](file:///C:\Data\3GPP\Extracts\R2-2210746.docx) Corrections on SIB32 update notification in 36.331 CATT CR Rel-17 36.331 17.2.0 4883 - F LTE\_NBIOT\_eMTC\_NTN Late

[R2-2210079](file:///C:\Data\3GPP\Extracts\R2-2210079-CR-TS36331-Misc-Corrections.docx) Miscellaneous corrections for IoT-NTN Nokia Solutions & Networks (I) CR Rel-17 36.331 17.2.0 4876 - D LTE\_NBIOT\_eMTC\_NTN

Other

[R2-2210706](file:///C:\Data\3GPP\Extracts\R2-2210706.docx) Discussion on RRC corrections for IoT NTN Samsung R&D Institute UK discussion Rel-17

Proposal 1: Clarify that leaving RRC\_CONNECTED due to GNSS position out-of-date is specific to NTN.

Proposal 2: Clarify that clause 5.3.3.21 refers to an “invalid GNSS position” or “GNSS position no longer being valid”.

Proposal 3: Agree to the text proposal in R2-2210698.

Proposal 4: At T317 expiry the UE shall “initiate the acquisition of SIB31 in accordance with 5.3.18”.

Proposal 5: Agree to the text proposal on correcting the clause referenced at T317 expiry in R2-2210698.

[R2-2210698](file:///C:\Data\3GPP\Extracts\R2-2210698.docx) CR for RRC corrections for IoT NTN Samsung R&D Institute UK CR Rel-17 36.331 17.2.0 4879 - F FS\_LTE\_NBIOT\_eMTC\_NTN, LTE\_NBIOT\_eMTC\_NTN

[R2-2210704](file:///C:\Data\3GPP\Extracts\R2-2210704%20Add%20a%20new%20field%20for%20access%20stratum%20release.docx) Add a new field for access stratum release Google Inc. CR Rel-17 36.331 17.2.0 4880 - F NB\_IOTenh4\_LTE\_eMTC6-Core

* [AT119bis-e][107][IoT NTN] RRC corrections (Huawei)

Initial scope: Discuss RRC corrections in AI 7.2.4.1

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 14:00 UTC

Deadline (for rapporteur's summary in R2-2210848): Thursday 2022-10-13 16:00 UTC

Proposals marked "for agreement" in R2-2210848 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

[R2-2210848](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210848.zip) [offline-107] RRC corrections Huawei discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN-Core

For email agreement:

(14/14) Proposal 2: Add the following clarification to the field description of epochTime:

For serving cell, the startSFN indicates the current SFN or the next upcoming SFN after the frame where the message indicating the epochTime is received.

* Agreed

(14/14) Proposal 4: Keep the existing conditional presence for SIB31 in RRCConnectionReconfiguration (i.e., no spec change).

* Agreed

(13/13) Proposal 5: Network uses the SI modification to update SIB32, but it is up to UE implementation whether to re-acquire the new SIB32.

* Agreed

Proposal 6: Approve the following changes in R2-2210079:

Change “earth moving satellite” to “earth moving cell” and “quasi-earth fixed satellite” to “quasi-earth fixed cell”.

* Agreed

(12/13) Proposal 7: Add the following note in the description of IE EphemerisOrbitalParameters:

NOTE: The ECI and ECEF coincide at Epoch time (e.g. x,y,z axis in ECEF are aligned with x,y,z axis in ECI).

* Agreed

(13/13) Proposal 8: Change the reference in T317 description from 5.3.3.21 to 5.3.18.

* Agreed

For further discussion:

(8/14) Proposal 1: Introduce satellite assistance information (e.g. ephemeris, common TA parameters) for neighbour cells in SIB31 in a backward compatible manner.

* Continue online
* Come back on Wednesday (as RAN4 might send a further LS related to this, see R4-2217265)

Proposal 1a: Frequency list and cell list are added to the associated neighbour satellite ephemeris.

* Continue online

Proposal 3: In case of HO/CHO, discuss the intended interpretation of the SFN indicate by epochTime:

- (7/14) Option 2-1: the frame nearest to the frame where RRC reconfiguration message is received

- (6/14) Option 2-2: the frame nearest to the frame where the MIB of target cell is firstly acquired

* Continue online
* HW thinks both options are feasible and since we adopted option 2-1 for NR NTN we could adopt it for IoT NTN as well
* ZTE prefers 2-2 and 2-1 would be a bit complicated. But can also accept 2-1
* Oppo prefers 2-1
* In case of HO/CHO, the SFN indicated by epochTime is the frame nearest to the frame where RRC reconfiguration message is received

Agreements via email (from offline 107):

1. Add the following clarification to the field description of epochTime:

For serving cell, the startSFN indicates the current SFN or the next upcoming SFN after the frame where the message indicating the epochTime is received.

1. Keep the existing conditional presence for SIB31 in RRCConnectionReconfiguration (i.e., no spec change).
2. Network uses the SI modification to update SIB32, but it is up to UE implementation whether to re-acquire the new SIB32.
3. Approve the following changes in R2-2210079:

Change “earth moving satellite” to “earth moving cell” and “quasi-earth fixed satellite” to “quasi-earth fixed cell”.

1. Add the following note in the description of IE EphemerisOrbitalParameters:

NOTE: The ECI and ECEF coincide at Epoch time (e.g. x,y,z axis in ECEF are aligned with x,y,z axis in ECI).

1. Change the reference in T317 description from 5.3.3.21 to 5.3.18.

Agreements online:

1. In case of HO/CHO, the SFN indicated by epochTime is the frame nearest to the frame where RRC reconfiguration message is received

* [POST119bis-e][107][IoT NTN] RRC CR (Huawei)

Scope: Prepare a rapporteur CR based on the meeting decisions

Intended outcome: Agreeable 36.331 CR

Deadline (for companies' feedback): Thursday 2022-10-20 16:00 UTC

Deadline (for rapporteur's CR in R2-2211020): Friday 2022-10-21 10:00 UTC

R2-2211020 RRC corrections for Rel-17 IoT NTN Huawei CR Rel-17 36.331 17.2.0 XXXX - F LTE\_NBIOT\_eMTC\_NTN

Withdrawn

R2-2210745 Corrections on introducing UL gap configuration in 36.331 CATT CR Rel-17 36.331 17.2.0 4882 - F LTE\_NBIOT\_eMTC\_NTN Late

#### 7.2.4.2 Idle/Inactive mode corrections

Impacts to 36.304

[R2-2210700](file:///C:\Data\3GPP\Extracts\R2-2210700.docx) Corrections on IoT NTN idle mode Samsung R&D Institute UK CR Rel-17 36.304 17.2.0 0856 - F LTE\_NBIOT\_eMTC\_NTN

[R2-2210731](file:///C:\Data\3GPP\Extracts\36304_CR0857_(Rel-17)_R2-2210731%20-%20Miscellaneous%20idle%20mode%20corrections.docx) Miscellaneous idle mode corrections Ericsson CR Rel-17 36.304 17.2.0 0857 - F LTE\_NBIOT\_eMTC\_NTN

* [AT119bis-e][122][IoT NTN] idle mode corrections (Ericsson)

Updated scope: Prepare a rapporteur CR based on the meeting decisions

Updated intended outcome: Agreeable 36.304 CR

Updated deadline (for companies' feedback): Tuesday 2022-10-18 22:00 UTC

Updated deadline (for rapporteur's CR in R2-2211016): Wednesday 2022-10-19 08:00 UTC

R2-2211016 Idle mode corrections for Rel-17 IoT NTN Ericsson CR Rel-17 36.304 17.2.0 XXXX - F LTE\_NBIOT\_eMTC\_NTN

### 7.2.5 UE capabilities corrections

Capability signalling for IoT-NTN

[R2-2209713](file:///C:\Data\3GPP\Extracts\36331_CR4873_(Rel-17)_R2-2209713%20eMTC%20NTN%20UE%20capability.docx) NTN UE capability signaling modification for eMTC Qualcomm Incorporated CR Rel-17 36.331 17.2.0 4873 - F LTE\_NBIOT\_eMTC\_NTN

[R2-2209714](file:///C:\Data\3GPP\Extracts\36331_CR4874_(Rel-17)_R2-2209714%20NB-IoT%20NTN%20UE%20capability.docx) NTN UE capability signaling modification for NB-IoT Qualcomm Incorporated CR Rel-17 36.331 17.2.0 4874 - F LTE\_NBIOT\_eMTC\_NTN

[R2-2209439](file:///C:\Data\3GPP\Extracts\R2-2209439%20Add%20UE%20capability%20of%20reception%20of%20SIB32.docx) Add support of reception of SIB32 MediaTek Inc. CR Rel-17 36.306 17.2.0 1860 - F LTE\_NBIOT\_eMTC\_NTN-Core

* Continue in offline 108
* (after offline 108) Not pursued

[R2-2210078](file:///C:\Data\3GPP\RAN2\Docs\R2-2210078.zip) Corrections for capability for NPRACH segmentated Transmission Nokia Solutions & Networks (I) CR Rel-17 36.306 17.2.0 1861 - F LTE\_NBIOT\_eMTC\_NTN

* Continue in offline 108
* (After offline 108) Content is agreed. To be included in a rapporteur CR

[R2-2210776](file:///C:\Data\3GPP\Extracts\36306_CR1862_(Rel-17)_R2-2210776%20Correction%20to%20ntn-Connectivity-EPC-r17.docx) Correction in the description of ntn-Connectivity-EPC-r17 Lenovo, Motorola Mobility (rapporteur) CR Rel-17 36.306 17.2.0 1862 - F LTE\_NBIOT\_eMTC\_NTN-Core

* Continue in offline 108
* (After offline 108) Content is agreed. To be included in a rapporteur CR
* [AT119bis-e][108][IoT NTN] UE capabilities (Mediatek)

Initial scope: Discuss proposals in AI 7.2.5 (apart from those on capability signalling for IoT-NTN)

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210849): Thursday 2022-10-13 22:00 UTC

Proposals marked "for agreement" in R2-2210849 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

[R2-2210849](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210849.zip) [offline-108] UE capabilities Mediatek discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN-Core

Proposal 1 (11/12): The changes regarding addition of a capability for Discontinuous Coverage, suggested in CR R2-2209439, are not pursued.

* Agreed

Proposal 2 (12/12): The changes suggested in CR R2-2210078 are agreed for incorporation in TS 36.306.

* Agreed

Proposal 3 (12/12): The changes suggested in CR R2-2210776 are agreed for incorporation in TS 36.306.

* Agreed

Agreements via email (from offline 108):

1. The changes regarding addition of a capability for Discontinuous Coverage, suggested in CR R2-2209439, are not pursued.
2. The changes suggested in CR R2-2210078 are agreed for incorporation in TS 36.306.
3. The changes suggested in CR R2-2210776 are agreed for incorporation in TS 36.306.

## 8.6 IoT NTN enhancements

(xx-Core; leading WG: RAN1; REL-18; WID: RP-221806)

Time budget: 1 TU

Tdoc Limitation: 3 tdocs

### 8.6.1 Organizational

LSs, rapporteur inputs and other organizational documents. Rapporteur inputs and other pre-assigned documents in this AI do not count towards the tdoc limitation.

[R2-2210368](file:///C:\Data\3GPP\Extracts\R2-2210368%20IoT-NTN%20AgreementsList.docx) List of RAN2 Agreements in IoT-NTN MediaTek Inc. report Rel-18

- QC is ok to list agreements but having list of open issues could be controversial

- ZTE thinks it’s better to add the information of the meeting at which the agreements were taken

* Noted

### 8.6.2 Performance Enhancements

#### 8.6.2.1 HARQ enhancements

[R2-2210152](file:///C:\Data\3GPP\Extracts\R2-2210152%20Discussion%20on%20the%20HARQ%20enhancement%20for%20IoT-NTN.docx) Discussion on the HARQ enhancement for IoT-NTN CMCC discussion Rel-18 IoT\_NTN\_enh

Observation 1: Whether the configuration of enabling/disabling on DL HARQ feedback can be dynamically indicated via DCI is up to RAN1 discussion.

Observation 2: NB-IoT CP solutions do not use RRCReconfiguration message, and there is no any security risk and privacy issue of leaking HARQ relevant information.

Proposal 1: For NB-IoT, enabling/disabling HARQ feedback can be configured per DL HARQ process at least via UE specific RRC signaling (e.g. RRCConnectionSetup).

* Nokia thinks this is being discuss in RAN1.
* Ericsson thinks that if RAN1 decides on DCI solution we don’t need to adopt another solution. HW agrees
* MTK/QC/Samsung/Xiaomi/ZTE/Lenovo/CATT support p1
* MTK thinks that a decision on RRC does not preclude the use of DCI based approach.
* Oppo thinks that RRC anyways need to be supported.
* QC wonders why some companies care only about reconfiguration of HARQ feedback enable/disable, how about other bunch of parameters for NB-IoT, why they do not need reconfiguration? So simply RRC based is sufficient
* For NB-IoT, enabling/disabling HARQ feedback can be configured per DL HARQ process at least via UE specific RRC signaling (e.g. RRCConnectionSetup). This does not preclude other options (e.g. DCI-based). We can also revert this decision if requested by RAN1.

Proposal 2: The UE expects that MAC-CEs are transmitted using HARQ processes with feedback enabled.

* CATT is generally ok
* Ericsson thinks this puts a requirement on the NW and then it’s not ok
* Oppo thinks we can start assuming this.

Proposal 3: Disabling HARQ feedback is supported for NB-IoT with single HARQ process, and it is up to eNB implementation whether to disable the HARQ feedback.

* Oppo/ZTE support p3
* IDC thinks if only RRC based solution is supported, P2 and P3 may be contradictory
* Ericsson does not agree on this
* Disabling HARQ feedback is supported for NB-IoT with single HARQ process, and it is up to eNB implementation whether to disable the HARQ feedback

Proposal 4: For HARQ process with DL HARQ feedback disabled, the UE will not start the corresponding DL HARQ RTT timer, similarly to NR NTN.

* Nokia thinks NR NTN can be used a baseline, but for NB-IoT with single HARQ process we might need some different behaviour
* Continue in offline 120

Proposal 5: For HARQ process with UL HARQ re-transmission disabled, the UE will not start the corresponding UL HARQ RTT timer, similarly to NR NTN.

* IDC thinks we should refer to HARQ mode A/B instead
* Continue in offline 120

Proposal 6: Blind retransmission is supported for HARQ feedback disabling in IoT NTN.

* Nokia supports this
* HW supports blind retransmission
* MTK supports this.
* IDC wonders how this relates to repetitions? Does it mean blind retransmission of a bundle of repetitions? QC thinks this should be the repetition of the whole bundle.
* QC wonders if this done with spec impacts or not.
* Oppo wonders if this is also for UL or only DL
* ZTE thinks we can remove no spec change for now and allow time to check this. Oppo thinks there is no spec change.
* IDC thinks there was a spec change for msg3
* Working Assumption: Blind retransmission can be used in IoT NTN when HARQ feedback is disabled and when HARQ mode B is used (RAN2 assumes there is no spec change for this)

Agreements:

1. For NB-IoT, enabling/disabling HARQ feedback can be configured per DL HARQ process at least via UE specific RRC signaling (e.g. RRCConnectionSetup). This does not preclude other options (e.g. DCI-based). We can also revert this decision if requested by RAN1.
2. Disabling HARQ feedback is supported for NB-IoT with single HARQ process, and it is up to eNB implementation whether to disable the HARQ feedback

Working Assumption:

1. Blind retransmission can be used in IoT NTN when HARQ feedback is disabled and when HARQ mode B is used (RAN2 assumes there is no spec change for this)

[R2-2210036](file:///C:\Data\3GPP\Extracts\R2-2210036%20Discussion%20on%20disabling%20of%20HARQ%20feedback.doc) Discussion on disabling of HARQ feedback Xiaomi discussion Rel-18

Proposal 1 Disabling HARQ feedback for downlink transmission and new HARQ state for uplink transmission is considered as optional sub-feature requiring capability signalling for eMTC and NB-IOT.

Proposal 2 Enabling/disabling HARQ feedback can be configured per DL HARQ process at least via UE specific RRC signalling for NB-IOT.

Proposal 3 Regarding enabling/disabling of HARQ feedback reconfiguration, RAN2 is suggested to wait for RAN1 progress on DCI based enabling/disabling of HARQ feedback for downlink transmission.

Proposal 4 When a HARQ process is configured with DL HARQ feedback disabled, UE will not start the corresponding HARQ RTT timer.

Proposal 5 New HARQ state for uplink transmission can be configured per UL HARQ process at least via UE specific RRC signalling for eMTC and NB-IOT.

* Oppo thinks this should be Mode B
* Ericsson thinks we can remove the last part
* Nokia thinks this could be per grant so this cannot be supported
* IDC thinks we should refer to mode A/B
* HARQ mode A/B for uplink transmission may be configured per UL HARQ process at least via UE specific RRC signalling for eMTC and NB-IOT NTN. We can also revert this decision if requested by RAN1

Proposal 6 Send LS to RAN1 that RAN2 has agreed to introduce new HARQ state for uplink transmission, and ask RAN1 to take it into consideration when deciding on DCI based enabling/disabling HARQ feedback for downlink transmission.

* Continue in offline 120

Proposal 7 When a HARQ process is configured with HARQ UL retransmission disabled, UE will not start the corresponding UL HARQ RTT timer.

Proposal 8 LCP restriction on allowed HARQ mode is introduced for IOT NTN.

* Continue in offline 120

Agreements:

1. HARQ mode A/B for uplink transmission may be configured per UL HARQ process at least via UE specific RRC signalling for eMTC and NB-IOT NTN. We can also revert this decision if requested by RAN1

[R2-2210702](file:///C:\Data\3GPP\Extracts\R2-2210702.docx) On HARQ enhancements for IoT NTN Samsung R&D Institute UK discussion Rel-18 IoT\_NTN\_enh

Proposal 1: For LTE-M, UL HARQ mode is introduced both to support controlling DRX timers and LCP operation.

Proposal 2: For NB-IoT, UL HARQ mode is introduced to support controlling DRX.

Proposal 3: For NB-IoT LCP restrictions are not introduced.

Proposal 4: The starting time of HARQ RTT timers in LTE-M and NB-IoT for single TB does not need to change for NTN.

Proposal 5: RAN2 to consider how HARQ RTT timers should be adjusted for multiple TB scheduling.

Proposal 6: HARQ RTT timers to be started after each individual TB or DL HARQ feedback in a multiple TB transmission.

Proposal 7: eNB configures HARQ for NB-IoT using capabilities from UE or from MME, as in normal NB-IoT operation.

* [AT119bis-e][120][IoT NTN Enh] HARQ enhancements (CMCC)

Scope: Continue the discussion on p4, p5 from [R2-2210152](file:///C:\Data\3GPP\Extracts\R2-2210152%20Discussion%20on%20the%20HARQ%20enhancement%20for%20IoT-NTN.docx) as well as p6 and p8 from [R2-2210036](file:///C:\Data\3GPP\Extracts\R2-2210036%20Discussion%20on%20disabling%20of%20HARQ%20feedback.doc)

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Tuesday 2022-10-18 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2210863](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210863.zip)): Tuesday 2022-10-18 1200 UTC

[R2-2210863](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210863.zip) [offline-120] HARQ enhancements CMCC discussion Rel-18 IoT\_NTN\_enh

(17/17) Proposal 1: RAN2 agree to take R17 NR NTN DRX solution as baseline for IoT NTN, e.g. for HARQ process with DL HARQ feedback disabled, the UE will not start the corresponding DL HARQ RTT timer.

(14/17) Proposal 2: For NB-IoT NTN with single HARQ process when the HARQ feedback is disabled, the UE will start/restart drx-inactivity timer in the subframe containing the last repetition of the corresponding PDSCH reception.

(17/17) Proposal 3: RAN2 agree to take R17 NR NTN DRX solution as baseline for IoT NTN, e.g. for HARQ process in HARQ mode B, the UE will not start the corresponding UL HARQ RTT timer.

(16/17) Proposal 4: For NB-IoT NTN with single HARQ process in HARQ mode B, the UE will start/restart drx-inactivity timer in the subframe containing the last repetition of the corresponding PUSCH transmission.

(13/17) Proposal 5: RAN2 to send LS to RAN1 about the new introduced HARQ state (i.e. HARQ mode A/B) for UL.

(16/17) Proposal 6: The solutions of LCP restriction on allowed HARQ mode in NR NTN can be reused for eMTC NTN.

[R2-2209410](file:///C:\Data\3GPP\Extracts\R2-2209410.docx) Discussion on the HARQ disabling in IoT NTN CATT discussion Rel-18 IoT\_NTN\_enh

[R2-2209442](file:///C:\Data\3GPP\Extracts\R2-2209442_Discussion%20on%20disabling%20HARQ%20feedback%20in%20IoT-NTN.docx) Discussion on disabling HARQ Feedback in IoT-NTN MediaTek Inc. discussion

[R2-2209666](file:///C:\Data\3GPP\Extracts\R2-2209666%20Discussion%20on%20disabling%20DL%20HARQ%20feedback.docx) Discussion on disabling DL HARQ feedback Huawei, HiSilicon discussion Rel-18 IoT\_NTN\_enh

[R2-2209717](file:///C:\Data\3GPP\Extracts\R2-2209717%20IoT%20HARQ%20process.doc) Enhancement for UL and DL HARQ processes Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh

[R2-2209750](file:///C:\Data\3GPP\Extracts\R2-2209750%20Discussion%20on%20performance%20enhancement%20for%20IoT%20NTN.docx) Discussion on performance enhancement for IoT NTN Transsion Holdings discussion Rel-18

[R2-2209834](file:///C:\Data\3GPP\Extracts\R2-2209834%20Further%20discussion%20on%20HARQ%20enhancements.docx) Further discussion on HARQ enhancements ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2210088](file:///C:\Data\3GPP\Extracts\R2-2210088%20-%20Discussion%20on%20HARQ%20enhancement%20for%20IoT%20NTN.doc) Discussion on HARQ enhancement for IoT NTN OPPO discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2210195](file:///C:\Data\3GPP\Extracts\R2-2210195%20(R18%20IoT-NTN%20WI%20AI%208.6.2.1)%20-%20disabling%20HARQ%20feedback.docx) Disabling HARQ feedback for IoT-NTN Interdigital, Inc. discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2210643](file:///C:\Data\3GPP\Extracts\R2-2210643%20On%20HARQ%20enhancements%20for%20IoT%20NTN.docx) On HARQ enhancements for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-18 IoT\_NTN\_enh

[R2-2210761](file:///C:\Data\3GPP\Extracts\R2-2210761%20-%20R18%20IoT%20NTN%20performance%20enhancement.docx) R18 IoT NTN performance enhancement Ericsson discussion Rel-18 IoT\_NTN\_enh

#### 8.6.2.2 GNSS operation enhancements

[R2-2209409](file:///C:\Data\3GPP\Extracts\R2-2209409.docx) Discussion on the issues of GNSS operation in connected mode CATT discussion Rel-18 IoT\_NTN\_enh

[R2-2209835](file:///C:\Data\3GPP\Extracts\R2-2209835%20Further%20discussion%20on%20GNSS%20enhancements.docx) Further discussion on GNSS enhancements ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2209966](file:///C:\Data\3GPP\Extracts\R2-2209966%20Considerations%20on%20reducing%20UE%20GNSS%20operations%20in%20long%20connection%20time.docx) Considerations on reducing UE GNSS operations in long connection time Lenovo discussion Rel-18

[R2-2210097](file:///C:\Data\3GPP\Extracts\R2-2210097%20GNSS%20operation.doc) Discussion on GNSS operation in connected mode OPPO discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2210153](file:///C:\Data\3GPP\Extracts\R2-2210153%20Discussion%20on%20the%20GNSS%20enhancement%20for%20IoT-NTN.docx) Discussion on the GNSS enhancement for IoT-NTN CMCC discussion Rel-18 IoT\_NTN\_enh

[R2-2210406](file:///C:\Data\3GPP\Extracts\R2-2210406%20Discussion%20on%20improved%20GNSS%20operation.doc) Discussion on GNSS operation Huawei, HiSilicon discussion Rel-18 IoT\_NTN\_enh

[R2-2210440](file:///C:\Data\3GPP\Extracts\R2-2210440%20(R18%20IoT-NTN%20WI%20AI%208.6.2.2)%20GNSS%20enhancements.docx) GNSS acquisition and reporting for IoT NTN InterDigital discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2210644](file:///C:\Data\3GPP\Extracts\R2-2210644%20Regarding%20GNSS%20operation%20enhancements%20for%20IoT%20NTN.docx) Regarding GNSS operation enhancements for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-18 IoT\_NTN\_enh

[R2-2210703](file:///C:\Data\3GPP\Extracts\R2-2210703.docx) On improved GNSS operation for IoT NTN Samsung R&D Institute UK discussion Rel-18 IoT\_NTN\_enh

* [AT119bis-e][101][IoT NTN Enh] GNSS operation (CATT)

Initial scope: Discuss the proposals in the submitted contributions in AI 8.6.2.2

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Thursday 2022-10-13 1200 UTC

Initial deadline (for rapporteur's summary in R2-2210840): Thursday 2022-10-13 1400 UTC

R2-2210840 [offline-101] GNSS operation CATT discussion Rel-18 IoT\_NTN\_enh

Proposal 1: Send LS to RAN1 ask at least the following issues:

- Whether the GNSS position fix time duration for measurement keeps unchanged during the long connection mode for the same UE.

- Whether the GNSS validity duration will change or not during the long connection for the same UE

- Which option(Option 1: RLF based; Option 2: gap based) will be used for GNSS measurement gap configuration

- IDC thinks RAN1 is already discussing all these aspects

- Oppo thinks this is being discussed in RAN1. Samsung agrees

- MTK/Ericsson agree there is no need to send the LS now.

* No LS is sent for now

Proposal 2: Consider the following scenarios in further discussion for the UE reporting GNSS position fix time duration for measurement:

- Upon network request

- During RACH procedure

- After completing a GNSS measurement

- During handover procedure

- Oppo thinks RAN2 could discuss based on RAN1 progress

- Samsung is not sure whether there is an agreement that the GNSS fix position should be reported

- IDC thinks this would be influenced by whether or not GNSS position fix duration changes, which is also currently being discussed by RAN1

- MTK/rapporteur think we need to see more progress in RAN1 before further discussing this in RAN2

* RAN2 will wait for more RAN1 progress on this

Proposal 3: RAN2 to discuss whether and how to introduce a NW indication to indicate UE to make GNSS measurement.

### 8.6.3 Mobility Enhancements

[R2-2209836](file:///C:\Data\3GPP\Extracts\R2-2209836%20Further%20discussion%20on%20mobility%20enhancements.docx) Further discussion on mobility enhancements ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

Neighbour cell measurements

Proposal 1: The configuration framework for connected mode neighbor cell measurement in SIB3-NB can be reused for R18 NB-IoT over NTN and can be further extended, e.g., to incorporate more possible triggering conditions.

* IDC thinks we need to decide how it works first and then check whether we can reuse the same framework. Oppo agrees, but is ok with the second part.
* Nokia/Ericsson/Lenovo also agree with IDC
* QC thinks we can differentiate the earth fixed and earth moving cell cases.
* Postponed

Observation 1: If measurement in R17 NB-IoT would be applied to eMTC over NTN, RAN2 needs to discuss whether the measurement configuration framework in SIB3 for R17 NB-IoT can also be introduced for eMTC over NTN and how the new configuration coexist with the legacy measurement/report configuration.

Observation 2: For such scenario as eMTC where mobility may be frequent and the purpose of neighbor cell measurement is mainly to improve the handover, “relaxed” neighbor cell measurement may be not suitable or even would cause 'too late handover'.

Proposal 2: It’s suggested not to introduce new triggering condition for connected mode neighbor cell measurement for eMTC over NTN.

* NEC supports this
* Ericsson does not support this. This is not about connected mode measurements for HO but assistance information for the network
* Apple/QC/MTK/Lenovo/Intel support p2
* Oppo also don’t support p2, as we would be left with RSRP only. We need to consider enhancements for eMTC. CATT agrees we need time-based solution at least.
* Samsung also does not agree with p2.
* Huawei agrees with p2.
* CMCC agrees with Huawei and think we can say we align to NR NTN.
* ZTE clarifies that the proposals is for connected mode neighbor cell measurement (for which no enhancements is considered as needed)
* IDC thinks that both NB-IoT and eMTC only have RSRP threshold to trigger measurements currently. IDC thinks the original WI objective was meant for NB-IoT but it’s not clear this is not useful for eMTC
* Ericsson think there is no differentiation in the WID for this.
* Continue in offline 118

Observation 3: For NB-IoT over NTN supporting connected mode neighbor cell measurements, since the signal quality change may be very small when the UE moves between the cell center and the cell edge, the RSRP-based triggering condition for neighbor cell measurement may be useless and seldom configured.

Observation 4: Different from NB-IoT, it’s not easy to use serving cell stop time information as a new time-based trigger for connected mode measurement for eMTC over NTN as UE may need to trigger measurement much earlier than this serving cell stop time in order to ensure target cell for handover can be found timely. But there is no clear rule on how to set this earlier timing amount.

Proposal 3: In NB-IoT over NTN, the triggering condition for connected mode neighbor cell measurement can be based on distance between the UE and the satellite.

* Continue in offline 118

Proposal 4: For NB-IoT over LEO, connected mode neighbor cell measurement when the target cell is in enhanced coverage still needs to be considered.

* Postponed

Proposal 5: For supporting connected mode neighbor cell measurement in NB-IoT over LEO, RAN2 needs to inform RAN4 that requirement of Measurement Occasion (MOdetect\_inter\_NB1-NC and MOmeasure\_inter\_NB1-NC) with 2000 ms length is needed.

* Postponed

Proposal 6: For NB-IoT over LEO, UE could perform connected mode measurements on neighbor cell by using resources on which the UE is not scheduled for data transmission or reception. This is already supported by RAN4 specification.

* Postponed

Proposal 7: For NB-IoT over LEO, UE can report an indication to inform eNB that UE is going to start the connected mode neighbor cell measurements.

* Continue in offline 118

CHO enhancements (for eMTC)

Proposal 8: For eMTC over NTN, except moving cells scenario for LEO, it’s suggested to introduce location based CHO triggering events.

* Oppo wonders why we are excluding earth-moving cells
* QC thinks we already agreed time-based and wonders why we need another mechanism.
* Huawei thinks time-based is more suitable for earth-fixed cells and location-based for earth-moving cells.
* IDC wonders if we also use NR R17 as baseline here
* For eMTC over NTN, for both earth-moving and earth-fixed cell scenarios, we introduce location based CHO triggering events

Agreements:

1. For eMTC over NTN, for both earth-moving and earth-fixed cell scenarios, we introduce location based CHO triggering events

[R2-2209443](file:///C:\Data\3GPP\Extracts\R2-2209443_Mobility%20Enhancements%20in%20IoT-NTN.docx) On Mobility Enhancements in IoT-NTN MediaTek Inc. discussion

Proposal 1: UE shall start intra/inter frequency measurement in connected mode before the t-Service if present.

* IDC thinks is related to p10
* Oppo supports p1 and p2
* Ericsson agrees with IDC and in any case thinks this should be “may” not “shall”
* ZTE thinks think P1 is mainly for continuous coverage case, and P10 is for discontinuous coverage case)
* QC thinks this is meant to introduce new triggers for eMTC
* Continue in offline 118

Proposal 2: The exact time to start measurements in connected mode before t-Service can be left to UE implementation.

* Continue in offline 118

Proposal 3: The condition of stopping UE measurement before t-Service is not specified.

* Continue in offline 118

Proposal 4: For earth-moving cell, the serving cell footprint information is broadcast for determining the time of loss of coverage of current cell in NB-IoT.

* Continue in offline 118

Proposal 5: NB-IoT UE starts intra/inter frequency measurements in RRC connected mode before the calculated time of losing coverage.

* Continue in offline 118

Proposal 6: NB-IoT UE can calculate the time of losing coverage before entering RRC connected mode and skip to next cell if the remaining time of current cell’s coverage is too short to start a connection.

* Continue in offline 118

Proposal 7: For eMTC, network assigns UE a time of probably losing coverage after the location report. UE starts intra/inter frequency measurements before this time.

* Continue in offline 118

Proposal 8: The exact time to start measurements in connected mode before the assigned time of losing coverage can be left for UE implementation.

* Continue in offline 118

Proposal 9: UE calculates the time of UE entering the neighbor satellite’s coverage.

* Continue in offline 118

Proposal 10: UE starts intra/inter frequency measurements in RRC connected mode after the calculated time of entering the neighbor satellite’s coverage

* Continue in offline 118

Proposal 11: RAN2 will re-use the location-based solutions introduced in Rel-17 NR NTN as the baseline for mobility enhancements in eMTC-based NTN. Any further enhancements in FFS.

* Continue in offline 118

[R2-2209411](file:///C:\Data\3GPP\Extracts\R2-2209411.docx) Discussion on IoT NTN Mobility Enhancements CATT discussion Rel-18 IoT\_NTN\_enh

Proposal 1: For IoT-NTN, the connected UE should trigger the neighbor cell measurement before the end of the serving time of serving cell or the starting serving time of the neighbor cell for the UE which is late arrival.

* Continue in offline 118

Proposal 2: For IoT-NTN, distance-based trigger for triggering intra and inter frequency measurements in connected mode is not supported.

* Continue in offline 118

Proposal 3：Location-based CHO solution should not be supported by eMTC UE in NTN.

* Not pursued (superseded by Agreement 1)
* [AT119bis-e][118][IoT NTN Enh] Mobility enhancements (ZTE)

Scope: Discuss mobility enhancements, based on remaining proposals in [R2-2209836](file:///C:\Data\3GPP\Extracts\R2-2209836%20Further%20discussion%20on%20mobility%20enhancements.docx), [R2-2209443](file:///C:\Data\3GPP\Extracts\R2-2209443_Mobility%20Enhancements%20in%20IoT-NTN.docx) and [R2-2209411](file:///C:\Data\3GPP\Extracts\R2-2209411.docx)

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Tuesday 2022-10-18 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2210861](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210861.zip)): Tuesday 2022-10-18 1200 UTC

[R2-2210861](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210861.zip) [offline-118] Mobility enhancements ZTE discussion Rel-18 IoT\_NTN\_enh

Proposal 1: RAN2 prioritize the discussion on trigger enhancements for connected mode measurement for R18 NB-IoT NTN. The corresponding discussion for eMTC NTN, e.g., whether the same time-based trigger and location-based trigger as that for NB-IoT NTN connected mode measurement can be considered for eMTC NTN, is postponed.

Proposal 2: The (whole) mechanism of R17 NB-IoT connected mode measurement is kept as a baseline for R18 NB-IoT NTN. RAN2 can further discuss whether the new introduced triggers work jointly or independently from legacy trigger.

Proposal 3a: For quasi-earth fixed cell, NB-IoT UE may start intra/inter frequency measurement in connected mode before the t-Service, if present in SIB3-NB.

Proposal3b: For earth moving cell, it’s FFS whether UE may start intra/inter frequency measurement in connected mode before the time when the serving cell is going to stop serving the area it is currently covering. And if yes, RAN2 further discuss how NB-IoT NTN UE determines this time and what assistance information needs to be provided to UE.

Proposal4: RAN2 would not specify the condition of stopping UE measurement in connected mode.

Proposal 5a: For quasi earth fixed cell and earth moving cell case, it’s FFS how the UE starts connected mode measurement before the time when the serving cell is going to stop serving the area it is currently covering (hereinafter referred to as “stop time of serving cell”). The following options can be further considered:

- Option 1: If(start) time info of neighbor cell (s) is available:

- Option 1-1: UE may start intra/inter frequency measurements in RRC connected mode upon the (start) time when it enters the neighbor cell’s coverage.(modified based on P10 in [2] and also reflect InterDigital's comment. Please note, in order to be different from Option 1-2, the “after” in original P10 is changed to above highlight “upon”)

- Option 1-2: UE may ignore the (start) time info of neighbor cell (s) and start intra/inter frequency measurements in RRC connected mode before the stop time of serving cell. (modified based on P1 in [3], e.g.,“which is late arrival”,with intention to avoidunnecessary early start measurement)

- Option 2: If no available (start) time info of neighbor cell (s):

- Option 2-1: The exact time to start measurements in connected mode before the stop time of serving cell can be left to UE implementation (modified based on P2 in [2])

- Option 2-2: UE may not start measurements in connected mode before the stop time of serving cell (given according to rapporteur’s understanding on Xiaomi’s comment, with intention to avoidunnecessary measurement)

- Other option

Proposal 5b: It’s FFS how to determine the (start) time info of neighbor cell (s) for UE in connected mode.

Proposal 6:For NB-IoT NTN, the distance-based new trigger is supported for connected mode measurement. The details is FFS and the following options can be further considered:

- Option 1: distance between UE and serving cell reference location is used for quasi-earth fixed cell case and distance between UE and serving satellite is used for earth moving cell case.

- Option 2: distance between UE and serving satellite is used for both quasi-earth fixed cell case and earth moving cell case

- Option 3: distance between UE and serving cell reference location is used for both quasi-earth fixed cell case and earth moving cell case

- Other option

Proposal 7: Working assumption: It’s no need for NB-IoT UEin connected mode to inform eNB that it is going to start the connected mode neighbor cell measurements.

Proposal 8: The discussion on UE behaviour when the remaining time of current cell’s coverage is too short for RRC connection establishment is postponed.

[R2-2209580](file:///C:\Data\3GPP\Extracts\R2-2209580%20Discussion%20on%20neighbour%20cell%20measurements%20in%20IoT%20NTN.docx) Discussion on neighbour cell measurements in IoT NTN Intel Corporation discussion Rel-18 IoT\_NTN\_enh

[R2-2209718](file:///C:\Data\3GPP\Extracts\R2-2209718%20IoT%20mobility.doc) Connected mode mobility enhancements Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh

[R2-2209719](file:///C:\Data\3GPP\Extracts\R2-2209719%20RLF%20detection.doc) RLF detection in earth fixed cell Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh

[R2-2209751](file:///C:\Data\3GPP\Extracts\R2-2209751%20Discussion%20on%20mobility%20enhancement%20for%20IoT%20NTN.docx) Discussion on mobility enhancement for IoT NTN Transsion Holdings discussion Rel-18

[R2-2209794](file:///C:\Data\3GPP\Extracts\R2-2209794_RLF%20in%20IoT%20NTN.doc) Neighbour cell measurements before RLF Apple discussion Rel-18 IoT\_NTN\_enh

[R2-2209967](file:///C:\Data\3GPP\Extracts\R2-2209967%20NTN-specific%20CONNECTED%20neighbour%20cell%20measurement%20for%20NB-IoT.docx) NTN-specific CONNECTED neighbour cell measurement for NB-IoT Lenovo discussion Rel-18

[R2-2209968](file:///C:\Data\3GPP\Extracts\R2-2209968%20On%20IDLE%20mobility%20for%20IoT%20NTN.docx) On IDLE mobility for IoT NTN Lenovo discussion Rel-18

[R2-2209978](file:///C:\Data\3GPP\Extracts\R2-2209978.doc) Discussion on triggering neighbour cell measurement before RLF Spreadtrum Communications discussion Rel-18

[R2-2210074](file:///C:\Data\3GPP\Extracts\R2-2210074-Mobility-Enhancements-IoT-NTN.docx) On the applicability of mobility enhancements features for IoT-NTN Nokia, Nokia Shanghai Bell discussion Rel-18

[R2-2210089](file:///C:\Data\3GPP\Extracts\R2-2210089-%20Discussion%20on%20mobility%20enhancement%20for%20IoT%20NTN.doc) Discussion on mobility enhancement for IoT NTN OPPO discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2210122](file:///C:\Data\3GPP\Extracts\R2-2210122%20Enhancements%20on%20the%20neighbour%20cell%20measurement.doc) Enhancements on the neighbour cell measurement Xiaomi discussion

[R2-2210154](file:///C:\Data\3GPP\Extracts\R2-2210154%20Discussion%20on%20the%20mobility%20enhancement%20for%20IoT-NTN.docx) Discussion on the mobility enhancement for IoT-NTN CMCC discussion Rel-18 IoT\_NTN\_enh

[R2-2210196](file:///C:\Data\3GPP\Extracts\R2-2210196%20(R18%20IoT-NTN%20WI%20AI%208.6.3)%20-%20mobility%20enhancements.docx) IoT-NTN mobility enhancements Interdigital, Inc. discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2210321](file:///C:\Data\3GPP\Extracts\R2-2210321.docx) Mobility Enhancement for IoT NTN Samsung R&D Institute UK discussion

[R2-2210372](file:///C:\Data\3GPP\Extracts\R2-2210372.docx) Use of Elevation Angle Threshold for IoT NTN Neighbour Cell Measurements SHARP Corporation discussion R2-2208518

[R2-2210407](file:///C:\Data\3GPP\Extracts\R2-2210407%20Discussion%20on%20mobility%20enhancements.DOC) Discussion on mobility enhancements Huawei, HiSilicon discussion Rel-18 IoT\_NTN\_enh

[R2-2210597](file:///C:\Data\3GPP\Extracts\R2-2210597.docx) Discussion on Mobility Enhancements of IoT NTN TURKCELL discussion Rel-18

[R2-2210733](file:///C:\Data\3GPP\Extracts\R2-2210733%20-%20Discussion%20on%20Conditional%20Handover%20in%20IoT%20NTN.docx) Discussion on Conditional Handover in IoT NTN Ericsson discussion Rel-18 IoT\_NTN\_enh

[R2-2210735](file:///C:\Data\3GPP\Extracts\R2-2210735%20-%20Discussion%20on%20connected%20mode%20measurements.docx) Discussion on connected mode measurements Ericsson discussion Rel-18 IoT\_NTN\_enh

### 8.6.4 Enhancements to discontinuous coverage

Not treated at this meeting. No contributions expected

## 8.7 NR NTN enhancements

(xx-Core; leading WG: RAN1; REL-18; WID: RP-222654)

Time budget: 1 TU

Tdoc Limitation: 3 tdocs

### 8.7.1 Organizational

LSs, rapporteur inputs and other organizational documents. Rapporteur inputs and other pre-assigned documents in this AI do not count towards the tdoc limitation.

[R2-2210766](file:///C:\Data\3GPP\Extracts\R2-2210766%20-%20R18%20WI%20NR-NTN-enh%20workplan_v3.docx) R18 WI NR-NTN-enh work plan at RAN1, 2 and 3 THALES Work Plan Rel-18 NR\_NTN\_enh

* Noted

### 8.7.2 Coverage Enhancements

[R2-2209389](file:///C:\Data\3GPP\Extracts\R2-2209389.docx) Discussion on coverage enhancement in NR NTN CAICT discussion Rel-18 NR\_NTN\_enh-Core

[R2-2209406](file:///C:\Data\3GPP\Extracts\R2-2209406.docx) Discussion on NTN Coverage Enhancement CATT discussion Rel-18 NR\_NTN\_enh

[R2-2209508](file:///C:\Data\3GPP\Extracts\R2-2209508%20Discussion%20on%20RAN%20overhead%20reduction%20for%20VoNR%20support%20in%20NR%20NTN.docx) Discussion on RAN overhead reduction for VoNR support in NTN vivo discussion

[R2-2209709](file:///C:\Data\3GPP\Extracts\R2-2209709%20frame%20aggregation.doc) Frame aggregation for coverage enhancement Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh

[R2-2209710](file:///C:\Data\3GPP\Extracts\R2-2209710%20header%20reduction.doc) Protocol overhead reduction for coverage enhancement Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh

[R2-2209804](file:///C:\Data\3GPP\Extracts\R2-2209804_%20NTN%20Coverage%20Enhancement_v0.doc) Consideration on NTN Coverage Enhancement Apple discussion Rel-18 NR\_NTN\_enh-Core

[R2-2210033](file:///C:\Data\3GPP\Extracts\R2-2210033%20Discussion%20on%20coverage%20enhancement%20for%20NR%20NTN.doc) Discussion on coverage enhancement for NR NTN Xiaomi discussion Rel-18

[R2-2210285](file:///C:\Data\3GPP\Extracts\R2-2210285%20Consideration%20on%20coverage%20enhancements.doc) Consideration on coverage enhancements ZTE Corporation, Sanechips discussion Rel-18

[R2-2210566](file:///C:\Data\3GPP\Extracts\R2-2210566_Discussion%20on%20the%20L2%20header%20reduction%20in%20NTN.docx) Discussion on the L2 header reduction in NTN LG Electronics Inc. discussion NR\_NTN\_enh-Core

[R2-2210645](file:///C:\Data\3GPP\Extracts\R2-2210645%20Discussion%20on%20Coverage%20Enhancements%20for%20NR%20NTN.docx) Discussion on Coverage Enhancements for NR NTN Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh

[R2-2210685](file:///C:\Data\3GPP\Extracts\R2-2210685%20Discussion%20on%20RAN%20protocol%20overhead%20reduction.doc) Discussion on RAN protocol overhead reduction Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh

[R2-2210758](file:///C:\Data\3GPP\Extracts\R2-2210758%20-%20R18%20NR%20NTN%20Coverage%20enhancements.docx) R18 NR NTN Coverage enhancements Ericsson discussion Rel-18 NR\_NTN\_enh

* [AT119bis-e][103][NR NTN Enh] Coverage enhancements (Qualcomm)

Initial scope: Discuss the proposals in the submitted contributions in AI 8.7.2 (apart from those on msg3 repetition enhancements)

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Thursday 2022-10-13 1600 UTC

Initial deadline (for rapporteur's summary in [R2-2210842](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210842.zip)): Thursday 2022-10-13 1800 UTC

[R2-2210842](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210842.zip) [offline-103] Coverage enhancements Qualcomm discussion Rel-18 NR\_NTN\_enh

Proposal 1 (16/19) A UE may use application layer frame aggregation by implementation (e.g., AS and application layer interaction). FFS if RAN needs to know whether UE is using frame aggregation in the voice packet.

* LG prefers to remove the FFS
* Vivo prefers to remove the part in brackets.
* QC wonders if everyone agrees that RAN does not need to know if frame aggregation is used.
* RAN2 thinks a UE may use application layer frame aggregation by implementation (no RAN2 spec impacts). (RAN2 can further discuss whether RAN needs to know whether UE is using frame aggregation in the voice packet)

Proposal 2 (11/19) It is up to network to decide whether to configure SDAP header and integrity protection for a VoNR DRB to reduce the protocol overhead.

* RAN2 understands that it is up to network implementation to decide whether to configure SDAP header and integrity protection for a VoNR DRB to reduce the protocol overhead (no RAN2 spec impacts)

Proposal 3 (>5) RAN2 further discuss if there is any issue of using shorter PDCP SN (e.g., 7 bit) for VoNR DRB in NTN.

Proposal 4 (14/19) Wait RAN1 progress to discuss other solutions in the protocol overhead reduction study

Agreements:

1. RAN2 thinks a UE may use application layer frame aggregation by implementation (no RAN2 spec impacts). (RAN2 can further discuss whether RAN needs to know whether UE is using frame aggregation in the voice packet)
2. RAN2 understands that it is up to network implementation to decide whether to configure SDAP header and integrity protection for a VoNR DRB to reduce the protocol overhead (no RAN2 spec impacts)

Msg3 repetition

[R2-2209969](file:///C:\Data\3GPP\Extracts\R2-2209969%20Potential%20issues%20for%20Msg3%20repetition%20in%20NTN.docx) Potential issues for Msg3 repetition in NTN Lenovo discussion Rel-18

Proposal 1: RAN2 to study enhancements to Msg3 repetition for Rel-18 NR NTN.

Alternative proposal from [R2-2209406](file:///C:\Data\3GPP\Extracts\R2-2209406.docx)

Proposal 1: No further enhancements for Msg3 repetition determination in NTN.

Alternative proposal from [R2-2210645](file:///C:\Data\3GPP\Extracts\R2-2210645%20Discussion%20on%20Coverage%20Enhancements%20for%20NR%20NTN.docx)

Proposal 2: RAN2 to address the issues on how to support blind Msg3 retransmission for initial Msg3 transmission for NR NTN.

Alternative proposal from [R2-2210758](file:///C:\Data\3GPP\Extracts\R2-2210758%20-%20R18%20NR%20NTN%20Coverage%20enhancements.docx)

Proposal 1 Support contention free random access Msg3 repetition.

Withdrawn

R2-2210460 Discussion on Coverage Enhancements for NR NTN Hyundai Motor Company discussion Late

### 8.7.3 Network verified UE location

Including the report of [Post119-e][108]

[R2-2209597](file:///C:\Data\3GPP\RAN2\Docs\R2-2209597.zip) Summary of POST119-e [108] NW verified UE location (Thales) THALES discussion Rel-18

* [AT119bis-e][102][NR NTN Enh] NW verified UE location (Thales)

Initial scope: Continue the discussion on NW verified UE location, based on the report of [Post119][108] in [R2-2209597](file:///C:\Data\3GPP\RAN2\Docs\R2-2209597.zip) and the other submitted contributions in AI 8.7.3

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* Draft LSs to other groups (if any)

Initial deadline (for companies' feedback): Wednesday 2022-10-12 1200 UTC

Initial deadline (for rapporteur's summary in [R2-2210841](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210841.zip)): Wednesday 2022-10-12 1400 UTC

Updated scope: Discuss the possible content of an LS to SA1/SA2 (CC: RAN1, RAN3, RAN) based on p11 in [R2-2210841](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210841.zip))

Updated intended outcome: Draft LS to SA1/SA2

Updated deadline (for companies' feedback): Wednesday 2022-10-19 02:00 UTC

Updated deadline (for draft LS in R2-2211044): Wednesday 2022-10-19 04:00 UTC

[R2-2210841](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210841.zip) [offline-102] NW verified UE location Thales discussion Rel-18 NR\_NTN\_enh

# List of proposals for agreement:

Proposal 1: RAN2 assumes that the network is able to compute possible UE locations independently from the location information reported by UE.

Moderator’s note : CATT suggests to change the “location information reported by UE” to “GNSS location reported by UE”.

* Agreed as “RAN2 assumes that the network is able to compute possible UE locations independently from the GNSS location reported by UE.”

Proposal 7: RAN2 assumes that the UE location verification procedure can be triggered by the CN and it is up to the CN implementation to decide when to trigger the procedure.

* Samsung suggests to remove “implementation”
* Agreed as “RAN2 assumes that the UE location verification procedure can be triggered by the CN and it is up to the CN to decide when to trigger the procedure”

Proposal 9: RAN2 should consider in priority the NGSO case with earth moving and earth fixed beams for the definition of the UE location verification procedure.

* Agreed

Proposal 10: Multi-connectivity involving multiple transparent NTN NG-RAN nodes or transparent NTN NG-RAN node and TN NG-RAN node is not part of the Rel-18 study on UE location verification.

* Ericsson wonders about “transparent”. Nokia agrees to remove that
* Agreed as “Multi-connectivity involving multiple NTN NG-RAN nodes or NTN NG-RAN node and TN NG-RAN node is not part of the Rel-18 study on UE location verification”

# List of proposals that require online discussions:

Proposal 2: RAN2 assumes that the network (5GC) is able to verify the consistency (within 5-10 km) between the actual reported UE location with some of the possible UE locations computed by the network. Details on how the CN verifies the UE location is up to SA2.

Moderator’s note : Could be quickly agreed

* Ericsson wonders if we can assume something that has not being studied.
* Nokia thinks that “some of the possible…” is confusing. MTK suggest to keep only “possible location
* Agreed as: “RAN2 assumes that the verification of the consistency (within 5-10 km) between the actual reported UE location with the UE location(s) computed by the network is up to the 5GC. (this doesn’t mean that RAN2 has nothing to do for this WI objective)”

Proposal 3-4: RAN2 to assess possible signalling impacts (e.g. MAC HEADER, RRC) associated to the combination of one or several 3GPP defined RAT dependent positioning methods to support the network verification of the UE reported location once RAN1 has progressed sufficiently on the positioning methods.

Proposal 11: RAN2 to prepare an LS to SA1/SA2 requesting clarifications on the following TR recommendation “The solution should not impact significantly the latency of the targeted services nor infringe privacy requirements that apply to the UE location.”

• Is there any constraint on the latency (trigger to result) of the verification procedure?

• Can the verification procedure be run independently from the targeted services (e.g. in parallel to prevent any set-up delay)?

Moderator’s note 1 : Request from companies : need to coordinate with the RAN1 or to let the RAN1 send the LS; the LS shall be CC to RAN plenary

* Continue offline

Proposal 12: RAN2 to prepare an LS to SA3 asking whether an information reported by the UE in the MAC HEADER and/or the RRC protocol can be trusted by the network although derived from GNSS measurements (e.g. UE Specific TA, Doppler shift, Radial satellite velocity etc…)?

Proposal 13: RAN2 evaluates which information related to the NG RAN of Terrestrial Network could be used for UE location verification (e.g. TN cell information, PLMN identities, MCC, MNC) in case of overlapping coverage between TN and NTN.

* QC is not sure if this works, as there could be fake base stations.
* Ericsson thinks that any existing mechanism can be used, we don’t need to agree on something new.

Proposal 15: RAN2 expects that the network may implement some operation to not broadcast the PWS message to the non-targeting area. This is up to SA2 to define such mechanisms

Proposal 8: RAN2 to further discuss whether the TRP info (e.g. measurements in NRPPa, satellite ephemeris), exchanged between NG-RAN and LMF, need to be updated over time due to satellite motion.

Moderator’s note : online if there is time left

* Intel thinks it’s not clear what TRP info is in this case. And in any case this would be in RAN3 scope. Ericsson/Huawei agree.
* Continue the discussion in RAN3, if needed.

# List of non-priority proposals:

Proposal 5: NG-RAN may implement some processing to support/contribute to the verification of the UE location that could be triggered by core network.

Proposal 14: RAN2 ask to SA2 to confirm the following assumption : “the UE location verification procedure can be triggered by the CN and it is up to the CN implementation to decide when to trigger the procedure.”

Agreements:

1. RAN2 assumes that the network is able to compute possible UE locations independently from the GNSS location reported by UE
2. RAN2 assumes that the UE location verification procedure can be triggered by the CN and it is up to the CN to decide when to trigger the procedure
3. RAN2 should consider in priority the NGSO case with earth moving and earth fixed beams for the definition of the UE location verification procedure
4. Multi-connectivity involving multiple NTN NG-RAN nodes or NTN NG-RAN node and TN NG-RAN node is not part of the Rel-18 study on UE location verification
5. RAN2 assumes that the verification of the consistency (within 5-10 km) between the actual reported UE location with the UE location(s) computed by the network is up to the 5GC. (this doesn’t mean that RAN2 has nothing to do for this WI objective)

R2-2211044 LS on latency impact NTN verified UE location Thales LS out Rel-18 NR\_NTN\_enh To:SA1, SA2 Cc:RAN1, RAN3, RAN

[R2-2209407](file:///C:\Data\3GPP\Extracts\R2-2209407.docx) Discussion on UE Location Verification CATT discussion Rel-18 NR\_NTN\_enh

[R2-2209444](file:///C:\Data\3GPP\Extracts\R2-2209444-Network%20verification%20of%20UE%20location.docx) On Network Verified UE Location in NR NTN MediaTek Inc. discussion

[R2-2209509](file:///C:\Data\3GPP\Extracts\R2-2209509%20Discussion%20on%20NW%20verification%20of%20UE%20location%20in%20Rel-18%20NR%20NTN.docx) Discussion on Network verification of UE location in Rel-18 NR NTN vivo discussion

[R2-2209579](file:///C:\Data\3GPP\Extracts\R2-2209579%20Discussion%20on%20the%20technical%20issues%20of%20positioning%20methods%20in%20single-satellite%20NTN.docx) Discussion on the technical issues of positioning methods in single-satellite NTN Intel Corporation discussion Rel-18 NR\_NTN\_enh

[R2-2209665](file:///C:\Data\3GPP\Extracts\R2-2209665%20Discussion%20on%20the%20network%20verified%20UE%20location.doc) Discussion on the network verfied UE location Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh

[R2-2209793](file:///C:\Data\3GPP\Extracts\R2-2209793_NW%20verified%20UE%20location.doc) Discussion on network verified UE location Apple discussion Rel-18 NR\_NTN\_enh-Core

[R2-2209984](file:///C:\Data\3GPP\Extracts\R2-2209984%20Discussion%20on%20UE%20location%20verify%20procedure.doc) Discussion on UE location verify procedure Spreadtrum Communications discussion Rel-18

[R2-2210004](file:///C:\Data\3GPP\Extracts\R2-2210004_NTN_NW_Verified.docx) On NTN NW verified UE location aspects Lenovo discussion Rel-18

[R2-2210096](file:///C:\Data\3GPP\Extracts\R2-2210096%20NW%20verified%20UE%20location.doc) Discussion on network verified UE location OPPO discussion Rel-18 NR\_NTN\_enh-Core

[R2-2210120](file:///C:\Data\3GPP\Extracts\R2-2210120%20Discussion%20on%20network%20verified%20UE%20location%20.doc) Discussion on network verified UE location Xiaomi, CAICT discussion

[R2-2210242](file:///C:\Data\3GPP\Extracts\R2-2210242.docx) Network Verified UE Location Samsung R&D Institute UK discussion Rel-18

[R2-2210286](file:///C:\Data\3GPP\Extracts\R2-2210286%20Consideration%20on%20NW%20verified%20UE%20location.doc) Consideration on NW verified UE location ZTE Corporation, Sanechips discussion Rel-18

[R2-2210336](file:///C:\Data\3GPP\Extracts\R2-2210336%20On%20network%20verified%20position.docx) On network verified position Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core

[R2-2210443](file:///C:\Data\3GPP\Extracts\R2-2210443%20Discussion%20on%20Network%20Verified%20UE%20Location.docx) Discussion on Network Verified UE Location NTT DOCOMO INC. discussion Rel-18

[R2-2210509](file:///C:\Data\3GPP\Extracts\R2-2210509%20Considerations%20on%20UE%20Location%20Verification%20via%20Network.doc) Considerations on UE Location Verification via Network CMCC discussion Rel-18 NR\_NTN\_enh

[R2-2210709](file:///C:\Data\3GPP\Extracts\R2-2210709.docx) UE location verification in NTN Deutsche Telekom, Huawei, HiSilicon discussion Rel-18

[R2-2210757](file:///C:\Data\3GPP\Extracts\R2-2210757%20-%20R18%20NR%20NTN%20Network%20verified%20UE%20location.docx) R18 NR NTN Network verified UE location Ericsson discussion Rel-18 NR\_NTN\_enh

### 8.7.4 NTN-TN and NTN-NTN mobility and service continuity enhancements

Cell reselection enhancements

[R2-2209578](file:///C:\Data\3GPP\Extracts\R2-2209578%20Discussion%20on%20NTN%20cell%20reselection%20enhancements.docx) Discussion on NTN cell reselection enhancements Intel Corporation discussion Rel-18 NR\_NTN\_enh

NTN-NTN cell reselection

Observation 1: if the location coordinates of NTN cell center and the radius of cell coverage are broadcast for earth moving cell, a UE is able to predict the trajectory of cell center and the corresponding cell coverage on ground based on the satellite orbital parameters.

Proposal 1: For NTN-NTN cell reselection with earth moving cell, to consider providing parameters of serving cell to UE for UE to estimate the stop time of serving cell. These parameters of the serving cell can be satellite orbital parameters, location coordinates of cell center and the radius of cell coverage.

* Lenovo is fine with the first sentence but thinks the orbital parameters are already included in the ephemeris. For the location of the cell center, it’s difficult to provide for earth moving cells.
* CATT has the same view and could stick to the first part.
* Huawei agrees and then only new information is about cell coverage
* For NTN-NTN cell reselection with earth moving cell, RAN2 will consider providing parameters of serving cell to UE, for UE to estimate when the serving cell stops providing coverage at the present UE location (FFS whether this will be an optional UE feature) (this does not exclude any time-based or location-based approach) (other solutions can also be considered)
* Huawei think the UE needs to predict the movement and then the stop time.
* Ericsson/Interdigital/ZTE/Nokia/Xiaomi think we can start with this agreement which does not relate to time or distance based solutions

Proposal 2: If proposal 1 is agreed, to define a new trigger for the measurement relaxation considering the estimated cell stop time. For example, after UE camps in a cell, or for certain time “x”, UE may be allowed to relax neighbour cell measurements until the estimated cell stop time or certain time “y” before the estimated stop time.

* Continue in offline 117

Proposal 3: The parameters explained in Proposal 1 can also be for neighbour cells for UE to estimate which cells are the upcoming cells for cell reselection. I.e., these parameters of the neighbour cell can be satellite orbital parameters, location coordinates of cell center and the radius of cell coverage.

* Continue in offline 117

NTN-TN cell reselection

Proposal 4: To enhance NTN-TN cell reselection, means are defined for a UE to differentiate when camping on “NTN only area” vs “NTN-TN area”. “NTN only area” refers to areas where UE does not have TN coverage and can only have coverage with NTN.

* Oppo think the second one is “TN available” area.
* To enhance NTN-TN cell reselection, means are defined for a UE to differentiate when camping in an area only covered by NTN network (earth-moving or earth-fixed) vs an area where TN network(s) is/are also available.

Proposal 4.1. If proposal 4 is agreed,” cell type" (i.e. “TN” vs “NTN”) of a neighbour cell is indicated to UE (e.g. explicitly or implicitly).

* CATT thinks cell type is not clear
* NEC thinks it’s too early to agree on this. Nokia agrees
* Continue in offline 117

Proposal 4.2. If proposal 4 is agreed, network provides assistance information of NTN-only area (e.g., cell center and cell radius of TN neighbour cells and NTN serving cell, or the boundary line between TN area and NTN area).

* Continue in offline 117

Proposal 4.3. If proposal 4 is agreed, when a UE is in NTN only area, UE is not required to perform neighbour cell measurements for TN neighbour cells.

* Continue in offline 117

Agreements:

1. For NTN-NTN cell reselection with earth moving cell, RAN2 will consider providing parameters of serving cell to UE, for UE to estimate when the serving cell stops providing coverage at the present UE location (FFS whether this will be an optional UE feature) (this does not exclude any time-based or location-based approach) (other solutions can also be considered)
2. To enhance NTN-TN cell reselection, means are defined for a UE to differentiate when camping in an area only covered by NTN network (earth-moving or earth-fixed) vs an area where TN network(s) is/are also available.

* [AT119bis-e][117][NR NTN Enh] cell reselection enhancements (Intel)

Scope: Discuss NTN-NTN and NTN-TN cell reselection enhancements based on remaining proposals in [R2-2209578](file:///C:\Data\3GPP\Extracts\R2-2209578%20Discussion%20on%20NTN%20cell%20reselection%20enhancements.docx) and [R2-2210353](file:///C:\Data\3GPP\Extracts\R2-2210353%20Further%20view%20on%20Idle-%20and%20Connected-mode%20NTN%20mobility%20in%20Rel-18.docx)

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Tuesday 2022-10-18 0600 UTC

Initial deadline (for rapporteur's summary in [R2-2210860](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210860.zip)): Tuesday 2022-10-18 0800 UTC

[R2-2210860](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210860.zip) [offline-117] cell reselection enhancements Intel discussion Rel-18 NR\_NTN\_enh

Easy agreements:

(Full consensus) Proposal 3: System information is the basic means for providing necessary parameters to assist UE to estimate when the serving cell stops providing coverage at the present UE location.

(Full consensus) Proposal 9: UE is not required to perform neighbour cell measurements for TN neighbour cells in an area where there is no TN network coverage.

(19/20) Proposal 10: the method of detecting the transmission energy or SIB presence to determine the NTN coverage when a UE currently camps on a TN cell is not pursued.

Online confirmation:

(15/20) Proposal 1: In Earth-moving cell, the reference location and distance threshold of serving cell are provided by network for UE to estimate when the serving cell stops providing coverage at the present UE location.

* CATT suggests to add “FFS for the detail of providing reference location and/or distance threshold.”

Postponed discussion:

Proposal 2: In Earth-moving cell, regarding how to provide the reference location of serving cell, the following options can be further discussed:

1. only location coordinates of current cell center, and network is supposed to update the values every time when it is provided for Earth-moving cell.

2. multiple reference locations and its time information of Earth-moving cell.

3. based on the sub-satellite point derived by satellite ephemeris and the broadcasted location offset between sub-satellite point and the cell reference location

4. cell type (fixed or moving), reference location coordinates with a time stamp, and the velocity of reference location

5. cell type, reference location corresponding to the epochTime (reuse the existing epochTime).

Proposal 4: The discussion on assistance information of neighbour cell for UE to estimate when the neighbour cell starts providing coverage at the present UE location is postponed.

Proposal 5: The discussion on whether to relax neighbour cell measurements before the serving cell stops providing coverage at the present UE location is postponed.

Proposal 6: RAN2 to further discuss whether t-service needs to be provided in system information in case of feeder link switch.

Proposal 7: RAN2 to further discuss whether the cell type (i.e. “TN” vs “NTN”) of a neighbour cell can be indicated implicitly by existing system information, e.g., SIB19 or band numbers.

Proposal 8: Regarding the Assistance information for UE to identify an area where TN network is available, the following options can be further discussed:

1. The cell center and cell radius of TN neighbour cells, or in other terms, the reference location and a distance threshold of TN neighbour cells

2. The boundary line between TN area and NTN area

3. For quasi-earth fixed cells, TN coverage is described by a distance range from the cell center and an angle range based on a reference direction

4. An indication could be included in system information to indicate NTN cell’s coverage overlaps with terrestrial TN cell’s coverage

5. NTN cell can be divided to several virtual areas based on certain criteria. The virtual areas and the corresponding TN frequency information are broadcast as assistance information to help UE perform more accurate TN measurements.

6. Introduce a parameter using the polygon shape captured in TS 23.032 to describe the coverage area of a TN neighbour cell.

[R2-2209753](file:///C:\Data\3GPP\Extracts\R2-2209753%20Discussion%20on%20NTN-TN%20IDLE%20and%20INACTIVATE%20mobility%20and%20service%20continuity%20enhancements.doc) Discussion on NTN-TN IDLE and INACTIVATE mobility and service continuity enhancements Transsion Holdings discussion Rel-18

[R2-2209970](file:///C:\Data\3GPP\Extracts\R2-2209970%20Further%20considerations%20on%20IDLE%20and%20INACTIVE%20mobility.docx) Further considerations on IDLE/INACTIVE mobility Lenovo discussion Rel-18

[R2-2210045](file:///C:\Data\3GPP\Extracts\R2-2210045_NTN_mobility.docx) Discussion on assistance information of cell reselection for NTN-TN mobility ITRI discussion NR\_NTN\_enh

[R2-2210090](file:///C:\Data\3GPP\Extracts\R2-2210090%20Discussion%20on%20mobility%20enhancements%20for%20idle%20and%20inactive%20UEs.doc) Discussion on mobility enhancements for idle and inactive Ues OPPO discussion Rel-18 NR\_NTN\_enh-Core

[R2-2210159](file:///C:\Data\3GPP\Extracts\R2-2210159%20Cell%20reselection%20enhancements.docx) Cell reselection enhancements CMCC discussion Rel-18 NR\_NTN\_enh-Core

[R2-2210217](file:///C:\Data\3GPP\Extracts\R2-2210217.docx) NTN-TN mobility enhancements Sony discussion Rel-18 NR\_NTN\_enh

[R2-2210438](file:///C:\Data\3GPP\Extracts\R2-2210438%20(R18%20NR%20NTN%20WI%20AI%208.7.4)%20Idle-Inactive%20enhancements.docx) RRC Idle/Inactive mobility enhancements InterDigital discussion Rel-18 NR\_NTN\_enh-Core

[R2-2210468](file:///C:\Data\3GPP\Extracts\R2-2210468%208.7.4%20cell%20reselection%20enhancement.docx) NTN cell reselection enhancements Samsung Research America discussion Rel-18 NR\_NTN\_solutions-Core

[R2-2210589](file:///C:\Data\3GPP\Extracts\R2-2210589.docx) Discussion on NTN-TN mobility and NTN-NTN mobility ITL discussion Rel-18

[R2-2210598](file:///C:\Data\3GPP\Extracts\R2-2210598.docx) Discussion on mobility and service continuity enhancements for NR NTN Turkcell, Deutsche Telekom discussion Rel-18

[R2-2210737](file:///C:\Data\3GPP\Extracts\R2-2210737%20Discussion%20on%20idle%20mode%20aspects%20for%20NTN.docx) Discussion on idle mode aspects for NTN LG Electronics Inc. discussion Rel-18

Handover enhancements

[R2-2210095](file:///C:\Data\3GPP\Extracts\R2-2210095%20NTN%20connected%20mode%20mobility.doc) Discussion on NTN handover enhancements OPPO discussion Rel-18 NR\_NTN\_enh-Core

HO signalling enhancements

Proposal 1 To solve the signaling burst issue, RAN2 consider the design of including only the target cell ID/index in the handover command. The target cell’s configuration can be acquired through the pre-configured CHO configuration. FFS on the signaling options, e.g. MAC CE or RRC message.

* Vivo wonders if in this case there is a preconfiguration for the HO (is the difference compared with legacy CHO to use the HO cmd to trigger the execution, instead of using meas event based trigger?). Yes, Oppo thinks we can reuse the legacy CHO configuration before the HO command
* ZTE support the proposal and it can be used when the CHO condition is not satisfied at the UE
* Apple thinks we need group HO, otherwise overhead cannot be reduced. QC and Mediatek agree.
* Intel supports p1 and thinks the second indication can be done in a broadcast way
* VDF thinks this reuses CHO configuration but it’s not CHO, it’s just using preconfiguration. Also wonders what is the condition for the NW to trigger HO in this case (are measurement reports used?). Oppo thinks this is up to NW implementation (e.g. knowledge of feeder link switch), but this does not preclude the use of measurements.
* QC thinks HO command does not need to be UE specific in P1
* Nokia asks about the use case for this: earth-fixed or earth-moving? And what do we gain on top of R17 time-based CHO? Oppo thinks that no scenario is excluded here. CATT has similar views as Nokia.
* Ericsson agrees with Nokia and prefers to consider p2

Proposal 2 To reduce handover signalling overhead, some information in the handover command, e.g. t304 and spCellConfigCommon, that can be common to all UEs can be delivered to UEs in a broadcast manner.

* CMCC thinks that for moving cell it’s better to use a group manner approach. Lenovo thinks p2 can be useful for earth-fixed. For moving cells support CMCC's view.
* Samsung agrees and thinks we need to discuss what can be broadcast
* QC thinks that p2 alone is not sufficient, we need to consider group HO. Intel agrees
* Nokia is OK to study which parameters can be provide via common signalling
* MTK supports P2 in principle, but broadcast and groupcast both should be included
* Ericsson agrees with intention. Propose to replace "broadcast manner" by "common signaling"
* VDF thinks that broadcast signalling might be more costly for the operator, as it needs to reach UEs in the whole cell
* ZTE suggests to remove the examples.
* HW also thinks that we can also consider delta configuration. Nokia agrees
* RAN2 can further consider whether some information in the handover command that can be common to all UEs, can be delivered to UEs in common signalling and if there is real benefit (in terms of signalling overhead reduction) in this.

RACH-less Handover

Proposal 3 Support RACH-less handover in Rel-18 NR NTN.

* MTK has sympathy for this but thinks that RAN1 needs to be involved. Also this is also discussed in R18 mobility enhancements.
* HW wonders if this is for intra-satellite or inter-satellite. For inter-satellite we might need RAN1 because the TA would be different
* Intel also agrees RAN1 should check this.
* ZTE support RACH-less in NTN, FFS on the details
* Nokia wonders about the use cases, which could be limited (same TA or no TA)
* VDF wonders if this can be used in rare cases only or what.
* ZTE thinks that with the TA pre-compensation at UE side, RACH-less HO can be considered in NTN. The feasibility and required enhancements can be further analyzed in both RAN1 and RAN2
* QC thinks we can consider intra-satellite, inter-satellite with same or different feeder links and check with RAN1 in which scenarios RACH-less is possible
* CMCC thinks the TA is calculated by the UE so sees no real difference between intra-satellite and inter-satellite. MTK thinks the correctness can be identified and verified by RAN1.
* Send an LS to RAN1 (cc RAN4) listing the scenarios (intra-satellite, inter-satellite with same or different feeder links) and check with RAN1 in which scenarios RACH-less is possible (with no indication of RAN2 preference)

Agreements

1. RAN2 can further consider whether some information in the handover command that can be common to all UEs, can be delivered to UEs in common signalling and if there is real benefit (in terms of signalling overhead reduction) in this
2. Send an LS to RAN1 (cc RAN4) listing the scenarios (intra-satellite, inter-satellite with same or different feeder links) and check with RAN1 in which scenarios RACH-less is possible (with no indication of RAN2 preference)

* [AT119bis-e][121][NR NTN Enh] LS on RACH-less HO (Oppo)

Scope: Draft LS to RAN1 on RACH-less HO

Intended outcome: draft reply LS

Deadline (for companies' feedback): Tuesday 2022-10-18 0600 UTC

Deadline (for Draft LS in R2-2210864): Tuesday 2022-10-18 0800 UTC

[R2-2210864](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210864.zip) [Draft] LS on RACH-less HO in NTN Oppo LS out Rel-18 NR\_NTN\_enh To:RAN1 Cc:RAN4

* Change “respectively” into “respectfully”
* Remove Draft, put RAN2 as Source
* Revised in [R2-2211017](file:///C:\Data\3GPP\RAN2\Inbox\R2-2211017.zip)

[R2-2211017](file:///C:\Data\3GPP\RAN2\Inbox\R2-2211017.zip) LS on RACH-less HO in NTN Oppo LS out Rel-18 NR\_NTN\_enh To:RAN1 Cc:RAN4

* Approved

[R2-2209711](file:///C:\Data\3GPP\Extracts\R2-2209711%20Mobility%20enhancements.doc) Signaling and congestion reduction in satellite switch Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh

Group Handover

Proposal 1 Consider group HO command/indication to reduce signaling overhead from the source cell.

* HW would like to understand the target scenario (earth-moving or earth-fixed). HW thinks earth-fixed is the target, but we might not even need HO in this case if we reuse the same PCI
* Apple supports this
* MTK/Transsion support this.
* ZTE supports group HO but understands some further details need to be discussed thus prefer to say "group HO" here instead of "group HO command/indication"
* Intel thinks the HO should be UE specific (as they could have different capabilities) but we could have a two-step HO (as in the previous paper). QC thinks we can also consider the proposal of a pre-configuration + a common HO indication
* Apple supports the UE specific pre-configuration of the target cell + group HO indication. Samsung agrees
* VDF wonders how the ACK/NACK works?
* Nokia is not sure about the gains. Hughes agrees that we should see the benefits first.
* Continue the discussion (in future meeting) on group HO / “UE specific pre-configuration of the target cell + group HO” indication in the next meeting, also on the possible real benefits

RACH-less Handover

Proposal 2 Support dynamic grant from the target cell for RACH-less PUSCH transmission to reduce random access congestion in the target cell.

Proposal 3 Ask RAN1 for feedback on the support of dynamic grant from the target cell for RACH-less PUSCH transmission to the target satellite.

Agreements:

1. Continue the discussion (in future meeting) on group HO / “UE specific pre-configuration of the target cell + group HO” indication in the next meeting, also on the possible real benefits

[R2-2209390](file:///C:\Data\3GPP\Extracts\R2-2209390.docx) Discussion on NTN-NTN mobility CAICT discussion Rel-16 NR\_NTN\_enh-Core

[R2-2209445](file:///C:\Data\3GPP\Extracts\R2-2209445_HO%20enhancement%20in%20LEO-NTN%20with%20Earth-moving%20Cells.docx) Handover Enhancement in LEO NTN with Earth-moving Cells MediaTek Inc. discussion

[R2-2209577](file:///C:\Data\3GPP\Extracts\R2-2209577%20Discussion%20on%20NTN%20handover%20enhancements.docx) Discussion on NTN handover enhancements Intel Corporation discussion Rel-18 NR\_NTN\_enh R2-2207272

[R2-2209752](file:///C:\Data\3GPP\Extracts\R2-2209752%20Discussion%20on%20NTN-NTN%20CONNECTED%20mobility%20and%20service%20continuity%20enhancements.doc) Discussion on NTN-NTN CONNECTED mobility and service continuity enhancements Transsion Holdings discussion Rel-18

[R2-2209855](file:///C:\Data\3GPP\Extracts\R2-2209855%20Discussion%20on%20RACH-less%20handover.docx) Discussion on RACH-less handover ASUSTeK discussion Rel-18 NR\_NTN\_enh-Core

[R2-2209921](file:///C:\Data\3GPP\Extracts\R2-2209921%20NTN%20handover%20enhancements.doc) NTN handover enhancements LG Electronics Inc. discussion Rel-18

[R2-2209985](file:///C:\Data\3GPP\Extracts\R2-2209985%20Some%20enhancements%20in%20NTN%20handover.doc) Some enhancements in NTN handover Spreadtrum Communications discussion Rel-18

[R2-2210160](file:///C:\Data\3GPP\Extracts\R2-2210160%20Mobility%20enhancements%20for%20connected%20mode.docx) Mobility enhancements for connected mode CMCC discussion Rel-18 NR\_NTN\_enh-Core

[R2-2210198](file:///C:\Data\3GPP\Extracts\R2-2210198.docx) NR NTN connected mode mobility enhancement NEC Telecom MODUS Ltd. discussion Rel-18

[R2-2210218](file:///C:\Data\3GPP\Extracts\R2-2210218.docx) Signaling overhead reduction during NTN-NTN HOs Sony discussion Rel-18 NR\_NTN\_enh

[R2-2210338](file:///C:\Data\3GPP\Extracts\R2-2210338_Solutions%20to%20reduce%20UE%20power%20consumption%20for%20NTN%20to%20TN%20mobility%20in%20Idle%20or%20Inactive%20mode.docx) NTN-NTN handover enhancement for RRC\_CONNECTED UEs NEC Telecom MODUS Ltd. discussion R2-2207297

[R2-2210467](file:///C:\Data\3GPP\Extracts\R2-2210467%208.7.4%20NTN%20connected%20MobEnh.docx) NTN mobility enhancements in connected mode Samsung Research America discussion Rel-18 NR\_NTN\_solutions-Core

[R2-2210769](file:///C:\Data\3GPP\Extracts\R2-2210769%20Network-driven%20NTN-NTN%20Mobility.docx) Network-driven NTN-NTN Mobility Considerations Lockheed Martin discussion Rel-18

All aspects

[R2-2210353](file:///C:\Data\3GPP\Extracts\R2-2210353%20Further%20view%20on%20Idle-%20and%20Connected-mode%20NTN%20mobility%20in%20Rel-18.docx) Further view on Idle- and Connected-mode NTN mobility in Rel-18 Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core

NTN-NTN cell reselection

Observation 1: Rel-17 introduced distanceThresh and t-Service which can be used by the UEs in quasi-Earth fixed cell to perform cell reselection measurements.

Observation 2: using distance threshold or t-Service for cell reselections in Earth-moving NTN scenario is more complex than in quasi-Earth fixed NTN case.

Proposal 1: UE performs individual estimation, considering satellite’s ephemeris, cell reference location and its own location to enable location-based reselections in Earth-moving scenario.

* Continue in offline 117

Proposal 2: To enable time-based reselections in Earth-moving scenario, the IDLE UE is capable of computing its own location to adjust t-Service provided in SIB19.

* Continue in offline 117

Observation 3: Using RRC Release for providing assistance information for intra-NTN cell reselection is possible, but not optimal (as the configuration is cell-specific).

Proposal 3: System information is the basic means for providing necessary parameters to assist the NTN UE in intra-NTN cell reselection process.

* Continue in offline 117

NTN-TN cell reselection

Observation 4: It is beneficial for the power saving purposes if the UE can measure for NTN or TN coverage only when relevant.

Proposal 4: RAN2 is asked to consider the method of detecting the transmission energy or SIB presence to determine the NTN coverage.

* Continue in offline 117

Proposal 5: RAN2 is asked to consider the method where System Information provides a location-related indication where the search for TN coverage shall be initiated.

* Continue in offline 117

Handover enhancements

Observation 5: UE’s expected time of stay in the cell can be used for avoiding too early resource reservations.

Observation 6: When accessing the new cell, UE may report it was configured with the chain of CHO configurations in one of the preceding cells.

Proposal 6: To reduce the signalling overhead during mobility a mechanism is introduced, where the UE can be provided with CHO configurations for cells beyond the next cell change (future candidate cells).

* Continue in offline 119

Observation 7: In Earth-fixed case, the UE may reselect or handover to a cell which has a larger t-Service.

Proposal 7: RAN2 is asked to consider the solution for minimizing the signalling during mobility in EMC, e.g. via informing the UE about the partial cell layout.

Observation 8: LTE Rel-14 RACH-less applicability was limited to the cases where TA of the source and target cell is zero or where source’s TA can be reused at target cell.

Observation 9: Solution relying on Rel-14 RACH-less can be potentially applicable only to intra-satellite scenario or fully synchronized inter-satellite case.

Proposal 8: RACH-less HO is not supported in Rel-18 NTN enhancements.

Proposal 9: Group HO is not pursued as a part of Rel-18 NTN enhancements as similar goal can be achieved using CHO with time-based triggering.

[R2-2210405](file:///C:\Data\3GPP\Extracts\R2-2210405%20Discussion%20on%20NTN%20mobility%20enhancements.doc) Discussion on NTN mobility enhancements Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh

Proposal 5: In quasi-earth fixed cell scenarios, the PCI remains the same after the switching of satellites.

* Continue in offline 119
* [AT119bis-e][119][NR NTN Enh] HO enhancements (Nokia)

Scope: Discuss possible CHO-based approach (p6 in [R2-2210353](file:///C:\Data\3GPP\Extracts\R2-2210353%20Further%20view%20on%20Idle-%20and%20Connected-mode%20NTN%20mobility%20in%20Rel-18.docx)) and “same PCI” approach (p5 in [R2-2210405](file:///C:\Data\3GPP\Extracts\R2-2210405%20Discussion%20on%20NTN%20mobility%20enhancements.doc)) for connected mode mobility enhancements in NTN

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Tuesday 2022-10-18 1600 UTC

Initial deadline (for rapporteur's summary in [R2-2210862](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210862.zip)): Tuesday 2022-10-18 1800 UTC

[R2-2210862](file:///C:\Data\3GPP\RAN2\Inbox\R2-2210862.zip) [offline-119] HO enhancements Nokia discussion Rel-18 NR\_NTN\_enh

Proposal 1: RAN2 confirms that the sequence of next serving cells can be largely predicted in NTN thanks to the existence of predefined satellite orbits and negligible UE’s mobility in comparison to satellite’s motion.

Proposal 2: RAN2 continues the discussion (e.g. at RAN2#120) on the solution with keeping the same PCI after switching of the satellites. Clarify at least the following:

• RAN1 impact

• The need to perform UL beam switching and/or RA

• Applicability to hard or soft satellite switching

• How the concerns raised in Rel-17 are to be addressed

[R2-2209408](file:///C:\Data\3GPP\Extracts\R2-2209408.docx) Discussion on NTN Mobility Enhancements CATT discussion Rel-18 NR\_NTN\_enh

[R2-2209510](file:///C:\Data\3GPP\Extracts\R2-2209510%20Discussion%20on%20mobility%20and%20service%20continuity%20enhancement.docx) Discussion on mobility and service continuity enhancement vivo discussion

[R2-2209733](file:///C:\Data\3GPP\Extracts\R2-2209733%20Discussion%20of%20NTN-TN%20and%20NTN-NTN%20mobility.doc) Discussion of NTN-TN and NTN-NTN mobility China Telecom discussion Rel-18

[R2-2209805](file:///C:\Data\3GPP\Extracts\R2-2209805_%20NTN%20Mobility%20Enhancement_v0.doc) NTN Mobility Enhancement Apple discussion Rel-18 NR\_NTN\_enh-Core

[R2-2210121](file:///C:\Data\3GPP\Extracts\R2-2210121%20Cell%20reselection%20enhancements%20and%20handover%20signaling%20overhead%20reduction%20.doc) Cell reselection enhancements and handover signaling overhead reduction Xiaomi, CAICT discussion

[R2-2210405](file:///C:\Data\3GPP\Extracts\R2-2210405%20Discussion%20on%20NTN%20mobility%20enhancements.doc) Discussion on NTN mobility enhancements Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh

[R2-2210479](file:///C:\Data\3GPP\Extracts\R2-2210479-Discussion_on_NTN_mobility.doc) Discussion on NTN mobility Sharp discussion Rel-18 NR\_NTN\_enh-Core

[R2-2210629](file:///C:\Data\3GPP\Extracts\R2-2210629_Further%20discussion%20on%20NTN-TN%20and%20NTN-NTN%20mobility.doc) Further discussion on NTN-TN and NTN-NTN mobility NTT DOCOMO, INC. discussion Rel-18

[R2-2210668](file:///C:\Data\3GPP\Extracts\R2-2210668_Discussion%20on%20NTN-NTN%20and%20NTN-TN%20mobility.docx) Discussion on NTN-NTN and NTN-TN mobility ZTE corporation, Sanechips discussion Rel-18

* Revised in [R2-2210789](file:///C:\Data\3GPP\RAN2\Docs\R2-2210789.zip)

[R2-2210789](file:///C:\Data\3GPP\RAN2\Docs\R2-2210789.zip) Discussion on NTN-NTN and NTN-TN mobility ZTE corporation, Sanechips, CAICT discussion Rel-18

[R2-2210732](file:///C:\Data\3GPP\Extracts\R2-2210732%20-%20R18%20NR%20NTN%20Mobility%20enhancements.docx) R18 NR NTN Mobility enhancements Ericsson discussion Rel-18 NR\_NTN\_enh

Withdrawn

R2-2210767 Discussion on cell reselection enhancements for RRC\_IDLE/INACTIVE UEs to reduce UE power consumption PANASONIC discussion