3GPP TSG-RAN WG2 Meeting #120 R2-2213001

Toulouse, France, 14th-18th November, 2022

**Agenda item: 10.2**

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

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

**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 [AT120][000]

Organizational

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

* [AT120][100] Organizational – NR-NTN, IoT-NTN, RedCap and CE 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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Main room** | **Brk 2room** | **Brk 3 room** | **Brk 1 room** |
| **Monday** |  |  |  |  |
| 09:00 – 10:30 | [1], [2], [3] 10-15 min  5.1.1, 5.1.3 NR1516 CP (Johan)  Around 1230:  NR17 (Johan)  - 6.0.1, 6.0.2, 6.0.4 NR17 CP | Breakout to start after NR common items in the main room:  NR151617 UP (Diana)  5.1.2, 6.0.3  NR17  - 6.6 SDT  - 6.5 IIOT URLLC  - 6.18 RACH (Diana)  NR18 (Diana)  - 8.19 NR18 Other: URLLC R18 | Breakout to start after formal opening of meeting in main room:  NR1516 (Kyeongin)  NR17 (Kyeongin). |  |
| 11:00 – 13:00 |
| 14:00 – 16:00 | NR17 (Johan)  - 6.0.1, 6.0.2, 6.0.4 NR17CP  - 6.24 NR17 Other  - 6.16 NPN, 6.23 UDC | NR18 MT-SDT [0.5] (Diana)  NR18 UAV [0.5] (Diana) | NR17 (Kyeongin).  NR18 SL evolution [0.5] (Kyeongin) |
| 16:30 – 18:30 | NR17 (Johan)  - 6.19 feMIMO  - 6.22 MGE  - 6.21 NR17 TEI | NR18 Network Energy Saving [1] (Diana) | NRLTE1516 (Nathan)  - 5.3: Rel-15/16 positioning (R2-2213116)  NR17 (Nathan)  - NR Pos  - 6.11.0 IPA CRs  - 6.11.1 Incoming LSs (R2-2211137, R2-2211143)  - 6.11.2 RRC (R2-2211423, R2-2211543, R2-2212355)  - 6.11.3 LPP (R2-2211259, R2-2211262, R2-2211544, R2-2212234, R2-2212892)  - 6.11.4 MAC (R2-2211545)  - 6.11.5 UE cap (R2-2211546, R2-2212646, R2-2211506)  If time:  - 6.11.1 Stage 2 (38.305 CRs not already addressed by other discussions) |
| **Tuesday** |  |  |  |  |
| 08:30 – 10:30 | NR17 (Johan)  - 6.4 eIAB  - 6.9 ePowSav  - Left-overs from previous day | EUTRA16+ (Tero)  - 4.4: CSI subframe sets ([R2-2211108](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211108.zip), [R2-2212602](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212602.zip), [R2-2212219](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212219.zip)), UAV ([R2-2211187](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211187.zip)), PDCP ([R2-2211386](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211386.zip), [R2-2212763](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212763.zip), [R2-2212766](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212766.zip))  - 7.1: NPUSCH 16QAM ([R2-2212961](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212961.zip)), LTE relay Stage-2 ([R2-2211364](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211364.zip)), ue-ConfigRelease in HO request ([R2-2211751](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211751.zip))  NR17 DCCA (Tero)  - 6.2.1: CHO with SN ([R2-2211791](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211791.zip), [R2-2212255](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212255.zip))  - 6.2.2: Measurements for conditional reconfigs ([R2-2212460](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212460.zip), [R2-2211760](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211760.zip)), SCG deactivation corrections ([R2-2211965](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211965.zip), [R2-2212854](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212854.zip)) | NR17 (Nathan)  - NR pos (overflow from Monday session if needed)  - SL relay  - 6.7.0 IPA CRs  - 6.7.1 Incoming LSs (R2-2211128, R2-2211142, R2-2211147, R2-2211141, and related company proposals)  - 6.7.1 CRs other than 38.300 (R2-2211672, R2-2211749)  - 6.7.2 CP (R2-2213117)  - 6.7.3 UP (R2-2211398, R2-2211605, R2-2211703, R2-2212137, R2-2211503)  If time:  - 6.7.1 Stage 2 (CRs to 38.300) |  |
| 11:00 – 13:00 | 8.19 NR18 Other [0.5] (Johan)  8.12 NR18 Mobile IAB [0.5] (Johan) | NR17 MUSIM (Tero)  - 6.3: NAS busy indication ([R2-2211119](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211119.zip), [R2-2211246](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211246.zip)), UAI and aperiodic gaps ([R2-2211357](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211357.zip)), MUSIM and re-establishment ([R2-2211770](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211770.zip)), miscellaneous corrections ([R2-2212111](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212111.zip), [R2-2212746](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212746.zip))  IF time allows:  - 6.3: Editorial corrections ([R2-2211801](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211801.zip), [R2-2212745](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212745.zip), [R2-2211356](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211356.zip))  NR17 71 GHz (Tero)  - 6.20.1: TCI state for RSSI ([R2-2211148](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211148.zip), [R2-2211705](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211705.zip)), multi-PDSCH scheduling ([R2-2211149](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211149.zip), [R2-2211533](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211533.zip)), CCA config ([R2-2211158](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211158.zip), [R2-2211170](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211170.zip), [R2-2211941](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211941.zip)), miscellaneous corrections ([R2-2211991](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211991.zip), [R2-2211505](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211505.zip)) | NR18 Pos [2] (Nathan)  - 8.2.1 Organizational (R2-2211223, R2-2211130, R2-2211131, R2-2211139, R2-2211145, and related company proposals; TP in R2-2211224)  - 8.2.2 Sidelink positioning (R2-2213118)  - 8.2.3 RAT-dependent integrity (R2-2213119) |
| 14:00 – 16:00 | 8.4 NR18 feMob [2] (Johan)  - Start w 8.4.1 and 8.4.2 LTM | NR17 Slicing (Tero)  - 6.8: Slice-based RACH ([R2-2212696](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212696.zip)), SIB16 and slice-specific reselection priorities ([R2-2212568](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212568.zip)), slice-based reselection ([R2-2211962](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211962.zip), [R2-2211963](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211963.zip), [R2-2212152](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212152.zip), [R2-2212210](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212210.zip), [R2-2212316](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212316.zip), [R2-2212914](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212914.zip))  NR17 QoE (Tero)  - 6.14: Buffer level measurements ([R2-2212218](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212218.zip), [R2-2212464](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212464.zip)), PDU session ID signalling ([R2-2212463](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212463.zip)), clarifying SRB4 config ([R2-2211547](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211547.zip))  NR18 eQoE [0.5] (Tero)  - 8.14.2: QoE configuration ([R2-2212938](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212938.zip), [R2-2212635](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212635.zip), [R2-2212795](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212795.zip), [R2-2211800](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211800.zip))  - 8.14.4: Bearer handling ([R2-2211451](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211451.zip), [R2-2212940](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212940.zip)) | NR18 Pos [2] (Nathan)  - 8.2.3 continued  - 8.2.4 LPHAP (R2-2213120)  - 8.2.5 RedCap (R2-2211465, R2-2212228) |
| 16:30 – 18:30 | NR18 feMob [2] (Johan) | NR18 XR [2] (Tero)  - 8.5.1 : Work plan ([R2-2211595](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211595.zip)), SA2 status ([R2-2211596](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211596.zip)), TR update ([R2-2212908](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212908.zip)), SA2 LS on XR ([R2-2211138](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211138.zip), [R2-2211490](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211490.zip), [R2-2212189](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212189.zip))  - 8.5.2.1 : LCH mapping ([R2-2212471](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212471.zip), [R2-2212534](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212534.zip)), UL PDU set information ([R2-2211177](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211177.zip)), PDU set-based QoS ([R2-2211718](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211718.zip))  - 8.5.2.2 : Delay-awareness in LCP ([R2-2211598](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211598.zip), [R2-2212190](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212190.zip), [R2-2211178](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211178.zip))  - 8.5.2.3 : PDU discard in lower layers ([R2-2211993](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211993.zip)), PDU discard mechanism ([R2-2212129](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212129.zip)), PDU discard usage ([R2-2212331](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212331.zip))  IF time allows:  - 8.5.4.2 : CG enhancements ([R2-2212890](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212890.zip)) | NR17 (Nathan)  - SL relay (overflow from morning session if needed)  NR18 SL relay [1.5] (Nathan) |
| **Wednesday** |  |  |  |  |
| 08:30 – 10:30 | NR18 NCR [0.5] (Sasha)  NR17 MBS (Dawid)  - 6.1.1: LSin  - 6.1.3: R2-2213101 (RRC corrections summary)  - 6.1.3: Remaining issues  - 6.1.4: R2-2213102 (MAC corrections summary) | **R17 Maint (Sergio)**  **Iot NTN**  **- 7.2.1**  **- 7.2.2**  **- 7.2.3: outcome of [104], other issues**  **NR NTN**  **- 6.10.1**  **- 6.10.2**  **- 6.10.3: outcome of [101], [102], other issues** | NR18 IDC [1] (Yi) |  |
| 11:00 – 13:00 | NR17 MBS continuation, if needed (Dawid)  NR 18 MBS [0.5] (Dawid)  - 8.11.1: LSin  - 8.11.4: R2-2213103 (summary of AI 8.11.4)  - 8.11.2 | **R17 Maint (Sergio)**  **RedCap**  **- 6.12.1**  **- 6.12.2: outcome of [103], other issues**  **- 6.12.3**  **Cov Enh**  **- 6.19.2** | NR17 SONMDT (HuNan) |
| 14:00 – 16:00 | NR18 XR [2] (Tero)  - 8.5.4.2 : CG enhancements ([R2-2212890](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212890.zip)), UL assistance ([R2-2212936](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212936.zip)), PDU set retransmissions or PDU concatenation ([R2-2211601](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211601.zip))  - 8.5.4.1: BSR table and other BSR details ([R2-2211600](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211600.zip), [R2-2212517](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212517.zip))  - 8.5.3.2: UE assistance info for power saving ([R2-2211495](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211495.zip), [R2-2212632](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212632.zip))  - 8.5.3.1: DRX usage ([R2-2211180](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211180.zip), [R2-2211775](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211775.zip)), SFN wrap-around ([R2-2212886](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2212886.zip), [R2-2211860](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_120/Docs/R2-2211860.zip)) | **L18 IoT-NTN [1] (Sergio)**  **- 8.6.2.1**  **- 8.6.3.1**  **- 8.6.3.2** | NR18 SONMDT [1] (HuNan) |
| 16:30 – 18:30 | NR18 AIML [1] (Johan) | **NR18 NTN enh [1] (Sergio)**  **- 8.7.2**  **- 8.7.3**  **- 8.7.4.1**  **- 8.7.4.2** | NR18 SL relay [1.5] (Nathan)  - 8.9.1 Organizational (R2-2211120)  - 8.9.4 Multi-path (R2-2211208, R2-2213122)  - 8.9.2 UE-to-UE (R2-2213121)  - 8.9.3 Service continuity (R2-2211786, R2-2212698)  It time:  - 8.9.5 DRX (R2-2212274) |
| **Thursday** |  |  |  |  |
| 08:30 – 10:30 | CB NR1516 (Johan)  CB NR 17 (Johan)  - feMIMO  - Other | CB Diana | CB Kyeongin |  |
| 11:00 – 13:00 | CB NR17 Johan)  - MGE, NPN, UDC | CB Diana | CB Kyeongin |
| 14:00 – 16:00 | CB NR17 (Johan)  - continuation if needed  CB NR18 (Johan)  - Other, Mob | CB EUTRA16+, NR17 Tero (TBD, exact schedule announced on Wednesday) | CB Nathan |
| 16:30 – 18:30 | CB NR18 (Johan)  - Other, Mob IAB | CB NR17, NR18 Tero (TBD, exact schedule announced on Wednesday) | CB Nathan |
| **Friday** |  |  |  |  |
| 08:30 – 10:30 | CB Dawid TBD | **R17 CB (Sergio)**  **RedCap:**  **- Outcome of: [112],[103], [110], [109]**  **NR NTN:**  **- Outcome of [101]** | CB Nathan, Kyeongin |  |
| 11:00 – 13:00 | CB NR18 NCR (Sasha)  CB NR17, NR18 (Johan) | **R17 CB (Sergio)**  **CovEnh: p2 in R2-2211468**  **IoT NTN:**  **- Outcome of [104],[107],[106],[105],[113]**  **L18 IoT NTN:**  **NR NTN (cont):**  **- Outcome of [108], [102] any CP leftover issues** | CB Yi  CB HuNan |
| 14:00 – 16:00 | CB NR17, NR18 (Johan) | **CB Tero (14:00-14:30)**  **R17 CB (Sergio):**  **L18 IoT NTN :**  **- outcome of [111], 8.6.3.2 (if time allows)**  **N18 NR NTN:**  **- 8.74.1, 8.7.4.2 (if time allows)** | CB HuNan |
| 16:00 – 17:00 | Comebacks CP, (Johan) |  |  |  |

List and status of offline email discussions

NOTE: No offline email discussions will be kicked off before Monday Nov 14th, 09:00 CET

* [AT120][101][NR NTN] RNA across TN/NTN (Qualcomm)

Updated scope: Discuss proposals related to RNA across TN/NTN, also on whether inactive mode support should be optional or mandatory with IoT bit

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

* List of proposals for agreement (if any)
* List of proposals that require online discussions

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET (F2F discussion is invited)

Deadline for rapporteur's summary (in R2-2213019): Friday 2022-11-18 06:00 CET

Status: ongoing

* [AT120][102][NR NTN] RRC corrections (Ericsson)

Updated scope: Discuss the need for RRC changes on Epoch time, also based on RAN1 decisions (possibly include other leftover RRC issues)

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

Deadline for companies’ feedback: Friday 2022-11-18 06:00 CET

Deadline for rapporteur's summary (in R2-2213026): Friday 2022-11-18 09:00 CET

Status: ongoing

* [AT120][103][RedCap] CP corrections (Ericsson)

Initial scope: Discuss proposals/CRs related to PDCCH Config, NeedForGaps and margin for 1Rx UE

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

**F2F offline time**: **Monday 2022-11-14 16:00-16:30 (coffee break) in Brk1** (then the discussion can further continue via email if needed)

Deadline for rapporteur's summary (in R2-2213013): Wednesday 2022-11-16 06:00 CET

Status: ongoing

* [AT120][104][IoT NTN] RRC corrections (Huawei)

Updated scope: Discuss the need for RRC changes on Epoch time, also based on RAN1 decisions

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

Deadline for companies’ feedback: Friday 2022-11-18 09:00 CET

Deadline for rapporteur's summary (in R2-2213027): Friday 2022-11-18 11:00 CET

Status: ongoing

* [AT120][105][IoT-NTN] Stage 2 CR (Ericsson)

Scope: Discuss Stage 2 changes based on [R2-2212944](file:///C:\Data\3GPP\Extracts\R2-2212944%20-%20R17%20IoT%20NTN%20stage%202%20issues.docx)

Intended outcome: Updated Stage 2 CR

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET

Deadline for rapporteur's CR (in R2-2213015): Friday 2022-11-18 06:00 CET (might slip to a post-meeting discussion)

Status: ongoing

* [AT120][106][IoT-NTN] MAC corrections (Ericsson)

Scope: continue to discuss MAC changes based on [R2-2212943](file:///C:\Data\3GPP\Extracts\R2-2212943%20-%20R17%20IoT%20NTN%20User%20Plane%20issues.docx)

Intended outcome: Updated MAC CR

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET (F2F discussion is invited)

Deadline for MAC CR (in R2-2213016): Friday 2022-11-18 06:00 CET

Status: ongoing

* [AT120][107][IoT-NTN] new TAU trigger (QC)

Scope: continue the discussion on new TAU trigger

Intended outcome: list of agreeable proposals

**F2F offline time: Wednesday afternoon coffee break in Brk2**

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET

Deadline for rapporteur's summary (in R2-2213017): Friday 2022-11-18 06:00 CET

Status: ongoing

* [AT120][108][NR-NTN] Stage 2 CR (Ericsson)

Scope: Discuss Stage 2 changes based on submitted contributions

Intended outcome: Updated Stage 2 CR

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET

Deadline for rapporteur's summary (in R2-2213032): Friday 2022-11-18 06:00 CET (might slip to a post-meeting discussion)

Status: ongoing

* [AT120][109][RedCap] CG-SDT support (ZTE)

Scope: Discuss CD-SDT support for RedCap

Intended outcome: list of agreeable proposals

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET (F2F discussion is invited)

Deadline for rapporteur's summary (in R2-2213022): Friday 2022-11-18 08:00 CET

Status: ongoing

* [AT120][110][RedCap] MAC corrections (vivo)

Scope: Discuss MAC corrections

Intended outcome: list of agreeable proposals

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET

Deadline for rapporteur's summary (in R2-2213023): Friday 2022-11-18 08:00 CET

Status: ongoing

* [AT120][111][IoT-NTN\_Enh] Measurements Enhancements for eMTC (Ericsson)

Scope: continue to the discussion on measurement enhancements in connected mode for eMTC

Intended outcome: list of agreeable proposals

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET (F2F discussion is invited)

Deadline for rapporteur's summary (in R2-2213024): Friday 2022-11-18 06:00 CET

Status: ongoing

* [AT120][112][RedCap] Stage 2 CR (Nokia)

Scope: Discuss Stage 2 changes based on meeting agreements

Intended outcome: Agreeable Stage 2 CR

Deadline for companies' feedback: Thursday 2022-11-17 22:00 CET

Deadline for rapporteur's summary (in R2-2213020): Friday 2022-11-18 08:00 CET

Status: ongoing

* [AT120][113][IoT NTN] LS to RAN4 (Huawei)

Scope: Discuss LS to RAN4

Intended outcome: LS to RAN4

Deadline for companies’ feedback: Friday 2022-11-18 09:00 CET

Deadline for reply LS (in R2-2213018): Friday 2022-11-18 11:00 CET

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: 3 tdocs

### 6.10.0 In-principle agreed CRs

CRs AIP from RAN2#119bis-e.

Stage 2 CR

[R2-2212960](file:///C:\Data\3GPP\RAN2\Docs\R2-2212960.zip) Corrections to TS 38.300 for Rel-17 NR NTN Thales CR Rel-17 38.300 17.2.0 0572 2 F NR\_NTN\_solutions-Core R2-2211046

* Revised in R2-2213032 to reflect meeting agreements

R2-2213032 Corrections to TS 38.300 for Rel-17 NR NTN Thales, Ericsson CR Rel-17 38.300 17.2.0 0572 3 F NR\_NTN\_solutions-Core

MAC CR

[R2-2212335](file:///C:\Data\3GPP\Extracts\R2-2212335%20NTN%20Corrections%20for%20TS%2038321_%5bR2-119bise%5d.docx) Corrections to Release-17 NR Non-Terrestrial Networks (NTN): RAN2#119bis-e InterDigital CR Rel-17 38.321 17.2.0 1446 1 F NR\_NTN\_solutions-Core R2-2210868

RRC CR

[R2-2212779](file:///C:\Data\3GPP\Extracts\R2-2212779%2038331%20Rel-17%20CR%20NR%20NTN.docx) RRC corrections for Rel-17 NR NTN Ericsson CR Rel-17 38.331 17.2.0 3570 1 F NR\_NTN\_solutions-Core R2-2211018

* Revised in R2-2213028 to reflect meeting agreements

R2-2213028 RRC corrections for Rel-17 NR NTN Ericsson CR Rel-17 38.331 17.2.0 3570 2 F NR\_NTN\_solutions-Core

38.304 CR

[R2-2212607](file:///C:\Data\3GPP\Extracts\R2-2212607.docx) Idle mode corrections for Rel-17 NR NTN ZTE Corporation, Samsung, Sanechips CR Rel-17 38.304 17.2.0 0296 1 F NR\_NTN\_solutions-Core R2-2210869

* Revised in [R2-2212820](file:///C:\Data\3GPP\Extracts\R2-2212820.docx)

[R2-2212820](file:///C:\Data\3GPP\Extracts\R2-2212820.docx) Idle mode corrections for Rel-17 NR NTN ZTE Corporation, Samsung, Sanechips CR Rel-17 38.304 17.2.0 0296 2 F NR\_NTN\_solutions-Core [R2-2212607](file:///C:\Data\3GPP\Extracts\R2-2212607.docx)

### 6.10.1 General and Stage 2 corrections

LSs, rapporteur inputs and Stage 2 corrections. Rapporteur inputs and other pre-assigned documents in this AI do not count towards the tdoc limitation.

Incoming LSs

[R2-2211169](file:///C:\Data\3GPP\Extracts\R2-2211169_R4-2217175.docx) Reply LS on measurement gap enhancements for NTN (R4-2217175; contact: Apple) RAN4 LS in Rel-17 NR\_NTN\_solutions, NR\_MG\_enh To:RAN2

* Noted

Stage 2 CRs

[R2-2211570](file:///C:\Data\3GPP\Extracts\38300_CR0577_(Rel-17)_R2-2211570%20RRC%20INACTIVE%20in%20NTN.docx) Clarification on support of TN NTN mobility during RRC\_INACTIVE Qualcomm Incorporated CR Rel-17 38.300 17.2.0 0577 - F NR\_NTN\_enh

* Initially discussed in offline 101

[R2-2211326](file:///C:\Data\3GPP\Extracts\R2-2211326%20Correction%20on%20Stage-2%20descriptions%20for%20NR%20NTN.docx) Correction on Stage-2 descriptions for NR NTN vivo CR Rel-17 38.300 17.2.0 0573 - F NR\_NTN\_solutions-Core

* Discussed in offline 108

[R2-2211340](file:///C:\Data\3GPP\Extracts\R2-2211340-%20NTN%20stage-2%20correction.docx) NTN Stage-2 correction OPPO CR Rel-17 38.300 17.2.0 0574 - F NR\_NTN\_solutions-Core

* Discussed in offline 108

[R2-2212444](file:///C:\Data\3GPP\Extracts\R2-2212444%206.10.1%20Discussion%20on%20Stage%202%20corrections.docx) Discussion on Stage 2 corrections Samsung Research America discussion Rel-17 NR\_NTN\_solutions-Core

* Discussed in offline 108

[R2-2212952](file:///C:\Data\3GPP\Extracts\R2-2212952%20-%20R17%20NR%20NTN%20stage%202%20issues.docx) R17 NR NTN stage 2 issues Ericsson discussion Rel-17 NR\_NTN\_solutions

* Discussed in offline 108
* [AT120][108][NR-NTN] Stage 2 CR (Ericsson)

Scope: Discuss Stage 2 changes based on submitted contributions

Intended outcome: Updated Stage 2 CR

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET

Deadline for rapporteur's CR (in R2-2213032): Friday 2022-11-18 06:00 CET (might slip to a post-meeting discussion)

### 6.10.2 UP corrections

[R2-2212950](file:///C:\Data\3GPP\Extracts\R2-2212950%20-%20R17%20NR%20NTN%20MAC%20issues.docx) R17 NR NTN MAC issues Ericsson discussion Rel-17 NR\_NTN\_solutions

* IDC thinks p1 is editorial but ok to have, but maybe p2 is not needed.
* QC thinks that also p1 is not needed
* Not pursued

Moved here from 7.2.3

[R2-2211516](file:///C:\Data\3GPP\Extracts\R2-2211516%20Clarification%20on%20UE%20behaviour%20when%20validity%20timer%20expires.doc) Clarification on UE behaviour when validity timer expires Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

* CB Friday if time allows

### 6.10.3 CP corrections

RNA configuration across TN and NTN

[R2-2211514](file:///C:\Data\3GPP\Extracts\R2-2211514%20Discussion%20on%20RNA%20configuration%20across%20TN%20and%20NTN%20cells.doc) Discussion on RNA configuration across TN and NTN cells Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

* Discussed in offline 101

[R2-2211568](file:///C:\Data\3GPP\Extracts\R2-2211568%20TN%20NTN%20mobility%20RRC%20inactive.doc) Discussion for clarification on TN NTN mobility in RRC\_INACTIVE Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

* Discussed in offline 101

[R2-2211569](file:///C:\Data\3GPP\Extracts\38331_CR3620_(Rel-17)_R2-2211569%20RRC%20INACTIVE%20in%20NTN.docx) Clarification on TN NTN mobility during RRC\_INACTIVE Qualcomm Incorporated CR Rel-17 38.331 17.2.0 3620 - F NR\_NTN\_solutions-Core

* Discussed in offline 101

Offline discussion 101 will also consider the following contributions submitted to AI 6.0.1:

[R2-2211912](file:///C:\Data\3GPP\Extracts\R2-2211912%20Discussion%20on%20SDT%20&%20RNA%20Configuration%20cross%20NTN_TN%20Cells.doc) Discussion on SDT & RNA Configuration cross NTN/TN Cells FGI discussion

[R2-2211914](file:///C:\Data\3GPP\Extracts\R2-2211914%20Draft%20LS%20on%20RNA%20Configuration%20cross%20NTN_TN%20Cells.docx) DRAFT LS on RNA Configuration cross NTN/TN Cells FGI LS out To:RAN3

[R2-2211729](file:///C:\Data\3GPP\Extracts\R2-2211729_Discussion%20on%20SDT%20in%20TN%20and%20NTN%20mixed%20RNA_v0.doc) Discussion on SDT in TN and NTN mixed RNA Apple discussion Rel-17 NR\_NTN\_solutions-Core, NR\_SmallData\_INACTIVE-Core

[R2-2212127](file:///C:\Data\3GPP\Extracts\R2-2212127.docx) Discussion on TN-NTN mobility in RRC INACTIVE and SDT Capability Qualcomm Incorporated discussion Rel-17 NR\_SmallData\_INACTIVE-Core, NR\_NTN\_solutions-Core

[R2-2212735](file:///C:\Data\3GPP\Extracts\R2-2212735%20RNA%20configuration%20across%20TN%20cell%20and%20NTN%20cell.docx) RNA configuration across TN cell and NTN cell LG Electronics Inc. discussion Rel-17 NR\_NTN\_solutions-Core

* [AT120][101][NR NTN] RNA across TN/NTN (Qualcomm)

Scope: Discuss proposals related to RNA across TN/NTN

Intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions

F2F offline time: Tuesday 2022-11-15 10:30-11:00 (coffee break) in Brk1 (then the discussion can further continue via email if needed)

Deadline for rapporteur's summary (in R2-2213011): Wednesday 2022-11-16 06:00 CET

Updated scope: Discuss proposals related to RNA across TN/NTN, also on whether inactive mode support should be optional or mandatory with IoT bit

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

* List of proposals for agreement (if any)
* List of proposals that require online discussions

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET (F2F discussion is invited)

Deadline for rapporteur's summary (in R2-2213019): Friday 2022-11-18 06:00 CET

[R2-2213011](file:///C:\Data\3GPP\RAN2\Inbox\R2-2213011.zip) [offline-101] RNA across NT/NTN Qualcomm discussion Rel-17 NR\_NTN\_solutions-Core

Following agreement was made based on the F2F offline discussion.

- If UE does not support RRC\_INACTIVE in NTN cell, UE should go to RRC\_IDLE upon selecting the new NTN cell given UE was in RRC\_INACTIVE in TN. The UE performs NAS recovery considering this is the case of UE changing its state autonomously (can be further discussed other solution for UE not to perform NAS recovery in NTN).

- FFS whether this applies to only case of “TN and NTN cells are in the same RNA”.

- FFS whether/how it needs to be clarified in specification.

- Samsung wonders what happens in the other direction

- ZTE thinks that in 306 there is an IoT bit for TN and it was copied as a capability bit for NTN, so we could update that one as an IOT bit for NTN as well. Mediatek agrees we could go for this

- Samsung is ok to make Inactive mode support mandatory for NTN, with IoT bit

- QC thinks the problem would be there even if this is an IoT bit. ZTE agrees the problem would be there but since this would only happen during IoT we don’t need to specify the behaviour. ZTE would prefer to make it an Iot bit and avoid impacts to CT1

- Ericsson thinks we need to further discuss this

- Nokia would prefer to have it mandatory.

* Continue in offline 101, also on whether inactive mode support should be optional or mandatory with IoT bit

[R2-2213019](file:///C:\Data\3GPP\RAN2\Inbox\R2-2213019.zip) [offline-101] RNA across NT/NTN – second round Qualcomm discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1 Update TS 38.306 for support of RRC inactive state in NTN (i.e., mandatory with UE capability signalling).

* Agreed

Proposal 2 For UEs signaling inactiveStateNTN-r17 = 0 for NTN, current understanding is that the UEs in RRC\_INACTIVE will autonomously go to RRC IDLE upon moving from TN to NTN and monitor CN paging, i.e., no NAS recovery from UE. No specification change.

* VDF thinks this is wrong and we need to do NAS recovery. ZTE agrees NAS recovery is needed if the UE goes to idle, but wonders if this is needed: the UE could also stay in inactive, send resume. But also ok to say the UE goes to idle
* Intel agrees with the first part but this will immediately trigger NAS recovery
* Google is not sure the UE can immediately monitor for CN paging.
* HW agrees with p2
* RAN2 understands that for UEs signaling inactiveStateNTN-r17 = 0 for NTN, current understanding is that the UEs in RRC\_INACTIVE will autonomously go to RRC IDLE upon moving from TN to NTN and perform NAS recovery. Add a note to RRC to cover this case (IoT bit set to 0) when describing acquisition of SIB1

Proposal 3 Discuss the options to clarify possible confusions (1) check further if any further clarification may be needed and come back in the next meeting (2) agree now to add clarification for spotted possible confusions (3) UE always moves to RRC\_IDLE upon selecting NTN cell in RRC\_INACTIVE.

Proposal 4 If Proposal 3 option (2) is agreed, update specification for

(1) the UE should not initiate SDT if not supported in NTN but the UE has stored sdt-config in RRC spec,

(2) clarify TN and NTN networks are considered to be of same NR RAT type from RAN2 specification point of view

Proposal 5 Also update TS 38.306 to add description for ra-SDT-NTN and srb-SDT-NTN. Also clarify stage 2 specification that TN NTN mobility in RRC\_INACTIVE is supported.

Epoch time and validity timer handling

[R2-2211308](file:///C:\Data\3GPP\Extracts\R2-2211308%20Corrections%20on%20validity%20of%20SIB19-final.docx) Corrections on validity of SIB19 CATT CR Rel-17 38.331 17.2.0 3580 - F NR\_NTN\_solutions-Core

[R2-2211328](file:///C:\Data\3GPP\Extracts\R2-2211328%20Correction%20on%20T430%20handling%20in%20TS%2038.331.docx) Correction on T430 handling in TS 38.331 vivo CR Rel-17 38.331 17.2.0 3582 - F NR\_NTN\_solutions-Core

[R2-2211339](file:///C:\Data\3GPP\Extracts\R2-2211339%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 3583 - F NR\_NTN\_solutions-Core

[R2-2212065](file:///C:\Data\3GPP\Extracts\R2-2212065_CR3669_Correction%20for%20timer%20T430%20upon%20going%20to%20RRC_IDLE%20v2.0.docx) Correction for timer T430 upon going to RRC\_IDLE Lenovo Information Technology CR Rel-17 38.331 17.2.0 3669 - F NR\_NTN\_solutions-Core

[R2-2212446](file:///C:\Data\3GPP\Extracts\R2-2212446%206.10.3%20Discussion%20on%20RRC%20corrections.docx) Discussion on RRC corrections Samsung Research America discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2212805](file:///C:\Data\3GPP\Extracts\R2-2212805%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 38.331 17.2.0 3737 - F NR\_NTN\_solutions-Core

[R2-2212833](file:///C:\Data\3GPP\Extracts\R2-2212833%20Corrections%20on%20epochTime.doc) Corrections on epochTime Huawei, HiSilicon CR Rel-17 38.331 17.2.0 3738 - F NR\_NTN\_solutions-Core

[R2-2212258](file:///C:\Data\3GPP\Extracts\R2-2212258%20On%20T430%20and%20epochTime%20-%20Final%20Clarifications.docx) On T430 and epochTime - Final Clarifications Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2212947](file:///C:\Data\3GPP\Extracts\R2-2212947%20-%20Discussion%20on%20epoch%20time%20validity%20and%20T430%20start%20end%20description.docx) Discussion on epoch time, validity and T430 start/end description Ericsson discussion Rel-17 NR\_NTN\_solutions

* All documents to be discussed in offline 102

Measurement gaps

[R2-2212445](file:///C:\Data\3GPP\Extracts\R2-2212445%206.10.3%20Discussion%20on%20concurrent%20measurement%20gaps.docx) Discussion on concurrent measurement gaps Samsung Research America discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2211341](file:///C:\Data\3GPP\Extracts\R2-2211341-RRC%20correction%20on%20NTN%20measurements.docx) RRC correction on NTN measurements OPPO, ZEKU CR Rel-17 38.331 17.2.0 3584 - F NR\_NTN\_solutions-Core

[R2-2211727](file:///C:\Data\3GPP\Extracts\R2-2211727_38.331CR3637_(Rel-17)_Clarification%20on%20the%20concurrent%20measurement%20gap%20configuration.docx) Clarification on the concurrent measurement gap configuration Apple CR Rel-17 38.331 17.2.0 3637 - F NR\_NTN\_solutions-Core

[R2-2212256](file:///C:\Data\3GPP\Extracts\R2-2212256%20CSI-RSs%20for%20L3%20Measurements%20in%20Rel-17%20NTN.docx) CSI-RSs for L3 Measurements in Rel-17 NTN Nokia, Nokia Shanghai Bell CR Rel-17 38.331 17.2.0 3686 - F NR\_NTN\_solutions-Core

* All documents to be discussed in offline 102
* [AT120][102][NR NTN] RRC corrections (Ericsson)

Initial scope: Discuss proposals/CRs on Epoch time and validity timer handling issues (apart from those pending RAN1 feedback) and on measurement gaps

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

Deadline for companies’ feedback: Tuesday 2022-11-15 20:00 CET

Deadline for rapporteur's summary (in R2-2213012): Wednesday 2022-11-16 00:00 CET

Updated scope: Discuss the need for RRC changes on Epoch time, also based on RAN1 decisions (possibly include other leftover RRC issues)

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

Deadline for companies’ feedback: Friday 2022-11-18 06:00 CET

Deadline for rapporteur's summary (in R2-2213026): Friday 2022-11-18 09:00 CET

[R2-2213012](file:///C:\Data\3GPP\RAN2\Inbox\R2-2213012.zip) [offline-102] RRC corrections Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1 Agree the following change:

Upon receiving SIB19, the UE in RRC\_CONNECTED shall:

1> start or restart T430 for serving cell with the timer value set to ntn-UlSyncValidityDuration from the subframe indicated by epochTime;

* Agreed

Proposal 2 RAN2 to conclude SIB19 is cell specific in Release 17

* ZTE thinks we don’t need restrictions, this is up to NW implementation. Vivo agrees
* CATT thinks p2 is needed
* LG agrees on this for Rel-17
* Nokia wonders about the use case of making this area specific.
* Oppo thinks we never discussed this to be area specific and we should not discuss this at the last minute.
* QC wonders whether we need to clarify anything. Vivo thinks that not saying this means this is left as NW implementation
* We don’t clarify in the specs whether SIB19 is cell specific or area specific. This is left to NW implementation

Proposal 3 Consider Samsung approach on combining the proposals:

|  |  |  |  |
| --- | --- | --- | --- |
| T430 | Start or restart from the subframe indicated by epochTime upon reception of SIB19, or upon reception of RRCReconfiguration message including reconfigurationWithSync, or upon conditional reconfiguration execution i.e. when applying a stored RRCReconfiguration message including reconfigurationWithSync | Stop T430, if it is running, for the source cell upon reception of RRCReconfiguration message including reconfigurationWithSync, or upon conditional reconfiguration execution i.e. when applying a stored RRCReconfiguration message including reconfigurationWithSync. | Perform the actions as specified in 5.2.2.6. |

* Oppo thinks the text is misleading and we should clarify that the start is for the target cell for HO and CHO
* Agreed, with the clarification that the start is for the target cell for HO and CHO

Proposal 4 Agree R2-2212065 Correction for timer T430 upon going to RRC\_IDLE Lenovo

1> stop all timers that are running except T302, T320, T325, T330, T331 ~~and~~ T400 and T430;

NOTE: It is left to UE implementation whether to stop T430, if running, when going to RRC\_IDLE.

* Vivo thinks the note cannot change the normative text
* QC prefers to have a normative text saying that the UE may stop T430 when going in RRC Idle or Inactive
* Samsung would like to further check for Inactive state
* Add T430 to the list in the “shall statement” and add a second normative sentence saying that the UE may stop T430 when going in RRC Idle and Inactive

Proposal 5 Agree R2-2211328 Correction on T430 handling in TS 38.331 vivo (to start T430 after AS)

Proposal 6 Consider the following merged compromise:

epochTime

Indicate the epoch time for the NTN assistance information. When explicitly provided through SIB, or through dedicated signaling, The epochTime is the starting time of a DL sub-frame, indicated by a SFN and a sub-frame number signaled together with the assistance information. For serving cell, the sfn indicates the current SFN or the next upcoming SFN after the frame where the message indicating the epochTime is received. For neighbour cell, the sfn indicates the SFN nearest to the frame where the message indicating the epochTime is received~~Denoted by f0 the frame where the message indicating the epochTime is received and by f1 the frame containing the DL sub-frame defining the epochTime. For serving cell, the UE considers f1 to be f0 if the indicated SFN equals the SFN of f0, or the next frame with the indicated SFN if the indicated SFN differs from the SFN of f0. For neighbor cell, the UE considers f1 to be the frame, with the indicated SFN, that is nearest to f0.~~ The reference point for epoch time of the serving ~~satellite~~ NTN payload ephemeris and Common TA parameters is the uplink time synchronization reference point. If this field is absent, the epoch time is the end of SI window where this SIB19 is scheduled. This field is mandatory present when provided in dedicated configuration. If this field is absent in ntn-Config provided via NTN-NeighCellConfig the UE uses epoch time ~~from~~ of the serving ~~satellite ephemeris~~cell, otherwise the field is based on the timing of the serving cell, i.e. the SFN and sub-frame number indicated in this field refers to the SFN and sub-frame of the serving cell. In case of handover or conditional handover, this field is based on the timing of the target cell, i.e. the SFN and sub-frame number indicated in this field refers to the SFN and sub-frame of the target cell.~~, and~~ For the target cell, the UE considers ~~the target cell~~ epoch time, indicated by the SFN and sub-frame number in this field, to be the target cell frame nearest to the target cell frame in which the message indicating the epoch time is received. This field is excluded when determining changes in system information, i.e. changes to epochTime should neither result in system information change notifications nor in a modification of valueTag in SIB1.

Proposal 7 Agree R2-2211341 M RRC correction on NTN measurements OPPO, ZEKU

Proposal 8 Add restriction in field description that the field associatedMeasGapCSIRS2 is not configured in this release.

Proposal 9 Agree on CR R2-2211370 Correction on frequency band indicator Mediatek

R2-2213026 [offline-102] RRC corrections – second round Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2211408](file:///C:\Data\3GPP\Extracts\38331_CR3594_(Rel-17)_R2-2211408%20Clarification%20on%20NR%20NTN%20trackingAreaList.docx) Clarification on NR NTN trackingAreaList Intel Corporation CR Rel-17 38.331 17.2.0 3594 - F NR\_NTN\_solutions-Core

Neighbour cell list

[R2-2211371](file:///C:\Data\3GPP\Extracts\R2-2211371%20Discussion%20on%20UE%20behaviour%20based%20on%20the%20neighbour%20cell%20information%20between%20SIB3,%20SIB4,%20measObjectNR%20and%20SIB19_v2.docx) UE behaviour based on the neighbor cell information between SIB3, SIB4, measObjectNR and SIB19 Mediatek Inc. discussion Rel-17

[R2-2212257](file:///C:\Data\3GPP\Extracts\R2-2212257%20NR%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 1 F NR\_NTN\_solutions-Core R2-2210346

[R2-2212277](file:///C:\Data\3GPP\Extracts\R2-2212277%20Further%20consideration%20on%20NTN%20neighbour%20cell%20list%20in%20SIB19.docx) Further consideration on NTN neighbour cell list in SIB19 ZTE Corporation, Sanechips discussion R2-2210663

[R2-2212278](file:///C:\Data\3GPP\Extracts\R2-2212278_REL-17_38.331_CR3688_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 3688 - F NR\_NTN\_solutions-Core

[R2-2212834](file:///C:\Data\3GPP\Extracts\R2-2212834%20CR%20to%2038.331%20on%20neighbour%20cell%20ephemeris.docx) CR to 38.331 on neighbour cell ephemeris Huawei, HiSilicon CR Rel-17 38.331 17.2.0 3739 - F NR\_NTN\_solutions-Core

HO configuration

[R2-2212692](file:///C:\Data\3GPP\Extracts\R2-2212692_NTN%20Configuration%20at%20Handover%20and%20CHO.docx) NTN Configuration at Handover and CHO Sequans Communications discussion Rel-17 38.331 NR\_NTN\_solutions-Core R2-2210729

[R2-2211807](file:///C:\Data\3GPP\Extracts\R2-2211807%20Clarification%20on%20NTN%20configuration%20for%20handover.docx) Clarification on NTN configuration for handover ASUSTeK discussion Rel-17 38.331 NR\_NTN\_solutions-Core

IoT bit for inter satellite measurement

[R2-2212317](file:///C:\Data\3GPP\Extracts\R2-2212317%20Discussion%20on%20IOT%20bit%20for%20inter%20satellite%20measurement_v0.docx) Discussion on IOT bit for inter satellite measurement Mediatek India Technology Pvt. Discussion

[R2-2211368](file:///C:\Data\3GPP\Extracts\38331_CR3590_(Rel-17)_R2-2211368%20IOT%20bit%20for%20inter%20satellite%20measurement_v1.docx) IOT bit for inter satellite measurement Mediatek Inc. CR Rel-17 38.331 17.2.0 3590 - F NR\_NTN\_solutions-Core

[R2-2211369](file:///C:\Data\3GPP\Extracts\38306_CR0829_(Rel-17)_R2-2211369%20IOT%20bit%20for%20inter%20satellite%20measurement_v1.docx) IOT bit for inter satellite measurement Mediatek Inc. CR Rel-17 38.306 17.2.0 0829 - F NR\_NTN\_solutions-Core

UE capabilities

[R2-2211406](file:///C:\Data\3GPP\Extracts\R2-2211406%20Draft%20331%20CR%20for%20NR%20NTN%20UE%20capabilities.docx) Draft 331 CR for NR NTN UE capabilities Intel Corporation, Qualcomm Inc. draftCR Rel-17 38.331 17.2.0 F NR\_NTN\_solutions-Core

[R2-2211407](file:///C:\Data\3GPP\Extracts\R2-2211407%20Draft%20306%20CR%20for%20NR%20NTN%20UE%20capabilities.docx) Draft 306 CR for NR NTN UE capabilities Intel Corporation, Qualcomm Inc. draftCR Rel-17 38.306 17.2.0 F NR\_NTN\_solutions-Core

[R2-2211728](file:///C:\Data\3GPP\Extracts\R2-2211728_38.306CR0834_(Rel-17)_Clarification%20on%20NTN%20RRM%20measurement%20capability.docx) Clarification on NTN RRM measurement capability Apple CR Rel-17 38.306 17.2.0 0834 - F NR\_NTN\_solutions-Core

Propagation delay difference report

[R2-2211894](file:///C:\Data\3GPP\Extracts\R2-2211894%20Discussion%20on%20propagation%20delay%20difference%20reporting%20in%20TS%2038.331.docx) Discussion on propagation delay difference reporting in TS 38.331 vivo discussion

[R2-2212661](file:///C:\Data\3GPP\Extracts\R2-2212661%20Extend%20the%20neighbour%20cells%20number-final.docx) Extend the neighbour cells number for propagation delay difference reporting CATT CR Rel-17 38.331 17.2.0 3721 - F NR\_NTN\_solutions-Core

Other

[R2-2211370](file:///C:\Data\3GPP\Extracts\38331_CR3591_(Rel-17)_R2-2211370%20Correction%20on%20frequency%20band%20indicator_v1.docx) Correction on frequency band indicator Mediatek Inc. CR Rel-17 38.331 17.2.0 3591 - F NR\_NTN\_solutions-Core

* Discussed in offline 102

[R2-2212662](file:///C:\Data\3GPP\Extracts\R2-2212662%20Discussion%20on%20leftover%20issues-final.docx) Discussion on leftover issues CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2212895](file:///C:\Data\3GPP\Extracts\38331_CR3555_(Rel-17)_R2-2212895%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 1 F NR\_NTN\_solutions-Core R2-2210646

[R2-2212804](file:///C:\Data\3GPP\Extracts\R2-2212804%20Correction%20on%20coarse%20UE%20location%20reporting%20for%20TS%2038.300.docx) Correction on coarse UE location reporting for TS 38.300 Xiaomi, CAICT CR Rel-17 38.300 17.2.0 0594 - F NR\_NTN\_solutions-Core

Withdrawn

R2-2211327 Correction on propogation delay reporting for NR NTN in TS 38.331 vivo CR Rel-17 38.331 17.2.0 3581 - F NR\_NTN\_solutions-Core Withdrawn

## 6.12 Reduced Capability

(NR\_redcap-Core; leading WG: RAN1; REL-17; WID: [RP-211574](file:///C:\Data\3GPP\archive\RAN\RAN%2392\Tdocs\RP-211574.zip))

Tdoc Limitation: 4 tdocs

### 6.12.1 General and Stage 2 corrections

LSs, rapporteur inputs and Stage 2 corrections. Rapporteur inputs and other pre-assigned documents in this AI do not count towards the tdoc limitation.

Incoming LSs

[R2-2211115](file:///C:\Data\3GPP\Extracts\R2-2211115_R4-2214484.docx) Reply LS on configuring margin for 1 Rx RedCap Ues (R4-2214484; contact: Ericsson) RAN4 LS in Rel-17 NR\_redcap-Core To:RAN2

* Noted

[R2-2211116](file:///C:\Data\3GPP\Extracts\R2-2211116_R4-2214487.docx) Reply LS on RRM relaxation for Redcap (R4-2214487; contact: vivo) RAN4 LS in Rel-17 NR\_redcap-Core To:RAN2

* Noted

[R2-2212985](file:///C:\Data\3GPP\RAN2\Inbox\R2-2212985.zip) LS on reference SSB for s-MeasureConfig checking (R4-2218138; contact: Apple) RAN4 LS in Rel-17 NR\_redcap-Core To:RAN2

* HW thinks we can confirm this and we can invite them to check our latest spec
* Vivo also confirms but thinks our spec is sufficiently clear
* MTK has the same understanding and wonders whether we already have a blanket statement already covering this
* QC also agrees, not sure we need to change the spec but can accept that
* ZTE thinks the current spec is already
* RAN2 confirms the RAN4 understanding
* Reply to the LS accordingly and explaining how to interpret our spec, with no actual change to our spec
* [POST120][102][RedCap] LS to RAN4 (Apple)

Scope: discuss reply LS to RAN4 on reference SSB for s-MeasureConfig checking

Intended outcome: Reply LS

Deadline: short

Stage 2 CRs

[R2-2211479](file:///C:\Data\3GPP\Extracts\38.300_CR0576(Rel-17)_%20R2-2211479_Correction%20on%20TS%2038.300%20for%20RedCap.docx) Correction on TS 38.300 for RedCap vivo CR Rel-17 38.300 17.2.0 0576 - F NR\_redcap-Core Late

* ZTE/Ericsson/HW/Nokia are ok with removing “only” but not with the addition of the two sentences.
* ZTE/Nokia are also fine with the last change. Ericsson thinks we need to clarify the behaviour in RRC Connected first.
* Agree the removal of “only” and the purely editorial change
* Come back to the last change after the RRC spec is clarified
* Agreed changes will be added to the rapporteur CR

[R2-2212378](file:///C:\Data\3GPP\Extracts\R2-2212378%20Correction%20on%20applicability%20of%20NCD-SSB%20in%2038.300.docx) Correction on applicability of NCD-SSB in Stage-2 Nokia, Nokia Shanghai Bell CR Rel-17 38.300 17.2.0 0586 - F NR\_redcap-Core

* Ericsson agrees with the intention and suggests to revise as “and RA resource selection”
* ZTE thinks this is not essential and not needed. There are other cases and not all of them are listed.
* HW agrees with the intention but no need to modify the spec
* QC would like to capture this. Vivo agrees.
* Agreed as “and RA resource selection” and added to the rapporteur CR

[R2-2212379](file:///C:\Data\3GPP\Extracts\R2-2212379%20Miscellaneous%20corrections%20for%20RedCap%20in%2038.300.docx) Miscellaneous RedCap corrections in stage-2 Nokia (Rapporteur), Huawei CR Rel-17 38.300 17.2.0 0587 - F NR\_redcap-Core

* Change is agreed
* Revised in R2-2213020

[R2-2213020](file:///C:\Data\3GPP\RAN2\Inbox\R2-2213020.zip) Miscellaneous RedCap corrections in stage-2 Nokia (Rapporteur), Huawei CR Rel-17 38.300 17.2.0 0587 1 F NR\_redcap-Core

* Update the change on 1Rx to “A RedCap UE with 1 Rx branch applies the associated offset for broadcasted cell specific RSRP thresholds for random access, SDT, cell edge condition and cell (re)selection criterion as specified in TS 38.133 [13]”
* Revised in R2-2213033

R2-2213033 Miscellaneous RedCap corrections in stage-2 Nokia (Rapporteur), Huawei CR Rel-17 38.300 17.2.0 0587 2 F NR\_redcap-Core

* Agreed
* [AT120][112][RedCap] Stage 2 CR (Nokia)

Scope: Discuss Stage 2 changes based on meeting agreements

Intended outcome: Agreeable Stage 2 CR

Deadline for companies' feedback: Thursday 2022-11-17 22:00 CET

Deadline for rapporteur's summary (in R2-2213020): Friday 2022-11-18 08:00 CET

Rapporteur input

[R2-2212750](file:///C:\Data\3GPP\Extracts\R2-2212750%20-%20Miscellaneous%20corrections%20for%20RedCap%20WI%20-%20TS%2038.331.docx) Miscellaneous corrections for RedCap WI Ericsson CR Rel-17 38.331 17.2.0 3732 - F NR\_redcap-Core

* Revised in R2-2213021 to reflect meeting agreements

R2-2213021 Miscellaneous corrections for RedCap WI Ericsson CR Rel-17 38.331 17.2.0 3732 1 F NR\_redcap-Core

* [POST120][103][RedCap] RRC CR (Ericsson)

Scope: include meeting agreements in the RRC CR

Intended outcome: Agreeable RRC CR

Deadline: short

[R2-2212751](file:///C:\Data\3GPP\RAN2\Docs\R2-2212751.zip) Miscellaneous corrections for RedCap WI Ericsson CR Rel-17 38.304 17.2.0 0313 - F NR\_redcap-Core Late

* Futurewei has a similar CR. Mediatek/QC/vivo/Huawei/Nokia are ok with Futurewei version
* Adopt the formulation in R2-2212543
* HW would like to remove the parts related to halfDuplexRedCapAllowed. Nokia thinks this is aligned to other parts in the specification (331). Ericsson would like to keep the alignment to 331.
* Intel supports the changes to halfDuplexRedCapAllowed.
* Futurewei thinks we should limit this to UEs “only capable of…”/ Nokia thinks this is not correct
* Thales wonders what “only capable of” means. Is that per band? HW thinks this refers to the band of the cell the UE is accessing but we don’t need to clarify
* Changes to halfDuplexRedCapAllowed are agreed, clarifying that “The RedCap UE only capable of operating in half-duplex for FDD shall treat this cell as if cell status is "barred"”
* Revised in R2-2213025 reflecting changes above.

R2-2212025 Miscellaneous corrections for RedCap WI Ericsson CR Rel-17 38.304 17.2.0 0313 1 F NR\_redcap-Core Late

* [POST120][104][RedCap] 38.304 CR (Ericsson)

Scope: include meeting agreements in the 38.304 CR

Intended outcome: Agreeable 38.304 CR

Deadline: short

### 6.12.2 CP corrections

PDCCH Config related

[R2-2211430](file:///C:\Data\3GPP\Extracts\R2-2211430%20Correction%20on%20the%20searchSpaceOtherSystemInformation%20for%20RedCap.docx) Correction on the searchSpaceOtherSystemInformation for RedCap Huawei, HiSilicon CR Rel-17 38.331 17.2.0 3598 - F NR\_redcap-Core

* Discussed in offline 103

[R2-2211904](file:///C:\Data\3GPP\Extracts\R2-2211904%20Correction%20on%20PDCCH-ConfigCommon%20for%20RedCap.docx) Correction on PDCCH-ConfigCommon for RedCap ZTE Corporation, Sanechips CR Rel-17 38.331 17.2.0 3659 - F NR\_redcap-Core

* Discussed in offline 103

NeedForGaps

[R2-2212663](file:///C:\Data\3GPP\Extracts\R2-2212663%20Correction%20on%20the%20filed%20descriptions%20of%20NeedForGaps%20in%2038.331-clean.docx) Correction on the filed descriptions of NeedForGaps in 38.331 CATT CR Rel-17 38.331 17.2.0 3722 - F NR\_redcap-Core

* Discussed in offline 103

Margin for 1Rx UE

Moved here from 6.12.1

[R2-2211331](file:///C:\Data\3GPP\Extracts\R2-2211331%20-%20Discussion%20on%20configuring%20margin%20for%201%20Rx%20RedCap%20UEs.doc) Discussion on configuring margin for 1 Rx RedCap UEs OPPO discussion Rel-17 NR\_redcap-Core

* Discussed in offline 103
* [AT120][103][RedCap] CP corrections (Ericsson)

Initial scope: Discuss proposals/CRs related to PDCCH Config, NeedForGaps and margin for 1Rx UE

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

**F2F offline time**: **Monday 2022-11-14 16:00-16:30 (coffee break) in Brk1** (then the discussion can further continue via email if needed)

Deadline for rapporteur's summary (in R2-2213013): Wednesday 2022-11-16 06:00 CET

[R2-2213013](file:///C:\Data\3GPP\RAN2\Inbox\R2-2213013.zip) [offline-103] RRC corrections Ericsson discussion Rel-17 NR\_redcap-Core

Proposal 1 The following text is added to the description of parameter searchSpaceOtherSystemInformation: “In that case, a RedCap UE in RRC Idle or Inactive shall monitor PDCCH to receive other system information using searchSpaceOtherSystemInformation in the initial DL BWP that includes CD-SSB and the entire CORESET#0”.

* Agreed

Proposal 2 Discuss whether there is a need for a change in the description for parameter pagingSearchSpace and reference to the RRC states in the description for the parameter searchSpaceOtherSystemInformation.

* ZTE thinks we already have a clear agreement that the UE does not need to monitor paging in that case. Vivo agrees with ZTE. HW also agrees. QC
* Agree the following change for the field description of pagingSearchSpace:

*ID of the search space for paging (see TS 38.213 [13], clause 10.1). If the field is absent, the UE does not receive paging in this BWP (see TS 38.213 [13], clause 10).*

*This field is absent for the RedCap-specific initial downlink BWP, if it does not include CD-SSB and the entire CORESET#0. In that case, a RedCap UE in RRC\_IDLE or RRC\_INACTIVE shall monitor paging in the initial DL BWP that includes CORESET#0.*

Proposal 3 Discuss whether there is a need for a change in subclause B.2 as proposed in R2-2211480.

* Change in B.2 as proposed in R2-2211480 is not pursued

Proposal 4 For RedCap UEs with 1 Rx branch, the offset is applied to cell-specific RSRP thresholds rsrp-ThresholdSSB-SUL and rsrp-ThresholdMsg3.

* Agreed

Proposal 5 For RedCap UEs with 1 Rx branch, discuss whether the offset is applied to cell-specific RSRP thresholds used for Rel-16/Rel-17 not-at-cell-edge criterion.

* Oppo thinks that the margin is now applied twice, which is not the intention.
* Vivo thinks there is no misunderstanding
* MTK thinks RAN4 did not discuss this and there is a risk that the offset is applied twice, which is wrong.
* RAN2 understands that the offset should not apply twice in this case and we will update our specs to avoid the double offset.
* MTK also thinks the offset should not apply to delta thresholds.
* Vivo thinks we should ask RAN4 to consider this.
* HW thinks we don’t need an LS to RAN4 for this.
* Oppo thinks the LS to RAN4 is needed also for other reasons
* RAN2 understanding is that offset shall not apply to delta thresholds: s-SearchDeltaP-r16 and s-SearchDeltaP-Stationary-r17
* Send LS to RAN4 for information, listing RAN2 decisions, including the avoidance of double offset (we don’t explicitly ask for feedback)

Proposal 6 The offset introduced for RedCap UEs with 1 Rx branch is captured in normative text.

* Agreed

Proposal 7 Discuss whether the normative text for the offset introduced for RedCap UEs with 1 Rx branch is captured in TS 38.300 or TS 38.331.

* ZTE thinks we can have a simple sentence in Stage 2 and refer to RAN4 specs
* Ericsson thinks this should go to field description in Stage 3
* Introduce a general sentence in Stage 2 (FFS whether additional changes are needed in each affected field description in Stage 3).

Proposal 8 Send an LS to RAN4 to inform them about RAN2 agreements.

Proposal 9 Discuss whether changes proposed in R2-2212663 for the description of parameters NeedforGapsIntraFreq and NeedForNCSG-IntraFreq are needed.

* CB Friday
* ZTE thinks the suggestion is not better than the current one and thinks we can further improve this
* Ericsson thinks we could address this in the next meeting
* Postpones to the next meeting
* [POST120][101][RedCap] LS to RAN4 (Oppo)

Scope: Discuss LS to RAN4 on offset for UEs with 1Rx branch

Intended outcome: LS to RAN4

Deadline: short

From SDT session:

For CG-SDT purpose, RAN2 has basic assumption that SSB will be configured in initial BWP with CG-SDT.   Notify RAN1

* Ericsson wonders what initial BWP with CG-SDT means.
* ZTE indicates this means that SSB could be configured in RRC Release.
* Nokia is ok to keep the agreement but doesn’t think we need to introduce the possibility to configure an SSB in RRC release. Intel/IDC/MTK agree.
* Ericsson wonders what SSB means here.
* VDF would like to understand the implication. ZTE clarifies that the implication is that it will not be possible to have CG-SDT on a BWP without SSB
* Continue the discussion in offline 109
* RAN2 has no consensus whether for RedCap SSB refers to CD-SSB or NCD-SSB in the agreement so we will continue in the next meeting on this (and we don’t notify RAN1 now)

For CG-SDT purpose, RAN2 has basic assumption that SSB will be configured in initial BWP with CG-SDT. For RedCap FFS if SSB refers to CD-SSB or any SSB

* [AT120][109][RedCap] CG-SDT support (ZTE)

Scope: Discuss CD-SDT support for RedCap

Intended outcome: list of agreeable proposals

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET (F2F discussion is invited)

Deadline for rapporteur's summary (in R2-2213022): Friday 2022-11-18 08:00 CET

[R2-2213022](file:///C:\Data\3GPP\RAN2\Inbox\R2-2213022.zip) [offline-109] CG-SDT support ZTE Corporation discussion Rel-17 NR\_redcap-Core

* VDF thinks CG-SDT is for small amount of data for stationary UEs and thinks there is no harm to provide the configuration for CG-SDT even if there is no SSB in the BWP. So wonders if there is any disadvantage with option 3
* Apple prefers option 2 but at least we should honor the agreement (no option 3)
* ZTE clarifies that the main change in the spec is to indicate that the UE uses the NCD-SSB for CG-SDT in this case
* QC thinks we have a plenary agreement not to use NCD-SSB for non-connected mode in Rel-17
* Vivo has a different understanding on the RAN plenary agreement, as it was referring to paging, reselection only. ZTE agrees.
* Nokia agrees with QC and thinks we can rule out option 2 and maybe we can consider option 3, as for RA-SDT.
* Samsung does not support option 2 and is open to support option 3.
* MTK agrees with Apple. MTK thinks we can’t assume that the UE can perform UL tx with no reference signals
* LG agrees to rule out option 2 and thinks only option 1 is acceptable
* Ericsson thinks option 3 should be supported
* Intel would like to postpone this discussion.
* HW thinks that to understand the impact of option 2 we need to clarify the spec impact. For option 3 we anyway need a UE capability. HW prefers to postpone this discussion.
* ZTE cannot accept option1, as it rules out a valid use case.
* Continue in the next meeting (all 3 options are still on the table).

Other contributions on Margin for 1Rx UE

[R2-2211332](file:///C:\Data\3GPP\Extracts\R2-2211332%20-%20Draft%20reply%20LS%20on%20configuring%20margin%20for%201%20Rx%20RedCap%20UEs.docx) Draft reply LS on configuring margin for 1 Rx RedCap UEs OPPO LS out Rel-17 NR\_redcap-Core To:RAN4

[R2-2211431](file:///C:\Data\3GPP\Extracts\R2-2211431%20Corrections%20on%20RSRP%20offset%20of%201Rx%20RedCap%20UEs.doc) Corrections on RSRP offset of 1Rx RedCap UEs Huawei, HiSilicon CR Rel-17 38.331 17.2.0 3599 - B NR\_redcap-Core

[R2-2212381](file:///C:\Data\3GPP\Extracts\R2-2212381%20margin%20for%201%20Rx%20redcap%20devices%20in%2038.331.docx) Correction on margin for 1 Rx RedCap devices in 38.331 Nokia, Nokia Shanghai Bell CR Rel-17 38.331 17.2.0 3696 - F NR\_redcap-Core

[R2-2212752](file:///C:\Data\3GPP\Extracts\R2-2212752%20-%20Configuration%20of%20margin%20for%201Rx%20RedCap%20UEs.docx) Configuration of margin for 1Rx RedCap UEs Ericsson discussion Rel-17 NR\_redcap-Core

[R2-2212753](file:///C:\Data\3GPP\Extracts\R2-2212753%20-%20Configuration%20of%20margin%20for%201%20Rx%20RedCap%20UEs%20-%20TS%2038.331.docx) Configuration of margin for 1 Rx RedCap UEs Ericsson CR Rel-17 38.331 17.2.0 3733 - F NR\_redcap-Core

[R2-2212768](file:///C:\Data\3GPP\Extracts\R2-2212768%20-%20Configuration%20of%20margin%20for%201%20Rx%20RedCap%20UEs%20-%20TS%2038.321.docx) Configuration of margin for 1 Rx RedCap UEs Ericsson CR Rel-17 38.321 17.2.0 1495 - F NR\_redcap-Core

[R2-2212769](file:///C:\Data\3GPP\Extracts\R2-2212769%20-%20Configuration%20of%20margin%20for%201%20Rx%20RedCap%20UEs%20-%20TS%2038.304.docx) Configuration of margin for 1 Rx RedCap UEs Ericsson CR Rel-17 38.304 17.2.0 0314 - F NR\_redcap-Core

Cell barred / IFRI handling

[R2-2211432](file:///C:\Data\3GPP\Extracts\R2-2211432%20Corrections%20on%20applying%20parameters%20in%20MIB%20and%20IFRI%20handling%20for%20RedCap%20UEs.doc) Corrections on applying parameters in MIB and IFRI handling for RedCap UEs Huawei, HiSilicon CR Rel-17 38.331 17.2.0 3600 - F NR\_redcap-Core

* Xiaomi thinks the first change is not needed. Second change is ok.
* Ericsson thinks no changes are needed, at least not the first one
* ZTE is fine with the CR
* Vivo is also fine with the CR.
* MTK and QC also agree (QC thinks first change is a sort of text optimization)
* Intel supports the CR
* RAN2 confirms the intention of the first change but no need to capture this
* Second and third changes are agreed and added to the rapporteur CR

[R2-2212543](file:///C:\Data\3GPP\Extracts\R2-2212543%20Miscellaneous%20corrections%20for%20RedCap%20WI%20-%20TS%2038.304.docx) Miscellaneous corrections for RedCap WI Futurewei, vivo, Xiaomi, Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, ZTE Corporation CR Rel-17 38.304 17.2.0 0309 - F NR\_redcap-Core

* Changes are agreed and added to the rapporteur CR

eDRX

[R2-2211333](file:///C:\Data\3GPP\Extracts\R2-2211333%20-%20Clarification%20on%20UE%20support%20of%20eDRX.doc) Clarification on UE support of eDRX OPPO CR Rel-17 38.306 17.2.0 0827 - F NR\_redcap-Core

* Intel thinks this is not needed in 306
* Oppo thinks the spec is not so clear
* Vivo thinks the procedural part is clear and wonders whether we need a further clarification in 306
* MTK thikns we don’t need this
* Not pursued

[R2-2211482](file:///C:\Data\3GPP\Extracts\38.304_CR0299(Rel-17)_R2-2211482_Correction%20on%20the%20description%20of%20PTW%20start%20for%20eDRX.docx) Correction on the description of PTW\_start for eDRX vivo, Guangdong Genius CR Rel-17 38.304 17.2.0 0299 - F NR\_redcap-Core

[R2-2211582](file:///C:\Data\3GPP\Extracts\R2-2211582%20Corrections%20on%20e-DRX%20for%20RedCap%20WI%20-TS%2038.304.docx) Corrections on e-DRX for RedCap WI -TS 38.304 Xiaomi Communications CR Rel-17 38.304 17.2.0 0300 - F NR\_redcap-Core

* MTK/vivo/Ericsson thinks there is no problem with the current spec
* Nor pursued

Other

[R2-2211480](file:///C:\Data\3GPP\Extracts\38.331_CR3603(Rel-17)_%20R2-2211480_Correction%20on%20RRC%20aspects%20for%20RedCap.docx) Correction on RRC aspects for RedCap vivo, Guangdong Genius CR Rel-17 38.331 17.2.0 3603 - F NR\_redcap-Core

* Last change is not pursued

[R2-2211706](file:///C:\Data\3GPP\Extracts\R2-2211706_s-MeasureConfig.docx) Clarification on the reference SSB used for measurement for RedCap when used with s-MeasureConfig Apple CR Rel-17 38.331 17.2.0 3634 - F NR\_redcap-Core

* Not pursued

[R2-2211903](file:///C:\Data\3GPP\Extracts\R2-2211903%20Correction%20on%20RRC%20configuration%20for%20RedCap.docx) Correction on RRC configuration for RedCap ZTE Corporation, Sanechips CR Rel-17 38.331 17.2.0 3658 - F NR\_redcap-Core

* MTK is generally ok, but in the correction for halfDuplexRedCap-Allowed we should add “that” instead of “whether”
* Vivo is ok with the CR, not sure about the need to update the terminology
* Ericsson thinks that apart from one change this is mostly editorial but can accept the CR
* ZTE thinks that absoluteFrequencySSB is cell specific and needs to always point to CD-SSB to RedCap
* MTK and Apple support this
* Changes are agreed (with MTK comment for the change to halfDuplexRedCap-Allowed) and added to the rapporteur CR

[R2-2212380](file:///C:\Data\3GPP\Extracts\R2-2212380%20correction%20on%20half%20duplex%20FDD%20in%2038.304.docx) Correction on halfDuplexRedCap-Allowed in 38.304 Nokia, Nokia Shanghai Bell CR Rel-17 38.304 17.2.0 0306 - F NR\_redcap-Core

* Already covered by previous meeting decisions

[R2-2212912](file:///C:\Data\3GPP\Extracts\38.300_CR0597(Rel-17)_%20R2-2212912_Correction%20on%20RACH%20configure%20for%20RedCap.docx) Correction on RACH configure for RedCap vivo, Guangdong Genius CR Rel-17 38.300 17.2.0 0597 - F NR\_redcap-Core

* HW thinks MAC spec is already clear on this and we don’t need this.
* LG thinks we can discuss where to capture this
* Intel is fine with the CR
* Nokia thinks it should be clear in RRC or MAC
* QC thinks we should clarify this in RRC
* ZTE thinks this should be for the initial RedCap BWP
* Comeback in the next meeting to see whether a change is needed in Stage 3

Withdrawn

R2-2211481 Correction on RACH configure for RedCap vivo, Guangdong Genius CR Rel-17 38.331 17.2.0 3604 - F NR\_redcap-Core Late

R2-2212859 Correction on RACH configure for RedCap vivo, Guangdong Genius CR Rel-17 38.304 17.2.0 0316 - F NR\_redcap-Core Late

### 6.12.3 UP corrections

[R2-2211483](file:///C:\Data\3GPP\Extracts\38.321_CR1461(Rel-17)_R2-2211483_Miscellaneous%20CR%20on%20TS%2038.321%20for%20RedCap.docx) Miscellaneous CR on TS 38.321 for RedCap vivo CR Rel-17 38.321 17.2.0 1461 - F NR\_redcap-Core

* Discuss in offline 110
* Revised in R2-2213033

R2-2213033 Miscellaneous CR on TS 38.321 for RedCap vivo CR Rel-17 38.321 17.2.0 1461 1 F NR\_redcap-Core

* Agreed

[R2-2211906](file:///C:\Data\3GPP\Extracts\R2-2211906%20Correction%20on%20DL%20BWP%20for%20RACH.docx) Correction on DL BWP in RACH procdure ZTE Corporation, Sanechips CR Rel-17 38.321 17.2.0 1475 - F NR\_redcap-Core

* Discuss in offline 110

[R2-2212095](file:///C:\Data\3GPP\Extracts\R2-2212095%20Mismatch%20issue%20on%20RAR%20reception%20on%20RedCap%20specific%20initial%20DL%20BWP.DOCX) Mismatch issue on RAR reception on RedCap specific initial DL BWP Huawei, HiSilicon, vivo discussion Rel-17 NR\_redcap-Core

* Discuss in offline 110
* [AT120][110][RedCap] MAC corrections (vivo)

Scope: Discuss MAC corrections

Intended outcome: list of agreeable proposals

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET

Deadline for rapporteur's summary (in R2-2213023): Friday 2022-11-18 08:00 CET

[R2-2213023](file:///C:\Data\3GPP\RAN2\Inbox\R2-2213023.zip) [offline-110] MAC corrections Vivo discussion Rel-17 NR\_redcap-Core

Proposal 1: [To agree] [9/11] The change in R2-2211483 is agreed with the below revision:

NOTE X: If a RedCap UE in RRC\_IDLE or RRC\_INACTIVE mode is configured with a separate initial BWP that is not associated with any SSB for RACH, it is up to the UE implementation to perform a new RSRP measurements before Msg1/MsgA retransmission.

* LG wonders is the MAC spec is the right place but can compromise to include this
* QC thinks it’s good to capture
* Agreed

Proposal 2: [To agree] [9/11]: NW based solution is adopted to resolve the mismatch issue for RAR reception on RedCap specific initial DL BWP:

- If the network is not able to identify the RedCap UE by Msg1, possible options for network:

 if initialDownlinkBWP-RedCap is configured, NW should transmit the corresponding RAR on both initialDownlinkBWP-RedCap and initialDownlinkBWP, or

 the initialDownlinkBWP-RedCap should be absent (if the bandwidth of initialDownlinkBWP is supported by RedCap UE).

* Nokia this is up to NW implementation, no need for a change
* HW would prefer to capture this
* QC supports to clarify this chairs note
* Vivo prefers to capture something in the specs as well
* RAN2 understand that NW based solution is adopted to resolve the mismatch issue for RAR reception on RedCap specific initial DL BWP:

If the network is not able to identify the RedCap UE by Msg1, possible options for network are for instance:

if initialDownlinkBWP-RedCap is configured, NW should transmit the corresponding RAR on both initialDownlinkBWP-RedCap and initialDownlinkBWP, or

the initialDownlinkBWP-RedCap should be absent (if the bandwidth of initialDownlinkBWP is supported by RedCap UE).

Proposal 3: [To discuss]: RAN2 to discuss either to capture this as a note in MAC or in Chair Note.

Withdrawn

R2-2212071 Mismatch issue on RAR reception on RedCap specific initial DL BWP Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core Withdrawn

## 6.19 Coverage Enhancements

(NR\_cov\_enh-Core; leading WG: RAN1; REL-17; WID: [RP-211566](file:///C:\Data\3GPP\archive\RAN\RAN%2392\Tdocs\RP-211566.zip))

Tdoc Limitation: 1 tdoc

Common aspects related to RACH indication (in MSG1) / RACH partitioning shall be submitted to 6.18

### 6.19.1 Organizational

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

### 6.19.2 General

All aspects.

[R2-2211468](file:///C:\Data\3GPP\Extracts\R2-2211468%20-%20Discussion%20on%20DMRS%20bundling.docx) Discussion on DMRS Ericsson discussion Rel-17 NR\_cov\_enh-Core

* ZTE suggests to postpone this after RAN1 discussion
* CB Friday.

Observation 2 RAN1 agreed that DMRS bundling was to be per band and per band combination, but the details of how to implement the per band and per band combination need to be decided.

Proposal 2 Define 1) a baseline capability parameter for support of DMRS bundling per band when the UE is configured with a single UL serving cell and 2) a per band combination capability parameter for when UE is configured with more than one UL serving cell and where the capability per band of the band combination is given by the baseline capability.

[R2-2212248](file:///C:\Data\3GPP\Extracts\R2-2212248%20Remaining%20Issues%20on%20DMRS%20Bundling.docx) Remaining Issues on DMRS Bundling vivo Mobile Com. (Chongqing) discussion Rel-17 NR\_cov\_enh-Core R2-2207130

* HW and ZTE think we can cover this in 306, not in 331. Ericsson agrees.
* After offline checking it seems that the suggested changes are already covered by the Mega capability CR

Moved here from 6.19.1

[R2-2212676](file:///C:\Data\3GPP\Extracts\R2-2212676%20Clarifications%20on%20DMRS%20bundling%20for%20NR%20Coverage%20Enhancements.doc) Clarifications on DMRS bundling for NR Coverage Enhancements Huawei, HiSilicon, China Telecom, ZTE Corporation CR Rel-17 38.331 17.2.0 3723 - F NR\_cov\_enh-Core

* HW thinks the restriction mentioned in the vivo CR is not needed in 331
* Ericsson supports the CR apart from the applicability for FR2 which should only be in 306.
* ZTE thinks we agreed to put that restriction in RRC in the last meeting. Ericsson can accept. LG also supports
* Agreed

[R2-2212880](file:///C:\Data\3GPP\Extracts\R2-2212880%20Correction%20on%20CE%20applicability%20to%20RA%20procedure.docx) Correction on CE applicability to RA procedure Nokia, Nokia Shanghai Bell CR Rel-17 38.321 17.2.0 1503 - F NR\_cov\_enh-Core

* LG thinks that in the UE does not support this the UE will not get there and then the CR is not needed. ZTE/QC agree. Ericsson also agrees
* Not pursued

## 7.2 NB-IoT and eMTC support for NTN

Tdoc Limitation: 3 tdocs

### 7.2.0 In-principle agreed CRs

CRs AIP from RAN2#119bis-e.

[R2-2211287](file:///C:\Data\3GPP\Extracts\R2-2211287%2036.321%20CR.docx) Corrections for Supporting Non-Terrestrial Network in NB-IoT and eMTC Mediatek Inc. CR Rel-17 36.321 17.2.0 1556 - F LTE\_NBIOT\_eMTC\_NTN-Core

* Revised in R2-2213016 to reflect meeting agreements

R2-2213016 Corrections for Supporting Non-Terrestrial Network in NB-IoT and eMTC Mediatek Inc. CR Rel-17 36.321 17.2.0 1556 1 F LTE\_NBIOT\_eMTC\_NTN-Core

[R2-2212106](file:///C:\Data\3GPP\Extracts\R2-2212106-CR-TS36306-IoT-NTN-Capability-Correction.docx) Miscellanious Correction for IoT-NTN Capabilities Nokia Solutions & Networks (I) CR Rel-17 36.306 17.2.0 1864 - F LTE\_NBIOT\_eMTC\_NTN

* Revised in R2-2213029 to reflect meeting agreements

R2-2213029 Miscellanious Correction for IoT-NTN Capabilities Nokia Solutions & Networks (I) CR Rel-17 36.306 17.2.0 1864 1 F LTE\_NBIOT\_eMTC\_NTN

[R2-2212830](file:///C:\Data\3GPP\Extracts\R2-2212830%20Corrections%20to%20IOT%20NTN.docx) Corrections to IOT NTN Huawei, HiSilicon CR Rel-17 36.331 17.2.0 4884 1 F LTE\_NBIOT\_eMTC\_NTN R2-2211020

* Revised in R2-2213031 to reflect meeting agreements

R2-2213031 Corrections to IOT NTN Huawei, HiSilicon CR Rel-17 36.331 17.2.0 4884 2 F LTE\_NBIOT\_eMTC\_NTN

[R2-2212955](file:///C:\Data\3GPP\Extracts\36304_CR0859_(Rel-17)_R2-2212955%20-%20Miscellaneous%20idle%20mode%20corrections.docx) Miscellaneous idle mode corrections Ericsson CR Rel-17 36.304 17.2.0 0859 - F LTE\_NBIOT\_eMTC\_NTN

### 7.2.1 General and Stage 2 corrections

LSs, rapporteur inputs and Stage 2 corrections. Rapporteur inputs and other pre-assigned documents in this AI do not count towards the tdoc limitation.

Incoming LSs

[R2-2211171](file:///C:\Data\3GPP\Extracts\R2-2211171_R4-2217265.docx) LS on information for neighbor/target cell in IoT NTN (R4-2217265; contact: Huawei) RAN4 LS in Rel-18 LTE\_NBIOT\_eMTC\_NTN\_req-Core To:RAN2

* Reply in R2-2213018

R2-2213018 Reply LS on information for neighbor/target cell in IoT NTN Huawei LS out Rel-18 LTE\_NBIOT\_eMTC\_NTN\_req-Core To:RAN4

* [AT120][113][IoT NTN] LS to RAN4 (Huawei)

Scope: Discuss LS to RAN4

Intended outcome: LS to RAN4

Deadline for companies’ feedback: Friday 2022-11-18 09:00 CET

Deadline for reply LS (in R2-2213018): Friday 2022-11-18 11:00 CET

Stage 2 corrections

[R2-2212944](file:///C:\Data\3GPP\Extracts\R2-2212944%20-%20R17%20IoT%20NTN%20stage%202%20issues.docx) R17 IoT NTN stage 2 issues Ericsson discussion Rel-17

* Mediatek thinks we can agree in principle
* HW agrees most of the changes but the part on autonomous pre-compensation is not needed. Nokia agrees. HW thinks in NTN we have the Doppler shift part but not the rest, so we can keep the Doppler part
* ZTE thinks the change in 23.21.7 is not needed, either we remote it or consult with RAN3. QC agrees with ZTE
* Ericsson the changes are meant to make it more readable.
* ZTE thinks some changes are intentional and should be checked with RAN3. Also VDF wonders about some changes
* Change in 23.21.7 is not agreed
* Continue in offline 105
* [AT120][105][IoT-NTN] Stage 2 CR (Ericsson)

Scope: Discuss Stage 2 changes based on [R2-2212944](file:///C:\Data\3GPP\Extracts\R2-2212944%20-%20R17%20IoT%20NTN%20stage%202%20issues.docx)

Intended outcome: Updated Stage 2 CR

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET

Deadline for rapporteur's CR (in R2-2213015): Friday 2022-11-18 06:00 CET (might slip to a post-meeting discussion)

[R2-2213015](file:///C:\Data\3GPP\RAN2\Inbox\R2-2213015.zip) IoT NTN corrections Ericsson CR Rel-17 36.300 17.2.0 XXXX - F LTE\_NBIOT\_eMTC\_NTN

### 7.2.2 UP corrections

[R2-2212943](file:///C:\Data\3GPP\Extracts\R2-2212943%20-%20R17%20IoT%20NTN%20User%20Plane%20issues.docx) R17 IoT NTN User Plane issues Ericsson discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Proposal 1 Change “k\_Mac” in UE-eNB RTT definition to “k-Mac” in the MAC section 3.1.

* Agreed

Proposal 2 In MAC spec, when UE-eNB RTT is used, there is no need to add “subframes” after.

* Oppo thinks we don’t need to change anything, there is no confusion in the specs
* Mediatek thinks we should be consistent. QC agrees with MTK.
* ZTE also don’t support p2, p3 and p4. Suggest to change the UE-eNB RTT definition (remove the last part)
* Continue in offline 106

Proposal 3 Introduce consistent use of “subframes” when UE-eNB RTT is used in MAC spec.

Proposal 4 For P1 and P2, consider the text proposal below.

Proposal 5 Correct the NB-IoT start of drx-InactivityTimer when UL HARQ RTT Timer expires for multiple scheduled TBs, see text proposal below.

* QC is not sure about this. Nokia wonders if this is for NTN or legacy
* Not pursued

Proposal 6 Correct the PUR retransmission start of PUR response window timer and the expiry of PUR response window timer, see text proposal below.

* Agreed

Proposal 7 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, where Koffset is the UE specific Koffset defined in 36.213 section 4.2 and k-Mac is a RRC configured parameter.

* QC can accept this but would like to remove “UE specific”. ZTE agrees with QC
* Agreed as: “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, where Koffset defined in 36.213 section 4.2 and k-Mac is a RRC configured parameter.”
* [AT120][106][IoT-NTN] MAC corrections (Ericsson)

Scope: continue to discuss MAC changes based on [R2-2212943](file:///C:\Data\3GPP\Extracts\R2-2212943%20-%20R17%20IoT%20NTN%20User%20Plane%20issues.docx)

Intended outcome: Updated MAC CR

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET (F2F discussion is invited)

Deadline for rapporteur’s summary (in R2-2213030): Friday 2022-11-18 06:00 CET

R2-2213030 [offline-106] IoT NTN MAC corrections Ericsson discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

[R2-2211334](file:///C:\Data\3GPP\Extracts\R2-2211334%20-%20Discussion%20on%20DRX%20HARQ%20RTT%20timer%20for%20eMTC%20over%20NTN.doc) Discussion on DRX HARQ RTT timer for eMTC over NTN OPPO discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

[R2-2211515](file:///C:\Data\3GPP\Extracts\R2-2211515%20Discussion%20on%20HARQ%20RTT%20timer%20in%20IoT%20NTN.DOCX) Discussion on HARQ RTT timer in IoT NTN Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

[R2-2212789](file:///C:\Data\3GPP\Extracts\R2-2212789%20On%20DRX%20HARQ%20RTT%20timer%20for%20eMTC%20NTN.docx) On DRX HARQ RTT timer for eMTC NTN Nokia, Nokia Shanghai Bell discussion Rel-17 IoT\_NTN\_enh

[R2-2212942](file:///C:\Data\3GPP\Extracts\36321_CR1558_(Rel-17)_R2-2212942%20-%20Correction%20for%20IoT%20NTN.docx) Correction for IoT NTN Ericsson CR Rel-17 36.321 17.2.0 1558 - F LTE\_NBIOT\_eMTC\_NTN

* Discussed in offline 106

[R2-2211577](file:///C:\Data\3GPP\Extracts\36321_CR1557_(Rel-17)_R2-2211577%20HARQ%20RTT%20timer%20start.docx) Start of DL HARQ RTT timer for eMTC in NTN Qualcomm Incorporated CR Rel-17 36.321 17.2.0 1557 - F LTE\_NBIOT\_eMTC\_NTN

[R2-2211286](file:///C:\Data\3GPP\Extracts\R2-2211286%20Correction%20on%20UE-eNB%20RTT%20calculation.docx) Correction on UE-eNB RTT Mediatek Inc. CR Rel-17 36.321 17.2.0 1555 - F LTE\_NBIOT\_eMTC\_NTN-Core

### 7.2.3 CP corrections

IoT NTN UE capability

[R2-2211310](file:///C:\Data\3GPP\Extracts\R2-2211310%20Discussion%20on%20remaining%20issue%20of%20IoT%20NTN%20UE%20capability-clean.docx) Discussion on remaining issue of IoT NTN UE capability CATT discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

[R2-2211575](file:///C:\Data\3GPP\Extracts\R2-2211575%20UE%20capability%20for%20eMTC%20NTN.docx) Discussion on SA2 LS reply on UE capability for IoT NTN Qualcomm Incorporated discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

[R2-2211576](file:///C:\Data\3GPP\Extracts\36331_CR4888_(Rel-17)_R2-2211576%20TN%20support%20indication.docx) Reporting the support of TN bands to NTN Qualcomm Incorporated CR Rel-17 36.331 17.2.0 4888 - F LTE\_NBIOT\_eMTC\_NTN

[R2-2212003](file:///C:\Data\3GPP\Extracts\R2-2212003%20Further%20discussion%20on%20UE%20capability%20signalling%20for%20IoT-NTN.docx) Further discussion on UE capability signalling for IoT-NTN ZTE Corporation, Sanechips discussion LTE\_NBIOT\_eMTC\_NTN-Core

[R2-2212831](file:///C:\Data\3GPP\Extracts\R2-2212831%20Remaining%20issues%20on%20UE%20capability%20signalling%20for%20IoT-NTN.DOCX) Remaining issues on UE capability signalling for IoT-NTN Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

[R2-2212679](file:///C:\Data\3GPP\Extracts\R2-2212679%20Corrections%20on%20HandoverPreparationInformation%20in%2036.331-clean.docx) Corrections on HandoverPreparationInformation in 36.331 CATT CR Rel-17 36.331 17.2.0 4897 - F LTE\_NBIOT\_eMTC\_NTN

* All documents to be discussed in offline 104
* [AT120][104][IoT NTN] RRC corrections (Huawei)

Initial scope: Discuss proposals/CRs on IoT NTN UE capability

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

Deadline for companies’ feedback: Tuesday 2022-11-15 20:00 CET

Deadline for rapporteur's summary (in R2-2213014): Wednesday 2022-11-16 06:00 CET

Updated scope: Discuss the need for RRC changes on Epoch time, also based on RAN1 decisions

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

Deadline for companies’ feedback: Friday 2022-11-18 09:00 CET

Deadline for rapporteur's summary (in R2-2213027): Friday 2022-11-18 11:00 CET

[R2-2213014](file:///C:\Data\3GPP\RAN2\Inbox\R2-2213014.zip) [offline-104] RRC corrections Huawei discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

(15/18) Proposal 1: UE in RRC\_IDLE triggers TAU with capability update upon TN-NTN mobility.

* VDF thinks that if the UE has different capabilities then it makes sense to trigger TAU. DT agrees and thinks there should be no impact on legacy procedures.
* HW thinks RAN2 has not discussed the case where UE have same capabilities for both. QC agrees with HW. Nokia agrees
* CATT supports p1
* Continue in offline 107

(12/18) Proposal 2: Add “or if the RRC\_IDLE UE moves across different network type (i.e., TN or NTN),” after “If the UE has changed its E-UTRAN radio access capabilities,” in 36.331 Section 5.6.3.1.

(15/18) Proposal 3: For UEs in RRC\_CONNECTED, upon TN-NTN mobility, the target node ignores the UE capability information (and/or RACS ID, in case of eMTC) from the source node, which can be left to NW implementation and has no spec impact.

* Nokia thinks this is also impacted
* DT thinks we need to take into account what happens in legacy.

(16/17) Proposal 4: Send an LS to CT1/SA2 (cc RAN3 and CT4) about the RAN2 conclusion on capability update upon TN-NTN mobility for UEs in RRC\_IDLE and RRC\_CONNECTED.

(15/17) Proposal 5: No additional RAN2 impact specific to RACS handling is needed on IoT NTN UE capability.

(15/18) Proposal 6: Changes in R2-2211576 (introducing a new IE to report the supported list of TN bands) are not pursued.

* [AT120][107][IoT-NTN] new TAU trigger (QC)

Scope: continue the discussion on new TAU trigger

Intended outcome: list of agreeable proposals

**F2F offline time: Wednesday afternoon coffee break in Brk2**

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET

Deadline for rapporteur's summary (in R2-2213017): Friday 2022-11-18 06:00 CET

[R2-2213017](file:///C:\Data\3GPP\RAN2\Inbox\R2-2213017.zip) [offline-107] new TAU trigger QC discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

- Add a note in 5.6.3.1 General as “NOTE: Update of UE’s EUTRAN capabilities upon mobility between TN and NTN in RRC\_IDLE is supported by use of Tracking Area Update.”.

- RAN2 assumes network implementation can make basic handover between TN and NTN work.

- Send LS to RAN3 and SA2 informing above RAN2 assumption and let them decide if any alignment work is needed in their specification.

R2-2213027 [offline-104] RRC corrections – second round Huawei discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Neighbour cell ephemeris

[R2-2212485](file:///C:\Data\3GPP\Extracts\R2-2212485%20On%20neighbouring%20cell%20ephemeris%20for%20IoT%20NTN.docx) On neighbouring cell ephemeris for IoT NTN Samsung R&D Institute UK discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Proposal 1: Neighbouring cell ephemeris is introduced for LTE-M in SIB31.

Proposal 2: Confirm with RAN4 whether neighbouring cell ephemeris is needed for NB-IoT for Rel-17 where connected mode measurements are not expected.

* HW thinks that in NB-IoT we have idle mode measurements that can rely on neighbour cell ephemeris
* Ericsson, Mediatek agrees with HW
* Oppo wonders what we do with SIB32c for discontinuous coverage: there seems to be some duplication. MTK thinks the ephemeris are different
* Oppo thinks we could ask RAN4 is ephemeris in SIB32 are sufficient
* DT thinks there is benefit
* Ericsson wonders if there is anything broken if we don’t have it
* QC prefers not to mix up the instantaneous ephemeris with the long term ones.
* QC would like to have this information in some other SIBs, not SIB31
* VC thinks we can have a compromise that we don’t support this in Rel-17 but at the same time we immediately agree that we will have in Rel-18, with details FFs. Ericsson, MTK, Nokia, ZTE supports this. CATT, Lenovo agrees
* HW wonders if we send an LS to RAN4m as the consequence is that RAN4 will not define requirements in Rel-17.
* We don’t introduce neighbour cell ephemeris in Rel-17 IoT-NTN, neither for eMTC not for NB-IoT. RAN2 agrees to support this in Rel-18, with details FFS.
* Send a LS to RAN4 in R2-2213018 to inform them of RAN2 decision

Agreements:

1. RAN2 doesn’t introduce neighbour cell ephemeris in Rel-17 IoT-NTN, neither for eMTC not for NB-IoT. RAN2 agrees to support this in Rel-18, with details FFS.

[R2-2211309](file:///C:\Data\3GPP\Extracts\R2-2211309%20Discussion%20on%20introducing%20satellite%20assistance%20information%20for%20neighbour%20cells%20in%20SIB31-clean.docx) Discussion on introducing satellite assistance information for neighbour cells in SIB31 CATT discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

Proposal 1: In Rel-17, RAN2 not to discuss the issue of introducing satellite assistance information for neighbour cells in SIB31.

[R2-2212001](file:///C:\Data\3GPP\Extracts\R2-2212001%20Discussion%20on%20RRC%20corrections.docx) Discussion on RRC corrections ZTE Corporation, Sanechips discussion LTE\_NBIOT\_eMTC\_NTN-Core

Proposal 1: Neighbour cell ephemeris information is not introduced in SIB for Rel-17 IoT NTN.

Proposal 2: To correct the value range and field description of “nprach-TxDurationFmt01” and “nprach-TxDurationFmt2” to align with RAN1 agreement.

* Agreed (actual text can be further checked in the CR review)

Proposal 3: To correct the “ul-SyncValidationDuration” in the SystemInformationBlockType31 field descriptions to “ul-SyncValidityDuration”.

* Agreed

[R2-2212043](file:///C:\Data\3GPP\Extracts\R2-2212043%20Inclusion%20of%20neighbour%20cell%20ephemeris%20in%20system%20information.docx) Inclusion of neighbour cell ephemeris in system information Lenovo discussion Rel-17

Proposal 1: RAN2 to decide whether to include neighbour cell ephemeris in system information for Rel-17 IoT NTN.

Proposal 2: If RAN2 agree to include neighbour cell ephemeris in system information for Rel-17 IoT NTN, it can be implemented by an extension IE in SIB31 using the same elements of ServingSatelliteInfo.

[R2-2212953](file:///C:\Data\3GPP\Extracts\R2-2212953%20-%20Neighbour%20cell%20information%20in%20IoT%20NTN.docx) Neighbour cell information in IoT NTN Ericsson discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

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

[R2-2211284](file:///C:\Data\3GPP\Extracts\R2-2211284%20Miscellaneous%20corrections%20to%20TS%2036.331%20for%20IoT%20NTN.docx) Misc RRC correction for IoT NTN MediaTek Inc. CR Rel-17 36.331 17.2.0 4885 - F LTE\_NBIOT\_eMTC\_NTN-Core

* Consider this in the RRC CR review (apart from the changes on neighbour cell ephemeris)

[R2-2212832](file:///C:\Data\3GPP\Extracts\R2-2212832%20CR%20to%2036.331%20on%20neighbour%20cell%20ephemeris.docx) CR to 36.331 on neighbour cell ephemeris Huawei, HiSilicon CR Rel-17 36.331 17.2.0 4898 - F LTE\_NBIOT\_eMTC\_NTN

* Not pursued

Epoch time

[R2-2211285](file:///C:\Data\3GPP\Extracts\R2-2211285%20Discussion%20on%20epoch%20time.docx) Discussion on epoch time Mediatek Inc. discussion Rel-17 36.331

Observation 1: UEs decode SI message in different position of SI window can have different interpretations of serving cell epoch time.

Proposal 1: Change the serving cell epoch time description to:” For serving cell, the startSFN indicates the current SFN or the next upcoming SFN after the last frame of SI window where the message indicating the epochTime is received.”

Observation 2: UEs decode SI message in different position of SI window can have different interpretations of neighbor cell epoch time.

Proposal 2: If neighbor cell epoch time in SI is agreed, the neighbor cell epoch time description can be: ”For neighbor cell if EpochTime is indicated explicitly by a SFN and subframe number, the UE considers this frame to be the frame nearest to the last frame of SI window where the message indicating the Epoch time is received.”

Observation 3: UE can have different interpretations of neighbor cell epoch time in HO/CHO message due to different reception time.

Proposal 3: It is up to NW implementation to fix different interpretation of neighbor cell epoch time in HO/CHO message due to different reception time.

* Oppo thinks this paper is not NB-IoT specific but in any case we need to wait for RAN1
* CB Friday

[R2-2212100](file:///C:\Data\3GPP\Extracts\R2-2212100-Further-discussion-on-epoch%20time.docx) Further discussion on epoch-Time reference for Handover scenarios Nokia, Nokia Shanghai Bell discussion Rel-17

Proposal 1: RAN2 to discuss the cell reference for the frames defined in the RAN2 #119bis agreement for additional impacts to HO/CHO scenarios.

Observation 1: If the UE has to await a future epoch time it will impact Random Access resource allocation and handover interruption requirements.

Proposal 2: RAN2 to discuss how to handle the nearest epoch time, defined in the RRC reconfiguration message for HO/CHO, which occurs before the UE receives the message.

Observation 2: In case of CHO execution whether UE need to wait for reading serving cell SFN before starting execution as per the above agreement is not clear.

Observation 3: Serving cell SFN reference for epoch time will not work for CHO recovery scenario.

Proposal 3: RAN2 to revisit the agreements on epochTimer reference based on its applicability for CHO and CHO recovery scenarios.

* CB Friday

Other

[R2-2212005](file:///C:\Data\3GPP\Extracts\R2-2212005%2036306CR_Corrections%20for%20UE%20capability.docx) Corrections for UE capability ZTE Corporation, Sanechips CR Rel-17 36.306 17.2.0 1863 - F LTE\_NBIOT\_eMTC\_NTN-Core Late

* Ericsson thinks the text about SIB31 is not needed in 36.306. QC/Nokia think this is clear in 36.331
* Nokia thinks the last 2 changes need reference to the specs. ZTE thinks there is nothing inL1 specs, the text is copied from NR NTN
* First change is agreed
* Continue the discussion on the last two changes in the review of the 36.306 CR

[R2-2212208](file:///C:\Data\3GPP\Extracts\R2-2212208-CR-to-TS36331SIB31-related-timer-correction.docx) Corrections related to Timers for SIB-31 acquisition Nokia Solutions & Networks (I) CR Rel-17 36.331 17.2.0 4890 - F LTE\_NBIOT\_eMTC\_NTN

* HW thinks the first change is correct but already covered in the MTK CR
* QC thinks we don/t need the second change. ZTE agrees
* Not pursued

Withdrawn

R2-2212099 On the remaining issues of UE capabilities for TN-NTN connected mode mobility Nokia, Nokia Shanghai Bell discussion Rel-17 Withdrawn

## 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.

[R2-2211658](file:///C:\Data\3GPP\Extracts\R2-2211658%20IoT-NTN%20AgreementsList.docx) IoT-NTN Agreements List Mediatek India Technology Pvt. report R2-2210368

### 8.6.2 Performance Enhancements

#### 8.6.2.1 HARQ enhancements

HARQ operation for NB-IoT NTN with single HARQ process

[R2-2211578](file:///C:\Data\3GPP\Extracts\R2-2211578%20IoT%20HARQ%20process.doc) Enhancement for UL and DL HARQ processes Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh

Proposal 1 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 plus 12 subframes.

* Oppo wonders if we need to take into account deltaPDCCH. Nokia thinks this should not be considered
* CATT supports this
* ZTE would like to reconsider this
* Oppo thinks we should keep it simple and align to RAN1. Samsung agrees with Oppo
* Ericsson wonders about the situation for eMTC
* Agreed

Proposal 2 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 plus UE-eNB RTT.

* Oppo wonders why we need this for HARQ mode B. IDC agrees and wonders if this is typo and HARQ mode A was actually meant. Nokia agrees. Furthermore it should be 3 + Kmac instead.
* CATT has the same view as Oppo, IDC, Nokia.
* IDC thinks that for mode A we already have the UL HARQ RTT timer offset by the UE eNB RTT
* Oppo thinks that we need to start the inactivity timer also in legacy.
* RAN2 understands that something needs to be added to consider the processing time also for inactivity timer of HARQ mode B. Continue the discussion on the details in the next meeting

Proposal 3 For NB-IoT, the same mechanism is adopted for HARQ feedback disable/enable and HARQ mode A/B configuration.

* HW thinks we could postpone this

Proposal 4 RAN2 discuss how to address the issue of HARQ processes for the multiple TBs scheduled by the same PDCCH.

* Continue in the next meeting

Agreements:

1. 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 plus 12 subframes.
2. RAN2 understands that something needs to be added to consider the processing time also for inactivity timer of HARQ mode B. Continue the discussion on the details in the next meeting

HARQ disabling for NB-IoT NTN

[R2-2211518](file:///C:\Data\3GPP\Extracts\R2-2211518%20Discussion%20on%20HARQ%20disabling%20for%20NB-IoT%20NTN.docx) Discussion on HARQ disabling for NB-IoT NTN Huawei, HiSilicon discussion Rel-18 IoT\_NTN\_enh

Proposal 1: For NB-IoT NTN HARQ disabling, support both RRC based and DCI based solution. Which solution is used can be configured by RRC. The details of DCI based solution are up to RAN1.

* Ericsson/IDC would like to wait for RAN1

LCP restrictions for eMTC

[R2-2211336](file:///C:\Data\3GPP\Extracts\R2-2211336%20-%20Discussion%20on%20HARQ%20enhancement%20for%20IoT%20NTN.doc) Discussion on HARQ enhancement for IoT NTN OPPO discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 7 For eMTC, the following LCH to HARQ process mapping rules are supported:

1) LCH is mapped only to a HARQ process configured with HARQ mode A;

2) LCH is mapped only to a HARQ process configured with HARQ mode B;

3) If an LCH is not configured with a mapping rule, it may be mapped to any HARQ process (HARQ mode A or B).

4) If UL HARQ mode is not configured, LCH mapping rules are not supported (legacy behaviour)

* Agreed

Proposal 8 For eMTC, introduce allowedHARQ-mode for each logical channel, e.g. included in LogicalChannelConfig IE.

* Agreed

Agreements:

1. For eMTC, the following LCH to HARQ process mapping rules are supported:

1) LCH is mapped only to a HARQ process configured with HARQ mode A;

2) LCH is mapped only to a HARQ process configured with HARQ mode B;

3) If an LCH is not configured with a mapping rule, it may be mapped to any HARQ process (HARQ mode A or B).

4) If UL HARQ mode is not configured, LCH mapping rules are not supported (legacy behaviour)

2. For eMTC, introduce allowedHARQ-mode for each logical channel, e.g. included in LogicalChannelConfig IE.

UE capability

[R2-2212618](file:///C:\Data\3GPP\Extracts\R2-2212618%20Discussion%20on%20the%20HARQ%20enhancement%20for%20IoT-NTN.docx) Discussion on the HARQ enhancement for IoT-NTN CMCC discussion Rel-18 IoT\_NTN\_enh

Proposal 4: An optional UE capability is introduced to indicate whether the UE supports disabling HARQ feedback for downlink transmission.

* CATT supports both
* Intel also supports but for p5 the LCP restriction part is only for eMTC
* Agreed

Proposal 5: An optional UE capability is introduced to indicate whether the UE supports HARQ Mode B and the corresponding LCP restrictions for uplink transmission.

* Agreed as “An optional UE capability is introduced to indicate whether the UE supports HARQ Mode B and, for eMTC, the corresponding LCP restrictions for uplink transmission”

Agreements:

1. An optional UE capability is introduced to indicate whether the UE supports disabling HARQ feedback for downlink transmission.
2. An optional UE capability is introduced to indicate whether the UE supports HARQ Mode B and, for eMTC, the corresponding LCP restrictions for uplink transmission

[R2-2211288](file:///C:\Data\3GPP\Extracts\R2-2211288%20On%20Disabling%20HARQ%20Feedback%20in%20IoT-NTN.docx) On Disabling HARQ Feedback in IoT-NTN Mediatek Inc. discussion

[R2-2211311](file:///C:\Data\3GPP\Extracts\R2-2211311%20Discussion%20on%20the%20HARQ%20disabling%20in%20IoT%20NTN-clean.docx) Discussion on the HARQ disabling in IoT NTN CATT discussion Rel-18 IoT\_NTN\_enh

[R2-2211549](file:///C:\Data\3GPP\RAN2\Docs\R2-2211549.zip) Remaining Issues on HARQ Feedback in IoT NTN Lockheed Martin discussion

[R2-2211833](file:///C:\Data\3GPP\Extracts\R2-2211833.docx) Discussion on HARQ enhancement for IoT NTN. Transsion Holdings discussion Rel-18

[R2-2212011](file:///C:\Data\3GPP\Extracts\R2-2212011%20Further%20discussion%20on%20HARQ%20enhancements.docx) Further discussion on HARQ enhancements ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2212044](file:///C:\Data\3GPP\Extracts\R2-2212044%20Further%20considerations%20on%20HARQ%20enhancements%20for%20IoT%20NTN.docx) Further considerations on HARQ enhancements for IoT NTN Lenovo discussion Rel-18

[R2-2212295](file:///C:\Data\3GPP\Extracts\R2-2212295%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

[R2-2212487](file:///C:\Data\3GPP\Extracts\R2-2212487%20On%20HARQ%20enhancements%20for%20IoT%20NTN.docx) On HARQ enhancements for IoT NTN Samsung R&D Institute UK discussion Rel-18 IoT\_NTN\_enh

[R2-2212726](file:///C:\Data\3GPP\Extracts\R2-2212726%20Discussion%20on%20HARQ%20enhancements%20for%20IoT%20NTN.docx) Discussion on HARQ enhancements for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-18 IoT\_NTN\_enh

[R2-2212806](file:///C:\Data\3GPP\Extracts\R2-2212806%20Discussion%20on%20disabling%20of%20HARQ%20feedback.doc) Discussion on disabling of HARQ feedback Xiaomi discussion Rel-18

[R2-2212954](file:///C:\Data\3GPP\Extracts\R2-2212954%20-%20R18%20IoT%20NTN%20performance%20enhancement.docx) R18 IoT NTN performance enhancement Ericsson discussion

#### 8.6.2.2 GNSS operation enhancements

Not treated at this meeting. No contributions expected

[R2-2211347](file:///C:\Data\3GPP\Extracts\R2-2211347%20GNSS%20operation.doc) Discussion on GNSS operation in connected mode OPPO discussion Rel-18 IoT\_NTN\_enh-Core

### 8.6.3 Mobility Enhancements

#### 8.6.3.1 Enhancements for neighbour cell measurements

neighbour cell measurements enhancements in connected mode for eMTC

[R2-2212778](file:///C:\Data\3GPP\Extracts\R2-2212778%20-%20Triggering%20neighbour%20cell%20measurements%20prior%20to%20RLF.docx) Triggering neighbor cell measurements prior to RLF Ericsson discussion Rel-18 IoT\_NTN\_enh

Proposal 1 Introduce time-based criteria to trigger neighbour cell measurements in connected mode for both NB-IoT and LTE-M in NTN.

* MTK supports p1
* QC thinks that RAN4 defines a minimum delay and wonders whether any new criteria is needed for LTE-M
* Oppo supports this for both NB-IoT and LTE-M
* IDC thinks that if we have it is for Earth-fixed. Also IDC thinks this makes more sense for CHO
* Intel thinks there is no use case for eMTC
* Samsung supports this for CHO and normal HO and we could actually refer to T-service
* HW wonders if connected UEs would have to look both a dedicated configuration and at broadcast signalling. ZTE agrees with HW and if we have it, it should not be used for HO. If we have it, we should have the same mechanism for NB-IoT and eMTC. NEC agrees
* CATT does not support p1
* Oppo thinks that Tservice is quite static and the UE could continue to be used in connected mode with no need to read it again
* HW thinks that we don't have measurement triggering enhancements even for NR NTN devices, why eMTC devices should be more complicated
* Nokia would like to clarify that this should be linked to a measurement config
* For NB-IoT we support a trigger for neighbour cell measurements based on T-service (in the quasi-Earth fixed case) (this does not preclude anything for eMTC discussion)
* ZTE thinks we should settle the details for the time-base dtrigger before knowing if we can apply this to eMTC
* Continue in offline 111 to discuss applicability for eMTC

Proposal 2 Introduce distance-based criteria to trigger neighbour cell measurements in connected mode for both NB-IoT and LTE-M at least for quasi-fixed earth cells in NTN.

Agreements:

1. For NB-IoT we support a trigger for neighbour cell measurements based on T-service (in the quasi-Earth fixed case) (this does not preclude anything for eMTC discussion)

* [AT120][111][IoT-NTN\_Enh] Measurements Enhancements for eMTC (Ericsson)

Scope: continue to the discussion on measurement enhancements in connected mode for eMTC

Intended outcome: list of agreeable proposals

Deadline for companies' feedback: Thursday 2022-11-17 20:00 CET (F2F discussion is invited)

Deadline for rapporteur's summary (in R2-2213024): Friday 2022-11-18 06:00 CET

R2-2213024 [offline 111] Measurement enhancements for eMTC Ericsson discussion Rel-18 IoT\_NTN\_enh

[R2-2211579](file:///C:\Data\3GPP\Extracts\R2-2211579%20IoT%20mobility.doc) Connected mode measurement trigger Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh

Proposal 5 For eMTC, no new trigger condition is needed for connected mode measurement but introduce distance-based trigger event for measurement report.

Proposal 6 check with RAN4 if connected mode RRM measurement relaxation based on time/location is possible.

Proposal 7 In connected mode in quasi-earth fixed cell, eMTC UE can perform intra-frequency neighbor cell measurements before the cell stop time if no measurement gap is needed.

[R2-2212238](file:///C:\Data\3GPP\Extracts\R2-2212238.docx) Enhancements for neighbour cell measurements NEC discussion Rel-18 IoT\_NTN\_enh

Observation 1 Objective of Support of neighbour cell measurements and corresponding measurements triggering before RLF is intended for NB-IoT but not for eMTC

Observation 2 triggering neighbour cell measurement when serving cell is about to swich off or when UE is moving away from serving cell for eMTC is covered by CHO/measurement configuration enhancement

Observation 3 there is no need to enhance S\_ measure for eMTC over NTN as same for NR NTN

Proposal 1 No need to support neighbour cell measurements and corresponding measurement triggering before RLF for eMTC over NTN

Proposal 2 triggering neighbour cell measurement when serving cell is about to swich off or when UE is moving away from serving cell for eMTC should be discussed in the CHO/measurement configuration enhancement topic

[R2-2211337](file:///C:\Data\3GPP\Extracts\R2-2211337%20-%20Discussion%20on%20measurement%20enhancement%20for%20IoT%20NTN.doc) Discussion on measurement enhancement for IoT NTN OPPO discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1 For NB-IoT, introduce location-based “s-measure criterion” and “low mobility criterion” for neighbouring cell measurement triggering in RRC\_CONNECTED.

Proposal 2 For eMTC, introduce location-based “s-measure criterion” for neighbouring cell measurement triggering in RRC\_CONNECTED.

Proposal 3 For both NB-IoT and eMTC, RRC\_CONNECTED neighbouring cell measurement triggering is based on a combination of RSRP-based criterion and location-based criterion.

(distance-based measurement triggers)

Proposal 4 For quasi-earth fixed cell, distance between UE and serving cell reference location is used to trigger neighbouring cell measurement in RRC\_CONNECTED for IoT NTN.

Proposal 5 For earth moving cell, distance between UE and serving satellite is used to trigger neighbouring cell measurement in RRC\_CONNECTED for IoT NTN.

Measurement triggers

[R2-2211289](file:///C:\Data\3GPP\Extracts\R2-2211289%20On%20Mobility%20Enhancements%20in%20IoT-NTN.docx) On Mobility Enhancements in IoT-NTN Mediatek Inc. discussion

Time-based measurement triggers based on serving cell coverage

* Quasi-earth fixed cells

Proposal 2: For quasi-earth fixed cells, UE may start intra/inter frequency measurement in connected mode before the t-Service if present.

- IDC wonders whether this has any specification impact

* Agreed as: “At least for NB-IoT NTN, for quasi-earth fixed cells, UE shall start intra/inter frequency measurement in connected mode before the t-Service if present. The exact time to start measurements in connected mode before t-Service can be left to UE implementation” (can revisit if we agree other proposal based on neighbour cell coverage)

- Intel thinks p2 (for earth-fixed cell) is not related to p8 (for earth-moving cell)

Proposal 3: The exact time to start measurements in connected mode before t-Service can be left to UE implementation.

Proposal 4: RAN2 will not specify the condition of stopping UE measurement before t-Service.

* Agreed
* Earth-moving cells

Proposal 5: For earth-moving cell, the UE derives when loss of coverage of current cell happens (how to derive this information is FFS)

- ZTE thinks we should rather base on the distance

- HW thinks we already have IE for footprint info in R17 IoT NTN

* Agreed

Proposal 6: For earth-moving cell, UE shall start intra/inter frequency measurements in RRC connected mode before losing coverage. The exact time to start measurements can be left to UE implementation

* Agreed

Agreements:

1. At least for NB-IoT NTN, for quasi-earth fixed cells, UE shall start intra/inter frequency measurement in connected mode before the t-Service if present. The exact time to start measurements in connected mode before t-Service can be left to UE implementation” (can revisit if we agree other proposal based on neighbour cell coverage)
2. RAN2 will not specify the condition of stopping UE measurement before t-Service
3. For earth-moving cell, the UE derives when loss of coverage of current cell happens (how to derive this information is FFS)
4. For earth-moving cell, UE shall start intra/inter frequency measurements in RRC connected mode before losing coverage. The exact time to start measurements can be left to UE implementation

Time-based measurement triggers based on neighbour cell coverage

Proposal 7: UE calculates the time of UE entering the neighbor satellite’s coverage.

Proposal 8: UE may start intra/inter frequency measurements in RRC connected mode after the calculated time of entering the neighbor satellite’s coverage for continuous coverage

[R2-2212296](file:///C:\Data\3GPP\Extracts\R2-2212296%20(R18%20IoT-NTN%20WI%20AI%208.6.3.1)%20-%20measurements%20before%20RLF.docx) Neighbour cell measurements before RLF Interdigital, Inc. discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1: Measurements of a neighbouring NTN cell are triggered before t-service only if the incoming neighbour cell t-serviceStart is before t-service, or if no t-serviceStart is provided for the neighbour cell.

Proposal 2: Measurements on TN carriers (if configured by the NW) can start independently of neighbouring NTN cell coverage. FFS whether this applies to all scenarios.

Proposal 3: If the serving cell t-service expires, stop T310 and start T311 (i.e. perform cell search and re-establishment without attempting to recover on the current cell for the duration of T310).

[R2-2211312](file:///C:\Data\3GPP\Extracts\R2-2211312%20%20Enhancements%20for%20Neighbour%20Cell%20Measurements.docx) Enhancements for Neighbor Cell Measurements CATT discussion Rel-18 IoT\_NTN\_enh

[R2-2211412](file:///C:\Data\3GPP\Extracts\R2-2211412%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

[R2-2211737](file:///C:\Data\3GPP\Extracts\R2-2211737_RLF%20in%20IoT%20NTN.doc) Neighbour cell measurements before RLF for NB-IoT Apple discussion Rel-18 IoT\_NTN\_enh

[R2-2211834](file:///C:\Data\3GPP\Extracts\R2-2211834.docx) Discussion on Enhancements for neighbour cell measurements Transsion Holdings discussion Rel-18

[R2-2212012](file:///C:\Data\3GPP\Extracts\R2-2212012%20Discussion%20on%20enhancements%20for%20neighbor%20cell%20measurements.docx) Discussion on enhancements for neighbor cell measurements ZTE Corporation, Sanechips discussion IoT\_NTN\_enh-Core

[R2-2212045](file:///C:\Data\3GPP\Extracts\R2-2212045%20CONNECTED%20neighbour%20cell%20measurement%20for%20NB-IoT%20in%20NTN%20(Revision%20of%20R2-2209967).docx) CONNECTED neighbour cell measurement for NB-IoT in NTN Lenovo discussion Rel-18

[R2-2212077](file:///C:\Data\3GPP\Extracts\R2-2212077%20Consideration%20on%20enhancements%20for%20the%20neighbour%20cell%20measurement.doc) Consideration on enhancements for the neighbour cell measurement Xiaomi discussion

[R2-2212486](file:///C:\Data\3GPP\Extracts\R2-2212486%20Connected%20mode%20mobility%20enhancements%20for%20IoT%20NTN.docx) Connected mode mobility enhancements for IoT NTN Samsung R&D Institute UK discussion Rel-18 IoT\_NTN\_enh

[R2-2212619](file:///C:\Data\3GPP\Extracts\R2-2212619%20Discussion%20on%20enhancements%20for%20neighbour%20cell%20measurements.docx) Discussion on enhancements for neighbour cell measurements CMCC discussion Rel-18 IoT\_NTN\_enh

[R2-2212828](file:///C:\Data\3GPP\Extracts\R2-2212828%20Discussion%20on%20neighbour%20cell%20measurements.DOC) Discussion on neighbour cell measurements Huawei, HiSilicon discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN

#### 8.6.3.2 Other

conditional reconfiguration triggers for eMTC

[R2-2212297](file:///C:\Data\3GPP\Extracts\R2-2212297%20(R18%20IoT-NTN%20WI%20AI%208.6.3.2)%20-%20other%20mobility%20enhancements.docx) Other IoT-NTN mobility enhancements Interdigital, Inc. discussion Rel-18 IoT\_NTN\_enh-Core

For conditional reconfiguration triggers for eMTC:

Proposal 1: For eMTC NTN, introduce a time-based conditional reconfiguration trigger based on condEventT1 in NR, where the event will be satisfied if conditional handover execution occurs between T1 and T2, where T2 = T1 + a duration (similar to condEventT1 in NR)

Proposal 2: For eMTC NTN, introduce a location-based conditional reconfiguration trigger based on condEventD1 in NR, where the event will be satisfied if the distance between the UE and a first reference location (e.g. within the serving cell) is above a threshold, and the distance between the UE and a second reference location (e.g. within a neighbour cell) is below a threshold. (similar to condEventD1 in NR)

Proposal 3: For eMTC NTN, introduce event A4 based conditional trigger (similar to condEventA4 in NR).

Proposal 4: Time and location-based trigger conditions may be configured independently (i.e., without a jointly configured event A4 measurement condition) for eMTC NTN.

For Idle/Inactive:

Proposal 5: Introduce optional distance-based relaxation for RRC\_IDLE based on distanceThresh in NR.

[R2-2211313](file:///C:\Data\3GPP\Extracts\R2-2211313%20Discussion%20on%20Location%20Based%20CHO%20Mechanism-final.docx) Discussion on Location Based CHO Mechanism CATT discussion Rel-18 IoT\_NTN\_enh

Earth-moving cell scenario:

Observation 1: For earth-moving cell scenario, the time of losing coverage is different for UEs with different locations in the cell.

Proposal 2: For location based CHO in earth-moving cell scenario, CondEvent D1 is also applicable, and the reference location used in CondEvent D1 should be real-time position.

Proposal 3: RAN2 to discuss the following two options on how to determine the real-time reference location of earth-moving cell.

- Provide UE the relative coordinate of the cell center. The relative coordinate of cell center is reference to the coordinate of sub-satellite point.

- Provide UE the beam antenna angle of the cell center. The beam angle of the cell center is reference to the direction of sub-satellite point.

Proposal 4: For earth-moving cell scenario, the enhanced mechanism of location-based CHO is also applicable for NR NTN.

[R2-2212948](file:///C:\Data\3GPP\Extracts\R2-2212948%20-%20Conditional%20Handover%20in%20IoT%20NTN.docx) Conditional Handover in IoT NTN Ericsson discussion

Proposal 3 Location-based and time-based CHO triggers can be configured standalone without a companion RRM measurement-based event for eMTC NTN.

Group HO

[R2-2212013](file:///C:\Data\3GPP\Extracts\R2-2212013%20Discussion%20on%20mobility%20enhancements%20for%20eMTC%20NTN.docx) Discussion on mobility enhancements for eMTC NTN ZTE Corporation, Sanechips discussion IoT\_NTN\_enh-Core

Proposal 11: Group based handover should be supported with the following:

- Divide UE into several groups and assign each UE with a group id.

- UE report the group id together with the measurement results in measurement report.

- Upon reception of measurement report from one or a few of the UEs in this group, Network can decide to handover all the UEs or some of them in this group and send HO command to each UE.

RLF

[R2-2211580](file:///C:\Data\3GPP\Extracts\R2-2211580%20RLF%20detection.doc) RLF detection in earth fixed cell Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh

Proposal 1 At cell stop time, the UE considers the radio link failure is detected in the earth fixed cell.

[R2-2212168](file:///C:\Data\3GPP\Extracts\R2-2212168.doc) Discussion on mobility enhancement in IoT-NTN Spreadtrum Communications discussion Rel-18

Proposal 3: Early RLF is not supported.

Proposal 4: When the serving satellite flies away from the serving area, the UE will perform RRC re-establishment.

Cell reselection enhancements

[R2-2212241](file:///C:\Data\3GPP\Extracts\R2-2212241.docx) Idle mode Mobility Enhancement for IoT NTN Samsung Electronics Nordic AB discussion

Proposal 1: The network may provide assistance information to the UE on serving and neighbour cells to assist the UE measurements and/or cell re-selection.

Proposal 2: The UE needs to consider the relative velocity with respect to the Earth-moving cells also during distance based cell re-selection.

[R2-2212046](file:///C:\Data\3GPP\Extracts\R2-2212046%20IDLE%20mobility%20for%20IoT%20NTN%20(Revision%20of%20R2-2209968).docx) IDLE mobility for IoT NTN Lenovo discussion Rel-18

[R2-2212239](file:///C:\Data\3GPP\Extracts\R2-2212239.docx) CHO and Measurement enhancement for eMTC NEC discussion Rel-18 IoT\_NTN\_enh

[R2-2212829](file:///C:\Data\3GPP\Extracts\R2-2212829%20Discussion%20on%20CHO%20enhancements.DOC) Discussion on CHO enhancements Huawei, HiSilicon discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN

Moved here from 8.6.3

[R2-2212101](file:///C:\Data\3GPP\Extracts\R2-2212101-Mobility-Enhancements-IoT-NTN.docx) Analysis on mobility enhancements for IoT-NTN Nokia, Nokia Shanghai Bell discussion Rel-18

[R2-2212102](file:///C:\Data\3GPP\Extracts\R2-2212102-Additional-Aspects-Mobility-Enhancements.docx) Additional aspects for mobility enhancements for IoT-NTN Nokia, Nokia Shanghai Bell discussion Rel-18

[R2-2212909](file:///C:\Data\3GPP\Extracts\R2-2212909.docx) Discussion on Mobility Enhancements of IoT NTN Turkcell discussion Rel-18

### 8.6.4 Enhancements to discontinuous coverage

Not treated at this meeting. No contributions expected

[R2-2211290](file:///C:\Data\3GPP\Extracts\R2-2211290%20On%20Enhancements%20to%20discontinuous%20coverage.docx) On Enhancements to discontinuous coverage Mediatek Inc. discussion

## 8.7 NR NTN enhancements

(xx-Core; leading WG: RAN1; REL-18; WID: RP-222654)

Time budget: 1 TU

Tdoc Limitation: 4 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.

[R2-2211129](file:///C:\Data\3GPP\Extracts\R2-2211129_S2-2209589.docx) Response LS on LCS framework for Network verified UE location (NTN) (S2-2209589; contact: CATT) SA2 LS in Rel-18 FS\_eLCS\_Ph3 To:RAN2 Cc:RAN3, RAN1

* Noted

Moved here from 6.10.1

[R2-2211132](file:///C:\Data\3GPP\Extracts\R2-2211132_S2-2209684.docx) LS on Satellite coverage data transfer to a UE using UP versus CP (S2-2209684; contact: Qualcomm) SA2 LS in Rel-18 FS\_5GSAT\_Ph2 To:CT1 Cc:RAN2, RAN3, SA3

- HW thinks this is more for discontinuous coverage for NB-IoT NTN rather than NR NTN

* Noted

### 8.7.2 Coverage Enhancements

Msg3 repetition (and segmented pre-compensation/ PUCCH repetition)

[R2-2211314](file:///C:\Data\3GPP\Extracts\R2-2211314%20Discussion%20on%20NTN%20coverage%20enhancements.docx) Discussion on NTN coverage enhancements CATT discussion Rel-18 NR\_NTN\_enh

Proposal 2: No further enhancements for Msg3 repetition determination in NTN.

Proposal 3: For NTN coverage enhancement scenario, if Timing Advance report (TAR) during RACH procedure is triggered, TA report MAC CE should be included in Msg5.

Proposal 4: The agreements about segment based UE pre-compensation for long UL transmission in Rel-17 IoT NTN can be reused in Rel-18 NR NTN coverage enhancement scenario.

- QC thinks this should be discussed in RAN1 first. IDC agrees

Proposal 5: Send LS to RAN1 to check if they have any concern if the agreements about segment based UE pre-compensation for long UL transmission in Rel-17 IoT NTN is reused in Rel-18 NR NTN coverage enhancement scenario.

- Ericsson thinks that p4, p5 and p6 are RAN1 issues and should be discussed there with no need for an LS. Samsung agrees

Proposal 6: PUCCH repetition for NTN in RAN2 can be studied after more inputs achieved in RAN1.

[R2-2212951](file:///C:\Data\3GPP\Extracts\R2-2212951%20-%20R18%20NR%20NTN%20Coverage%20enhancements.docx) R18 NR NTN Coverage enhancements Ericsson discussion

Observation 1 The R17 functionality of Msg3 repetition was not specified for contention free random access.

Observation 2 CFRA Msg3 repetition will improve Msg3 coverage, decrease the DCI overhead and decrease latency as a handover enhancement.

Proposal 1 Support Msg3 repetitions for contention free random access.

- Ericsson thinks that msg3 repetition is especially important for NTN

- LG thinks this increases UE complexity.

- QC agrees with p1 and thinks this is really the missing thing in NTN. We might need to check with RAN1 as well

- VDF wonders whether there is any performance improvement results for this

- CATT agrees with LG, this is not NTN specific issue, if needed, this can be discussed in CE WI

- Oppo thinks this is up to RAN1 to introduce. Location-based trigger should be considered in conjunction with this

- ZTE wonders which message is repeated with this procedure. Vivo also is not clear about this and think that RAN1 should initiate this.

- LG thinks this would lead to a tiny optimization for only a single transmission. Nokia agrees.

- Intel wonders whether DMRS bundling can be applied to Msg3?

- Lenovo is OK to leave this to RAN1. In Rel-17 CE RAN1 made decision regarding CBRA and CFRA

- NEC supports this, specifically for the HO case.

* Companies are invited to raise this in RAN1

[R2-2212047](file:///C:\Data\3GPP\Extracts\R2-2212047%20Potential%20issues%20for%20Msg3%20repetition%20in%20NTN%20(Revision%20of%20R2-2209969).docx) Potential issues for Msg3 repetition in NTN Lenovo discussion Rel-18

Proposal 1: RAN2 to confirm that enhancements to Msg3 repetition are needed for Rel-18 NR NTN.

And if Proposal 1 is agreed, at least the following NTN-specific issues may need to be discussed:

* The RSRP-based requesting mechanism for Msg3 repetition may not work well considering fuzzy RSRP difference in an NTN cell.
* The satellite movement may lead to collisions in the PRACH resources for requesting Msg3 repetition, especially when the serving satellite is at a low elevation angle.
* Due to the propagation delay and satellite movement, a UE requested for Msg3 repetition by Msg1 transmission may no longer fulfill the RSRP criterion, while a UE not requested for Msg3 repetition may fulfill the RSRP criterion after Msg1 transmission.
* The behavior of ContentionResolutionTimer with UE-gNB RTT offset applied to the start needs to be specified for Msg3 repetition.
* When TAR reporting is enabled in an NTN cell and a UE also requests for Msg3 repetition, whether TAR is transmitted in each Msg3 repetition

- LG thinks we don’t need to enhance msg3 repetition for these cases

*-* Oppo/Nokia support Lenovo observations. NEC agrees with Nokia.

*-* HW agrees with LG, no enhancements is needed.

*-* ZTE/vivo/MTK agree

*-* Samsung thinks there is no issue with ContentionResolutionTimer with UE-gNB RTT offset. Similarly for the last bullet. LG agrees

*-* CATT thinks that for the last bullet of TAR reporting, we share the same view with Lenovo, in this case, the TAR should be transmitted in Msg5.

* From RAN2 perspective we don’t consider msg3 repetition enhancements in R18 NR NTN (apart from msg3 for CFRA, if decided by RAN1)

Proposal 2: If Proposal 1 is agreed, RAN2 to further discuss the above NTN-specific issues for Msg3 repetition.

Agreements:

1. From RAN2 perspective we don’t consider msg3 repetition enhancements in R18 NR NTN (apart from msg3 for CFRA, if decided by RAN1)

Blind retransmission for initial Msg3 transmission

[R2-2212336](file:///C:\Data\3GPP\Extracts\R2-2212336%20(R18%20NR%20NTN%20WI%20AI%208.7.2)%20Msg3%20blind%20retx.docx) Blind Msg3 retransmission in Rel-18 NTN InterDigital discussion Rel-18 NR\_NTN\_enh-Core

Observation 1: Previous solutions for < UE-gNB RTT blind Msg3 retransmission grant reception mandate additional monitoring for all UEs regardless of coverage conditions, increasing power consumption uncessecarily.

Observation 2: If the ra-ContentionResolutionTimer is started immediately after initial Msg3 transmission and a blind Msg3 retransmission grant is not received prior to timer expiry, UE may declare premature Contention Resolution failure in some NTN deployment scenarios (e.g. GEO).

Proposal 1: Study enhancements to enable fast (i.e. < UE-gNB RTT after initial Msg3 transmission) blind Msg3 retransmission grant reception in Rel-18 NTN.

- Nokia supports the intention and we could reword the proposal

- NEC prefers to work on enhancing msg3 repetitions. Nokia thinks this would not help

- vivo thinks R17 UEs would not support this and then there might be interoperability issues

* RAN2 will consider enhancements to enable initial blind Msg3 retransmission grant reception in Rel-18 NTN

- MTK wonders if we can then conclude the study.

Proposal 2: Fast blind Msg3 retransmission grant reception is optional and enabled based on configuration and/or indication (e.g. via RAR).

Agreements:

1. RAN2 will consider enhancements to enable initial blind Msg3 retransmission grant reception in Rel-18 NTN

[R2-2212240](file:///C:\Data\3GPP\Extracts\R2-2212240.docx) Coverage enhancement NEC discussion Rel-18 NR\_NTN\_enh

Proposal 1 No further enhancement to support initial Msg3 blind scheduling

Proposal 2 RAN2 discuss necessary enhancement on Msg3 repetition feature for NTN scenario.

Proposal 3 RAN2 to study broadcast based codec bit rate adaptation mechanism for NTN.

Frame agreegation / L2 header reduction

[R2-2211335](file:///C:\Data\3GPP\Extracts\R2-2211335%20-%20Discussion%20on%20L2%20header%20reduction%20in%20NTN.doc) Discussion on L2 header reduction in NTN OPPO discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1 RAN2 doesn’t consider using shorter PDCP SN for VoNR in NTN.

* Agreed

Proposal 2 Using RLC TM mode for VoNR in NTN is not supported.

* Agreed

Proposal 3 RAN2 doesn’t consider MAC enhancement to reduce MAC header size for VoNR in NTN.

* Agreed

Agreements:

1. RAN2 doesn’t consider using shorter PDCP SN for VoNR in NTN.
2. Using RLC TM mode for VoNR in NTN is not supported.
3. RAN2 doesn’t consider MAC enhancement to reduce MAC header size for VoNR in NTN.

[R2-2212727](file:///C:\Data\3GPP\Extracts\R2-2212727%20On%20coverage%20enhancements%20for%20NR%20NTN.docx) On coverage enhancements for NR NTN Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh

Proposal 1: To support VoNR in NTN, RAN needs to know UE’s frame aggregation information in a voice packet.

- LG thinks we already discussed this and there was no support

- Nokia highlights that the proposal is the RAN needs to know the frame aggregation information, even if handled at higher level

- QC supports p1

- Oppo thinks we don’t need this. VDF agrees, it can be left to NW implementation. Ericsson agrees

* RAN2 will not specify signalling whereby the RAN knows the UE’s frame aggregation information in a voice packet

Agreements:

1. RAN2 will not specify signalling whereby the RAN knows the UE’s frame aggregation information in a voice packet

Proposal 2: The VoIP codec adaptation mechanism should be enhanced for NR NTN.

[R2-2212613](file:///C:\Data\3GPP\Extracts\R2-2212613%20Discussion%20on%20coverage%20enhancements.docx) Discussion on coverage enhancements CMCC discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: It may be beneficial for repetitions configuration if RAN has acknowledge of frame aggregation in voice packet at UE side. Kindly suggest RAN2 to discuss this cautiously.

Proposal 2: Suggest RAN2 not to pursue the L2 protocol overhead reduction at this time and we could also come back to this if RAN1 has some concerns.

[R2-2211571](file:///C:\Data\3GPP\Extracts\R2-2211571%20coverage%20enhancement.doc) Discussion on RAN2 aspects of coverage enhancements Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh

Proposal 1 RAN2 discuss the mechanism for UE to inform the gNB on the voice frame aggregation level.

Proposal 2 For coverage enhancements, study the details on specification change to support PDCP layer frame aggregation.

Proposal 3 PDCP compression of ROHC header is used to save 1 byte from the ROHC header and CRC check is ignored at ROHC when PDCP compression of ROHC header is configured.

Proposal 4 Introduce 1-byte PDCP header to be configured for voice DRB.

Proposal 5 Network can configure not to use RLC header from a PDU associated with the DRB that is configured for voice traffic.

Proposal 6 Consider removing L field from MAC subheader of the PDU associated with the low data rate DRB.

[R2-2211324](file:///C:\Data\3GPP\Extracts\R2-2211324%20Further%20discussion%20on%20overhead%20reduction%20for%20VoNR%20in%20NR%20NTN.docx) Further discussion on overhead reduction for VoNR in NR NTN vivo discussion

[R2-2212279](file:///C:\Data\3GPP\Extracts\R2-2212279%20Consideration%20on%20coverage%20enhancement%20in%20NTN.docx) Consideration on coverage enhancement in NTN ZTE Corporation, Sanechips discussion Rel-18

[R2-2212447](file:///C:\Data\3GPP\Extracts\R2-2212447%208.7.2%20Discussion%20on%20NR%20NTN%20Coverage%20Enhancement.docx) Discussion on NR NTN Coverage Enhancement Samsung Research America discussion Rel-18 NR\_NTN\_enh

[R2-2212760](file:///C:\Data\3GPP\Extracts\R2-2212760_Discussion%20on%20the%20L2%20header%20reduction%20in%20NTN_r2.DOCX) Discussion on the coverage enhancement in NTN LG Electronics Inc. discussion NR\_NTN\_enh-Core

[R2-2212803](file:///C:\Data\3GPP\Extracts\R2-2212803%20Discussion%20on%20coverage%20enhancement%20for%20NR%20NTN.doc) Discussion on coverage enhancement for NR NTN Xiaomi discussion Rel-18

[R2-2212937](file:///C:\Data\3GPP\Extracts\R2-2212937%20Discussion%20on%20coverage%20enhancements.doc) Discussion on coverage enhancements Huawei, HiSilicon discussion Rel-18

### 8.7.3 Network verified UE location

Comments to SA2 reply LS and NG-RAN involvement in verification procedure

[R2-2211517](file:///C:\Data\3GPP\Extracts\R2-2211517%20Discussion%20on%20the%20overall%20procedure%20of%20network%20verified%20UE%20location.doc) Discussion on the overall procedure of network verified UE location Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh

Observation 1: The AMF may only verify whether the selected PLMN is correct based on the location information provided by LMF according to the reply LS from SA2.

Observation 2: There may be some misalignment between SA2 and RAN on the requirements and use cases of Network verified UE location in R18.

Proposal 1: RAN2 to discuss whether the UE location verification procedure in SA2’s LS is sufficient to fulfil the requirements and use cases identified by RAN.

Proposal 2: RAN2 to discuss what additional procedure steps are needed on top of SA2 procedure and send an LS to SA2 if needed.

[R2-2212097](file:///C:\Data\3GPP\Extracts\R2-2212097_NTN_NW_Verified.docx) On NTN NW verified UE location aspects Lenovo discussion Rel-18

Proposal 2: AMF may trigger and perform the network UE location verification procedure using the NI-LR LCS procedure.

Observation 2: Without any indication to LMF for the choice of location estimate positioning method for verification, the LMF may choose a wrong positioning method.

Proposal 3: Send a LS to SA2 to clarify about the indication of selection of positioning method by LMF for the purpose of verification.

[R2-2211373](file:///C:\Data\3GPP\Extracts\R2-2211373-Network%20verification%20of%20UE%20location.docx) On Network Verified UE Location in NR NTN Mediatek Inc. discussion R2-2209444

Proposal 1: If RAN1 agrees to Multiple-RTT method then RAN2 should discuss a procedure where the UE is configured to transmit UE-specific TA reports several times for a serving cell over a short period of time immediately after moving to connected.

Reliability of UE reported information

[R2-2212640](file:///C:\Data\3GPP\Extracts\R2-2212640%20Network%20verified%20UE%20location.docx) Network verified UE location THALES discussion

Proposal 1: RAN2 to prepare an LS to SA3 asking which information reported by the UE in 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 2: NG-RAN may implement some processing to support/contribute to the verification of the UE location that could be triggered by core network.

[R2-2212949](file:///C:\Data\3GPP\Extracts\R2-2212949%20-%20R18%20NR%20NTN%20Network%20verified%20UE%20location.docx) R18 NR NTN Network verified UE location Ericsson discussion NR\_NTN\_enh

Proposal 1 RAN2 agreements shall state the assumptions. For example, “From a RAN2 point of view, assuming NW may trust the UE reported timing advance using RRC signalling, the NW can estimate the UEs position by receiving N measurements with at least T seconds in between each measurement.” or “From a RAN2 point of view, assuming UEs can be allowed access to services before the NW has verified the UE location, the latency of the verification is handled by the network.” or “Verification may be considered successful if reported UE location is within 5-10 km of one of NW estimated UE location symmetrical around the satellites nadir path o the ground”.

Proposal 2 From RAN2 point of view, assuming the NW may allow the UEs access to services before verifying the UE reported location, the latency of the NW verification can be handled by the NW.

* Agreed

Proposal 3 UE reporting of timing advance cannot be trusted in NTNs.

Proposal 4 RAN2 postpone solution discussions for NW verification of UE position until RAN1 have evaluated the solutions.

Proposal 5 RAN2 to summarize the discussion outcome in Chairman notes to conclude the SI.

Agreements:

1. From RAN2 point of view, assuming the NW may allow the UEs access to services before verifying the UE reported location, the latency of the NW verification can be handled by the NW.

Other

[R2-2211988](file:///C:\Data\3GPP\Extracts\R2-2211988.docx) Network Verified UE Location Samsung Electronics Nordic AB discussion

Proposal 1: RAN2 to agree the re-use of the LCS framework of the LMF for the network verification of UE reported location information in NTN.

* RAN2 agrees the re-use of the LCS framework of the LMF for the network verification of UE reported location information in NTN.
* RAN2 will work on the details of radio protocol aspects of the verification procedure based on the solution investigated by RAN1

Proposal 2: RAN2 to discuss possible handling of UEs that do not support the new feature of network verification of UE location information.

- Huawei thinks we can discuss this based on RAN1 progress

Agreements:

1. RAN2 agrees the re-use of the LCS framework of the LMF for the network verification of UE reported location information in NTN.
2. RAN2 will work on the details of radio protocol aspects of the verification procedure based on the solution investigated by RAN1

[R2-2212403](file:///C:\Data\3GPP\Extracts\R2-2212403%20Network%20verified%20UE%20location.docx) Further on network verified UE location Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh

[R2-2211325](file:///C:\Data\3GPP\Extracts\R2-2211325%20Further%20discussion%20on%20network%20verified%20UE%20location.docx) Further discussion on network verified UE location vivo discussion Rel-18

[R2-2211348](file:///C:\Data\3GPP\Extracts\R2-2211348%20NW%20verified%20UE%20location.doc) Discussion on network verified UE location OPPO discussion Rel-18 NR\_NTN\_enh-Core

[R2-2211572](file:///C:\Data\3GPP\Extracts\R2-2211572%20Location%20verification.doc) Discussion on network verified UE location Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh

[R2-2211733](file:///C:\Data\3GPP\Extracts\R2-2211733_Discusson%20on%20network%20verified%20UE%20location.doc) Discussion on NTN network verified UE location Apple discussion Rel-18 NR\_NTN\_enh-Core

[R2-2212078](file:///C:\Data\3GPP\Extracts\R2-2212078%20Discussion%20on%20network%20verified%20UE%20location.doc) Discussion on network verified UE location Xiaomi discussion

[R2-2212175](file:///C:\Data\3GPP\Extracts\R2-2212175%20Discussion%20on%20UE%20location%20verify%20procedure.doc) Discussion on UE position verify procedure Spreadtrum Communications discussion Rel-18

[R2-2212280](file:///C:\Data\3GPP\Extracts\R2-2212280%20Consideration%20on%20NW%20verified%20UE%20location.doc) Consideration on NW verified UE location ZTE Corporation, Sanechips discussion Rel-18

[R2-2212705](file:///C:\Data\3GPP\Extracts\R2-2212705%20Remaining%20Issues%20of%20UE%20Location%20Verification%20via%20Network.doc) Remaining Issues of UE Location Verification via Network CMCC discussion Rel-18 NR\_NTN\_enh

Withdrawn

[R2-2212334](file:///C:\Data\3GPP\Extracts\R2-2212334-Network%20verification%20of%20UE%20location.docx) On Network Verified UE Location in NR NTN Mediatek India Technology Pvt. discussion R2-2209444 Withdrawn

### 8.7.4 NTN-TN and NTN-NTN mobility and service continuity enhancements

#### 8.7.4.1 Cell reselection enhancements

NTN-TN

[R2-2211573](file:///C:\Data\3GPP\Extracts\R2-2211573%20IDLE%20mode%20enhancements.doc) TN neighbour cell measurement relaxation Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh

Proposal 1 Providing TN coverage data via dedicated UE signaling should be supported.

- Oppo wonders whether this could be RRC signalling or higher layer signalling (i.e. user data)

- Nokia thinks we need to discuss what TN coverage data is first. Also thinks this data should better be broadcast

- IDC thinks we need to understand which accuracy / granularity level is needed first

- VDF thinks this is not UE specific data

- MTK wonders about the storage overhead aspects

- HW does not think there will be a storage problem. The UE is only interested in the limited information of the area where it is located.

* RAN2 will first continue the investigation on the details of the TN coverage data (e.g. accuracy requirements for describing where TN network(s) is/are available) and UE storage overhead before deciding how to send the information to the UE.

Proposal 2 Send LS to SA2 if TN coverage data can be provided together with satellite coverage data.

Proposal 3 Introduce indication to identify TN cells from inter-frequency list and inter-RAT frequency list.

- vivo wonders if this per frequency. QC thinks it could be per cell in the neighbour cell list

- Nokia wonders where this information would be put.

- Ericsson wonders if cannot rely on implicit information.

- Oppo thinks we can rely on the band number

- Mediatek supports Ericsson and Oppo

- Apple thinks that at least for HAPS we have the same band number

* Continue the discussion on whether to introduce explicit indication to identify TN cells from inter-frequency list and inter-RAT frequency list (FFS on the granularity) or whether we rely on implicit information.

Proposal 4 Introduce relaxed measurement for TN frequency for which the reselection priority is higher than current NTN cell reselection priority.

Agreements:

1. RAN2 will first continue the investigation on the details of the TN coverage data (e.g. accuracy requirements for describing where TN network(s) is/are available) and UE storage overhead before deciding how to send the information to the UE.
2. Continue the discussion on whether to introduce explicit indication to identify TN cells from inter-frequency list and inter-RAT frequency list (FFS on the granularity) or whether we rely on implicit information.

[R2-2212338](file:///C:\Data\3GPP\Extracts\R2-2212338%20(R18%20NR%20NTN%20WI%20AI%208.7.4.1)%20NTN-TN%20mobility.docx) NTN-TN mobility and service continuity InterDigital discussion Rel-18 NR\_NTN\_enh-Core

Observation 1: Camping on NTN vs TN cells offer different advantages: TN has faster connection setup, whereas NTN may reduce the number of cell reselections due to larger cells sizes.

Observation 2: Broadcasting an accurate description of TN coverage across an entire NTN cell can require a huge amount of signalling.

Observation 3: Dedicated signalling (e.g. provided within the RRCRelease message) could allow a more accurate description of TN coverage immediately surrounding the UE, however such information may become outdated (e.g. based on UE movement).

Observation 4: Combining a rough description of TN coverage across the entire NTN cell (e.g. sent via broadcast signalling) with an accurate description surrounding the UE (e.g. sent via dedicated signalling) may be a good tradeoff between signalling overhead and accuracy.

Proposal 1: RAN2 to discuss the accuracy requirements for describing where TN network(s) is/are available (e.g. cell level, within X kms, etc.).

Observation 5: A UE under both TN and NTN coverage should have a clear understanding which cell IDs/frequencies are associated with a terrestrial network vs. a non-terrestrial network.

Proposal 2: In areas of overlapping NTN-TN coverage, RAN2 to confirm a UE can distinguish whether a neighbor cell or frequency belongs to a TN or NTN via existing specification.

Observation 6: A UE should be able to switch prioritizing NTN vs TN cell at least based on TN availability.

Proposal 3: A UE may switch between prioritizing TN and NTN during cell (re)selection. FFS how/when switch is triggered.

- MTK wonders whether we would reuse the existing priorities. In that case MTK is fine

- vivo wonders about the need to switch. Oppo agrees and thinks the UE should always prioritize TN coverage.

Proposal 4: Non-measurement-based factors (e.g. network type) are incorporated into the cell reselection procedure to support NTN/TN prioritization.

[R2-2211411](file:///C:\Data\3GPP\Extracts\R2-2211411%20Discussion%20on%20TN-NTN%20cell%20reselection%20enhancements.docx) Discussion on TN-NTN cell reselection enhancements Intel Corporation discussion Rel-18 NR\_NTN\_enh

Proposal 1: RAN2 adopts explicit description of geographical TN area, and focuses on the following options for further discussion:

Option 1: for each TN neighbour cell, the corresponding geographical area information is provided by network with location coordinates of cell center and cell radius.

Option 2: a boundary line is provided by network in the format of a list of location coordinates, additionally an indication can be used to indicate which side is the TN side

Option 6: for each TN area, a list of locations is provided by network, and the corresponding close shape could be illustrated by a polygon connecting these points within the list.

[R2-2211735](file:///C:\Data\3GPP\Extracts\R2-2211735_%20NTN-TN%20specific%20mobility%20enhancement_v0.doc) NTN-TN cell reselection enhancement Apple discussion Rel-18 NR\_NTN\_enh-Core

[R2-2211768](file:///C:\Data\3GPP\Extracts\R2-2211768_Discussion%20on%20NTN-TN%20cell%20reselection%20enhancements.docx) Discussion on NTN-TN cell reselection enhancements LG Electronics France discussion Rel-18 NR\_NTN\_enh

[R2-2211911](file:///C:\Data\3GPP\Extracts\R2-2211911%20Discussion%20on%20the%20no-TN-coverage%20area.doc) Discussion on the no-TN-coverage area FGI discussion

[R2-2211999](file:///C:\Data\3GPP\Extracts\R2-2211999_Further%20discussion%20on%20NTN-TN%20cell%20reselection%20enhancements.doc) Further discussion on NTN-TN cell reselection enhancements NTT DOCOMO, INC. discussion Rel-18

NTN-NTN

[R2-2211323](file:///C:\Data\3GPP\Extracts\R2-2211323%20Discussion%20on%20cell%20reselection%20enhancement%20in%20NR%20NTN.docx) Discussion on cell reselection enhancement in NR NTN vivo discussion Rel-18

* Location-based cell reselection enhancement for earth-moving cell

Proposal 1: For the earth-moving cell, if the distance between the UE and reference location of the serving cell is larger than a configured distance threshold, the UE shall perform neighbour cell measurement for cell reselection purpose.

Proposal 2: For the earth-moving cell, the existing parameter distanceThresh can be reused to provide the distance threshold for the location-based cell reselection.

Proposal 3: For the earth-moving cell, the reference location is signalled with an associated validity timer in the system information.

Proposal 4: If the validity timer of the reference location expires, UE re-acquires the reference location from the network.

Proposal 5: For the earth-moving cell, a new timer should be introduced as the validity timer for the reference location of the serving cell.

Proposal 6: An explicit cell type indication (i.e., quasi-earth fixed cell or earth-moving cell) to the UE is not needed.

* Location-based cell reselection enhancement for earth-moving cell

Observation 1: In the earth-moving cell, the stop time due to service link switching is caused by “cell coverage sliding over the earth surface” and it is a UE specific value. By contrast, the stop time due to feeder link switching is irrelevant to the stop time caused by “cell coverage sliding over the earth surface” and it is a UE-common value.

Proposal 7: For the time-based measurement initiation in the earth moving cell, two types of stop time (which intends to handle the stop time due to service-link switching and feeder-link switching respectively) should be supported.

Proposal 8: Similar to t-Service, the gNB configures a cell-level serving cell stop time that covers the stop time due to feeder-link switching in the earth-moving cell.

Proposal 9: Similar to the location-based criterion, the UE calculates a stop time based on the distance between the UE and reference location of serving cell to cover the stop time due to service-link switching.

Proposal 10: The UE should start neighbour cell measurements before either type of stop time is reached.

* NTN-TN mobility

Proposal 11: For NTN-TN mobility, an RRC\_IDLE/RRC\_INACTIVE UE is not required to perform neighbour cell measurements for a TN frequency in the area where there is no coverage of that frequency.

Proposal 12: A reference point and a distance threshold can be used to indicate TN coverage. They can be configured per frequency to indicate the TN coverage provided by the corresponding frequency.

[R2-2212448](file:///C:\Data\3GPP\Extracts\R2-2212448%208.7.4.1%20Discussion%20on%20NR%20NTN%20cell%20reselection%20enhancements.docx) Discussion on NR NTN Cell Reselection Enhancement Samsung Research America discussion Rel-18 NR\_NTN\_enh

Observation 1: How the beam footprint is moving w.r.t. the satellite may depend on satellite orbit, ephemeris, how the satellite beam is steered, etc.

Proposal 1: RAN2 to consider both scenarios for earth moving cell, i.e., static beam w.r.t. moving sub-satellite point and moving beam w.r.t. moving sub-satellite point.

Observation 2: NW cannot provide the reference location in a timely manner only by updating location coordinates according to SI periodicity, additional information is needed.

Proposal 2: For the earth-moving cell, the reference location coordinates with a timestamp and the velocity of reference location are provided.

Proposal 3: For the earth-moving cell, a fixed distance threshold associated with the reference location can be provided for the serving cell.

[R2-2212945](file:///C:\Data\3GPP\Extracts\R2-2212945%20-%20Cell%20reselection%20enhancements.docx) Cell reselection enhancements Ericsson discussion NR\_NTN\_enh

[R2-2211315](file:///C:\Data\3GPP\Extracts\R2-2211315%20Discussion%20on%20Mobility%20Enhancements%20in%20IDLE%20state-final.docx) Discussion on Mobility Enhancements in IDLE state CATT discussion Rel-18 NR\_NTN\_enh

[R2-2211338](file:///C:\Data\3GPP\Extracts\R2-2211338%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

[R2-2211410](file:///C:\Data\3GPP\Extracts\R2-2211410%20Discussion%20on%20NTN-NTN%20cell%20reselection%20enhancements.docx) Discussion on NTN-NTN cell reselection enhancements Intel Corporation discussion Rel-18 NR\_NTN\_enh

[R2-2211662](file:///C:\Data\3GPP\Extracts\R2-2211662%20Discussion%20on%20cell%20reselection%20in%20earth%20moving%20cell.docx) Discussion on cell reselection in earth moving cell CAICT,CAST Xi’an discussion Rel-18 NR\_NTN\_enh-Core

[R2-2211734](file:///C:\Data\3GPP\Extracts\R2-2211734_%20NTN-NTN%20cell%20reselection%20enhancement_v0%20.doc) NTN-NTN cell reselection enhancement Apple discussion Rel-18 NR\_NTN\_enh-Core

[R2-2211767](file:///C:\Data\3GPP\Extracts\R2-2211767_Discussion%20on%20NTN-NTN%20cell%20reselection%20enhancements.docx) Discussion on NTN-NTN cell reselection enhancements LG Electronics France discussion Rel-18 NR\_NTN\_enh R2-2210737

[R2-2211811](file:///C:\Data\3GPP\Extracts\R2-2211811%20Discussion%20on%20reference%20location%20for%20moving%20cell.docx) Discussion on reference location for moving cell ASUSTeK discussion Rel-18 NR\_NTN\_enh-Core

[R2-2211835](file:///C:\Data\3GPP\Extracts\R2-2211835%20Further%20discussion%20on%20NTN-NTN%20and%20NTN-TN%20cell%20reselection%20enhancements.doc) Further discussion on NTN-NTN and NTN-TN cell reselection enhancements Transsion Holdings discussion Rel-18

[R2-2211929](file:///C:\Data\3GPP\Extracts\R2-2211929.docx) Cell selection/reselection enhancements in NTN Sony discussion Rel-18 NR\_NTN\_enh

[R2-2212048](file:///C:\Data\3GPP\Extracts\R2-2212048%20IDLE%20and%20INACTIVE%20mobility%20regarding%20moving%20cells%20and%20TN%20area.docx) IDLE/INACTIVE mobility regarding moving cells and TN area Lenovo discussion Rel-18

[R2-2212079](file:///C:\Data\3GPP\Extracts\R2-2212079%20Cell%20reselection%20enhancements%20for%20NTN-NTN%20and%20NTN-TN%20mobility.doc) Cell reselection enhancements for NTN-NTN and NTN-TN mobility Xiaomi discussion

[R2-2212260](file:///C:\Data\3GPP\Extracts\R2-2212260%20On%20Cell%20Reselection%20Enhancements%20for%20Intra-NTN%20and%20NTN-TN%20Scenarios.docx) On Cell Reselection Enhancements for Intra-NTN and NTN-TN Scenarios Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core

[R2-2212281](file:///C:\Data\3GPP\Extracts\R2-2212281%20Discussion%20on%20cell%20reselection%20enhancements%20in%20NTN.docx) Discussion on cell reselection enhancements in NTN ZTE Corporation, Sanechips discussion Rel-18

[R2-2212337](file:///C:\Data\3GPP\Extracts\R2-2212337%20(R18%20NR%20NTN%20WI%20AI%208.7.4.1)%20Earth%20moving%20cell.docx) Cell reselection enhancements for Earth moving cell InterDigital discussion Rel-18 NR\_NTN\_enh-Core

[R2-2212384](file:///C:\Data\3GPP\Extracts\R2-2212384_Remaining%20issues%20on%20cell%20reselection%20enhancements.docx) Remaining issues on cell reselection enhancements NEC Telecom MODUS Ltd. discussion

[R2-2212559](file:///C:\Data\3GPP\Extracts\R2-2212559_Discussion_on_cell_reselection_enhancements.doc) Discussion on cell reselection enhancements Sharp discussion Rel-18 NR\_NTN\_enh-Core

[R2-2212614](file:///C:\Data\3GPP\Extracts\R2-2212614%20Discussion%20on%20NTN-TN%20reselection%20and%20reselection%20for%20earth%20moving%20cell.docx) Discussion on NTN-TN reselection and reselection for earth moving cell CMCC discussion Rel-18 NR\_NTN\_enh-Core

[R2-2212799](file:///C:\Data\3GPP\Extracts\R2-2212799.docx) Discussion on NTN-TN and NTN-NTN cell re-selection ITL discussion Rel-18

[R2-2212826](file:///C:\Data\3GPP\Extracts\R2-2212826%20Discussion%20on%20the%20cell%20reselection%20enhancements.doc) Discussion on cell reselection enhancements Huawei, HiSilicon discussion Rel-18 NR\_NTN\_solutions-Core

[R2-2212893](file:///C:\Data\3GPP\Extracts\R2-2212893%20Cell%20Reselection%20Enhancement%20for%20NTN-NTN%20and%20NTN-TN%20Mobility.docx) Cell Reselection Enhancement for NTN-NTN and NTN-TN Mobility Google Inc. discussion Rel-18

#### 8.7.4.2 Handover enhancements

Group HO (UE specific pre-configuration + group HO indication)

[R2-2211409](file:///C:\Data\3GPP\Extracts\R2-2211409%20Discussion%20on%20NTN%202-step%20handover.docx) Discussion on NTN 2-step handover Intel Corporation discussion Rel-18 NR\_NTN\_enh

Observation 1: the main handover issue in earth-moving cell and soft feeder link switch is signalling congestion of handover commands and RACH congestion towards the same target cell.

Observation 2: the pre-configuration in 2-step handover can mitigate the congestion of handover command.

Observation 3: the separate indication to trigger the handover execution in 2-step handover allows network prioritization of UEs based on current ongoing service requirements, also with the benefit of minimizing RACH congestion.

And we propose:

Proposal 1: RAN2 adopts 2-step handover solution in NR NTN, i.e., UE specific pre-configuration of the target cell + group HO indication.

[R2-2212339](file:///C:\Data\3GPP\Extracts\R2-2212339%20(R18%20NR%20NTN%20WI%20AI%208.7.4.2)%20CONN%20mobility%20enh.docx) NTN mobility enhancements for RRC\_CONNECTED InterDigital discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Group handover (i.e. an indication/command causes a group of UEs to trigger mobility) is supported in NTN.

How the UEs can be grouped can depend on several factors. For example, if the cell is an Earth moving cell, it may make sense to group UEs based on UE location. If the group HO indication is intended to trigger CHO then the UEs may be grouped based on characteristics of the triggering conditions (e.g. remaining time until CHO expiry). In either case, the network is best suited to perform the grouping, and when and how the UE is grouped should be based on NW implementation.

Proposal 2: How and when UEs are grouped is up to network implementation.

UEs within a specific group may then be provided with a group RNTI, which can be used to decode messages assigned for the group (e.g. measurements, HO commands, target cell configurations etc..)

Proposal 3: Once assigned to a group a UE is provided with a group RNTI, which is used to receive group related signalling (e.g. group HO command).

Common signalling for target cell configuration

[R2-2212449](file:///C:\Data\3GPP\Extracts\R2-2212449%208.7.4.2%20Discussion%20on%20NR%20NTN%20handover%20enhancements.docx) Discussion on NR NTN Handover Enhancement Samsung Research America discussion Rel-18 NR\_NTN\_enh

* Common signalling for target cell configuration

Observation 1: The ServingCellConfigCommon in HO command is cell-specific configuration and is common to UEs.

Proposal 1: Common signaling for HO command includes at least ServingCellConfigCommon.

Proposal 2: A valid duration is configured for the target cell’s common configuration.

Observation 2: For earth-moving candidate cell in CHO, the UE does not know the candidate cell is an earth-moving cell and can result in wrong distance evaluation if using the fixed reference location in condEventD1.

* CHO enhancements

Proposal 3: For earth-moving candidate cell in CHO, the NW should provide information for UE to estimate the movement of the reference location.

Observation 3: The UE releases CHO configuration after random access to the target cell.

Observation 4: In NTN, signaling overhead for frequent CHO configuration can be reduced.

Observation 5: CHO configuration overhead can be reduced if the UE stores CHO configuration for candidate cells.

Proposal 4: The NW can configure the UE to store candidate cell configuration to enable subsequent CHO.

* Service continuity

Observation 6: t-Service indicates the service ending time for the geo-location that currently served by the serving cell, which can also be utilized by connected UEs.

Observation 7: With the consideration of t-Service, the UE in RRC connected can detect RLF faster and it makes the following RRC connection resume/reestablishment faster.

Proposal 5: The UE in connected mode can use t-Service for fast RLF detection and recovery.

CHO enhancements

[R2-2212946](file:///C:\Data\3GPP\Extracts\R2-2212946%20-%20Handover%20enhancements.docx) Handover enhancements Ericsson discussion NR\_NTN\_enh

* CHO and Group HO

Observation 1 Quasi-earth fixed cell scenarios and feeder link switch in Earth-moving cell scenarios may involve a considerable signalling load during the RA procedure and during the handover preparation phase

Observation 2 In a quasi-earth fixed cell and at a feeder link switch, most of UEs in the source cell will perform handover to the same target cell. Only UEs moving closer to the cell border may need to perform handover to a different target cell.

Observation 3 CHO mitigates the signalling load in the source cell since handover preparation information can be sent well in advance before the short overlap time between old (source) cell and new (target) cell, or before a feeder link switch.

Observation 4 Unlike CHO, group-based handover requires additional signalling between network and a group of UEs to trigger handover to the target cell and may raise security concerns.

Proposal 1 RAN2 to focus on CHO enhancements to reduce HO signalling overhead in NTN.

* Common target cell configuration

Observation 5 Most information provided to each UE in the (C)HO command describing target cell configuration is identical for all UEs accessing the same target cell.

Observation 6 Certain target cell configurations such as C-RTNI or security keys need to be sent in a dedicated manner to each UE.

Observation 7 Group-based handover distributes common information on a per group basis which might entail more signalling overhead than broadcasting in System Information.

Proposal 2 (C)HO common target cell configuration is broadcast in System Information.

* Delta configuration

Observation 8 From a deployment perspective, during service link switch in a quasi-Earth fixed cell or a feeder link switch in an Earth-moving cell, it can be assumed that the source cell and the target cell will be configured almost identically.

Proposal 3 Delta configuration between leaving and incoming cells is used to broadcast (C)HO common target cell information in System Information.

* Reduced size of HO command

Proposal 4 Optimizing the (C)HO command for the concerned NTN scenarios so that only the UE unique configuration is carried in the RRC message.

* Reusing PCI after service link switch

Observation 9 Reusing PCI after service link switch is only valid in limited scenarios.

Observation 10 The current assumption that service link switch implies L3 mobility was taken at RAN2#112-e.

Observation 11 Reusing the same PCI during a service link soft switch increases the complexity in both UE and network sides.

Proposal 5 Confirm the assumption that service link switch implies L3 mobility in Rel 18.

[R2-2212259](file:///C:\Data\3GPP\Extracts\R2-2212259%20On%20Connected%20Mode%20Mobility%20for%20Rel-18%20NTN.docx) On Connected Mode Mobility for Rel-18 NTN Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core

* Chain of CHO

Proposal 1: RAN2 is asked to study if the fact that the next serving cells can be largely predicted in NTN Earth-moving scenario can be used to improve the mobility performance – for both the network and the UEs.

Observation 1: In EMC (NTN LEO scenario) the UE is commanded to perform HO approximately every 5 seconds.

Observation 2: In NTN LEO sending a HO command to the UE every ~5 seconds can be avoided if the UE is prepared in advance with CHO configurations for cells beyond the next cell change.

Observation 3: Delta configuration can be used to provide subsequent CHO configurations, to signalling overhead in the initiating serving cell does not have to be excessive.

Observation 4: As the average time of stay in the cell can be estimated in NTN EMC, it can be predicted since when the resources are needed in particular cell for a particular UE.

Proposal 2: RAN2 is asked to study how the UE can be provided with CHO configurations for cells beyond the next cell change (future candidate cells).

* Group HO, common HO parameters and pre-configuration

Observation 5: In group HO scheme it remains unclear how multiple UEs can use the same HO command which is considered to be a UE-specific configuration.

Observation 6: There is no signalling reduction even if mobility preparation is divided into pre-configuration and subsequent indication to perform cell change. Each UE is anyway configured individually with HO command.

Observation 7: Time-based CHO triggering (defined in Rel-17) can achieve similar goal as proposed group HO scheme. Additionally, it does not require signalling to trigger the actual cell change.

Proposal 3: Group HO or HO command pre-configuration is not pursued as a part of Rel-18 NTN enhancements unless clear gains are shown.

* Keeping PCI after satellite switches

Observation 8: If the PCI is reused after satellite switches, the UE may consider the cell remains the same. However, a Random Access to switch the beam is needed anyway.

Observation 9: For reusing PCI when satellite changes, there are two distinguishable cases: hard-switching and soft-switching.

Observation 10: There is a number of issues to resolve for reusing PCI after satellite switches, e.g. how to avoid RLF, the need to perform RA or inter-cell resource coordination.

Proposal 4: Reusing PCI after satellite switches is not pursued as a part of Rel-18 NTN, unless the gains are clearly proven and identified issues can be easily resolved.

PCI unchaged

[R2-2211316](file:///C:\Data\3GPP\Extracts\R2-2211316%20Discussion%20on%20PCI%20unchanged%20scenario-final.docx) Discussion on PCI unchanged scenario CATT discussion Rel-18 NR\_NTN\_enh

Scenario analyse

Observation 1: For quasi-earth-fixed cell scenario, the PCI unchanged scenario for quasi-earth-fixed cell can be easily realized from the perspective of network deployment and bring obvious benefits on signalling overhead reduction as well as power saving.

Applicability to hard or soft satellite switching

Observation 2: The possible delay introduced by hard satellite switching is not a PCI unchanged cell specific issue. Comparing with handover for this scenario, the PCI unchanged cell mechanism could reduce signalling overhead at least.

Observation 3: For hard satellite switching, if necessary, the seamless serving can be guaranteed by scheduling the upcoming satellite to adjust the antenna direction and frequency a little time before the current cell move away.

Observation 4: For soft satellite switching, the concern on the possibility for UE to detect and decode SSB from two satellites can be solved by setting the upcoming satellite provide NCD-SSB at the overlapping period.

Proposal 1: By network implementation, both hard satellite switching and soft satellite switching are applicable for PCI unchanged scenario.

Necessity of perform UL beam switching and/or RA

Proposal 2: The RA procedure can be used for UE to re-acquire UL synchronization as scenario of connected UE losing UL synchronization.

Observation 5: In PCI unchanged scenario, if the reference point is at gateway, the DL timing of this cell provided via the current satellite and the upcoming satellite is totally aligned, and at UE, the DL timing difference are only caused by the propagate delay difference between the current satellite and the upcoming satellite.

Proposal 3: The TA of the cell provided via the upcoming satellite can be calculated by the propagation delay difference of the cell provided via the current satellite and the upcoming satellite, when the RP is at the gateway.

Proposal 4: Send an LS to RAN1 to ask, for PCI unchanged scenario, whether the TA calculated by the propagate delay difference fulfil the accuracy requirement, when the RP is at the gateway.

Impacts on protocol

Proposal 5: NW informs the UE is under the scenario of PCI unchanged cell.

Proposal 6: RAN2 further discuss the following issues:

- How to inform the UE it is under the scenario of the PCI unchanged cell .e.g. via SI or dedicated signaling;

- When to perform re-sync to the new satellite.

[R2-2211736](file:///C:\Data\3GPP\Extracts\R2-2211736_NTN%20specific%20handover%20enhancement.doc) NTN specific handover enhancement Apple discussion Rel-18 NR\_NTN\_enh-Core

[R2-2211317](file:///C:\Data\3GPP\Extracts\R2-2211317%20Discussion%20on%20NTN%20HO%20Enhancements.docx) Discussion on NTN HO Enhancements CATT discussion Rel-18 NR\_NTN\_enh

[R2-2211322](file:///C:\Data\3GPP\Extracts\R2-2211322%20Discussion%20on%20handover%20enhancement%20for%20siganlling%20overhead%20reduction%20in%20NR%20NTN.docx) Discussion on handover enhancement for siganlling overhead reduction in NR NTN vivo discussion Rel-18

[R2-2211349](file:///C:\Data\3GPP\Extracts\R2-2211349%20NTN%20connected%20mode%20mobility.doc) Discussion on NTN handover enhancements OPPO discussion Rel-18 NR\_NTN\_enh-Core

[R2-2211574](file:///C:\Data\3GPP\Extracts\R2-2211574%20Mobility%20enhancements.doc) Signaling overhead reduction in satellite switch Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh

[R2-2211663](file:///C:\Data\3GPP\Extracts\R2-2211663%20Discussion%20on%20NTN%20HO%20enhancnment.docx) Discussion on NTN HO enhancnment CAICT discussion Rel-18 NR\_NTN\_enh-Core

[R2-2211769](file:///C:\Data\3GPP\Extracts\R2-2211769_Discussion%20on%20handover%20enhancements%20for%20NTN.docx) Discussion on HO enhancements for NTN LG Electronics France discussion Rel-18 NR\_NTN\_enh

[R2-2211784](file:///C:\Data\3GPP\Extracts\R2-2211784%20Reduction%20of%20handover%20overhead%20in%20NTN.doc) Reduction of handover overhead in NTN China Telecom discussion Rel-18 NR\_NTN\_enh

[R2-2211836](file:///C:\Data\3GPP\Extracts\R2-2211836%20Further%20discussion%20on%20NTN-NTN%20handover%20enhancements.doc) Further discussion on NTN-NTN handover enhancements Transsion Holdings discussion Rel-18

[R2-2211930](file:///C:\Data\3GPP\Extracts\R2-2211930.docx) Signaling overhead reduction and group handover during NTN-NTN HOs Sony discussion Rel-18 NR\_NTN\_enh

[R2-2211998](file:///C:\Data\3GPP\Extracts\R2-2211998_Further%20discussion%20on%20NTN-NTN%20handover%20enhancements.doc) Further discussion on NTN-NTN handover enhancements NTT DOCOMO, INC. discussion Rel-18

[R2-2212049](file:///C:\Data\3GPP\Extracts\R2-2212049%20Issue%20analysis%20for%20service%20continuity%20in%20TN-NTN%20and%20NTN-NTN%20scenarios.docx) Issue analysis for service continuity in TN-NTN and NTN-NTN scenarios Lenovo discussion Rel-18

[R2-2212080](file:///C:\Data\3GPP\Extracts\R2-2212080%20Discussion%20on%20handover%20enhancements%20for%20NTN-NTN%20mobility.doc) Discussion on handover enhancements for NTN-NTN mobility Xiaomi discussion

[R2-2212282](file:///C:\Data\3GPP\Extracts\R2-2212282%20Discussion%20on%20HO%20enhancements%20in%20NTN.docx) Discussion on HO enhancements in NTN ZTE Corporation, Sanechips discussion Rel-18

[R2-2212560](file:///C:\Data\3GPP\Extracts\R2-2212560_Discussion_on_handover_enhancements.doc) Discussion on handover enhancements Sharp discussion Rel-18 NR\_NTN\_enh-Core

[R2-2212615](file:///C:\Data\3GPP\Extracts\R2-2212615%20Discussion%20on%20handover%20enhancements.docx) Discussion on handover enhancements CMCC discussion Rel-18 NR\_NTN\_enh-Core

[R2-2212721](file:///C:\Data\3GPP\Extracts\R2-2212721_HO_CHO%20Signaling%20Overhead%20Reduction%20by%20NTN-config%20omission.docx) HO/CHO Signaling Overhead Reduction by NTN-config omission Sequans Communications discussion Rel-18 NR\_NTN\_enh-Core

[R2-2212802](file:///C:\Data\3GPP\Extracts\R2-2212802.docx) View on NTN HO enhancements ITL discussion

[R2-2212827](file:///C:\Data\3GPP\Extracts\R2-2212827%20Discussion%20on%20NTN%20handover%20enhancements.doc) Discussion on NTN handover enhancements Huawei, HiSilicon discussion Rel-18 NR\_NTN\_solutions-Core

[R2-2212894](file:///C:\Data\3GPP\Extracts\R2-2212894%20NTN-TN%20Mobility%20Enhancement%20for%20RRC_CONNECTED%20UEs.docx) NTN-TN Mobility Enhancement for RRC\_CONNECTED UEs Google Inc. discussion Rel-18

[R2-2212934](file:///C:\Data\3GPP\Extracts\R2-2212934_Further%20discussion%20on%20NTN-NTN%20handover%20enhancements.doc) Further discussion on NTN-NTN handover enhancements NTT DOCOMO, INC. discussion Rel-18

Moved here from 8.7.4

[R2-2211372](file:///C:\Data\3GPP\RAN2\Docs\R2-2211372.zip) Handover Enhancement in LEO NTN Mediatek Inc. discussion R2-2209445

[R2-2212177](file:///C:\Data\3GPP\Extracts\R2-2212177%20Some%20enhancements%20in%20NTN%20handover.doc) Some enhancements in NTN handover Spreadtrum Communications discussion Rel-18

Moved here from 8.7.4.1

[R2-2212385](file:///C:\Data\3GPP\Extracts\R2-2212385_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 R2-2210338

## Summary

TBD

Agreed CRs

NR-NTN

IoT-NTN

RedCap

CovEnh

Approved LSs out

[Post120] Email discussions

Short

* [POST120][101][RedCap] LS to RAN4 (Oppo)

Scope: Discuss LS to RAN4 on offset for UEs with 1Rx branch

Intended outcome: LS to RAN4

Deadline: short

Long