3GPP TSG-RAN WG2 Meeting #123 R2-2308961

Toulouse, France, Aug 21-25, 2023

**Agenda item: 8.1**

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

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

**Document for: Approval**

General

Recording of voice or video at meetings is not used in 3GPP. This applies also to this e-Meeting. At this e-Meeting, no specific actions are taken to prevent the recording of web conferences. Companies that have concerns related to recordings, if any, may express those by email in the main meeting organizational thread [AT123][000]

Organizational

1. All organization emails and notes will be shared over the following email discussion throughout the meeting:
* [AT123][100] Organizational – NR-NTN and IoT-NTN session (RAN2 VC)

Scope:

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

Schedule/Plan

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Main room** | **Brk 1 room** | **Brk 2 room** | **Brk 3 room** |
| **Monday August 21**  |
| 09:00 – 10:30 | [1], [2], [2.5] Elections[3] 10-25 minNR1516 CP (Johan)- CommonNR17 (Johan)- Common | Breakout to start after formal opening of meeting in main roomNR18 fCovEnh [0.5] (Eswar) | Breakout to start after formal opening of meeting in main room:NRLTE1516 Pos (Nathan)NR17 Pos (Nathan)  |  |
| 11:00 – 13:00 | NR18 XR [2] (Tero), could possibly start earlier TBD |
| 14:30 – 16:30 | NR18 Closed WIs early items, if needed (Yi, Sasha)NR18 (Johan)- Early items TBD- CommonNR17 (Johan)- Common, if time (TBD continue 20min after the break) | NR151617 UP (Diana)NR18 MT-SDT [0.5] (Diana)NR18 Network Energy Saving [1] (Diana) | NRLTE1516 V2X/SL (Kyeongin)NR17 SL (Kyeongin) |
| 17:00 – 19:00 | NR18 MIMO evo [0.75] (Erlin)- Early items | NR18 SL evolution [1] (Kyeongin) |
| **Tuesday August 22** |
| 08:30 – 10:30 | NR18 feMob [2] (Johan)  | NR18 eQoE [1] (Tero)  | NR17 (Nathan) - Pos SL Relay TBD |  |
| 11:00 – 13:00 | NR18 Mobile IAB [0.5] (Johan)**NR17 NTN Maint (Sergio)****- 4.2****- 6.3** | NR18 XR [2] (Tero) | NR18 Pos [2] (Nathan) |
| 14:30 - | [2.5] Elections (*Voting for Chair: voting tool open 12:30 - 14:00*) |  |  |
|  – 16:30 | NR18 LP WUS [0.5] (Johan)- Short: Early items for offline prep.NR17 Common (Johan), continuation. | Start after common session: **NR18 NTN enh [1] (Sergio)****- 7.7.1****- 7.7.2****- 7.7.3****- 7.7.4.1.1****- 7.7.4.1.2****- 7.7.4.2 : report of [Post122][114]** | Start after common session: NR18 Pos [2] (Nathan) |
| 17:00 | [2.5] Elections, if needed (*Voting for Chair 2nd round: voting tool open 15:30 - 16:55*) |  |  |
| – 19:00 | NR18 Other [2] (Johan)  | Start after common session: NR18 UAV [1] (Diana) | Start after common session: NR17 (Nathan) NR18 SL relay [1.5] (Nathan) |
| **Wednesday August 23** |
| 08:30 – 10:30 | NR18 feMob [2] (Johan) | 8:30-9:00 EUTRA17+ (Tero)9:00-10:30 MUSIM  | NR 18 MBS [0.75] (Dawid) |  |
| 11:00 – 13:00 | NR17- Common (Johan), continuation.  | NR18 URLLC [0.5] (Diana)NR18 Network Energy Saving [1] (Diana) | NR17 SONMDT (HuNan) |
| 14:30 | [2.5] Elections (*Voting for Vice Chair: voting tool open 12:30 - 14:00)* |  |  |
|  – 16:30 | NR18 Other [2] (Johan) | Start after common session:NR18 RedCap [1] (Mattias) | Start after common session:NR18 SONMDT [1] (HuNan) |
| 17:00 | [2.5] Elections (*Voting for Vice Chair: voting tool open 15:30 - 16:55)* |  |  |
|  – 19:00 | NR18 AIML [1] (Johan) | Start after common session:**R18 IoT-NTN [1] (Sergio)****- 7.6.1****- 7.6.2.1 : report of [101]****- 7.6.2.2****- 7.6.3.1: report of [Post122][112]****- 7.6.3.2****- 7.6.4 : report of [Post122][113]** | Start after common session:NR18 SL relay [1.5] (Nathan) |
| **Thursday August 24** |
| 08:30 – 10:30 | CB NR151617 (Johan) | CB Diana | CB Kyeongin |  |
| 11:00 – 13:00 | NR18 TEI [1] (Johan, TBD Nathan) | CB Diana | CB Kyeongin |
| 14:30 – 16:30 | CB NR17 (Johan) | **CB Sergio,** Tero  | CB Nathan |
| 17:00 – 19:00 | CB NR17 (Johan)CB NR18 (Johan) | CB TeroMUSIM con’t TBD | CB Nathan |
| **Friday August 25** |
| 08:30 – 10:30 | NR18 MIMO evo [0.75] (Erlin)- late items and CBs. CB Dawid | CB Mattias TBD | CB Nathan, Kyeongin TBD |  |
| 11:00 – 13:00 | CB Johan, Eswar TBD | **CB Sergio****- TBD****NTN Self evaluation (Sergio)****- 7.25.4: report of [102]** | TBDCB NR18 IDC [0] (Yi) |
| 14:30 – 16:00 | CB Johan  | CB TeroCB NR18 NCR [0] (Sasha) | CB HuNan |
| 16:00 – 17:00 | CB and conclusion (Johan) |  |  |  |

List and status of offline discussions

NOTE: No offline email discussions will be kicked off before Monday Aug 21th, 09:00 local time

* [AT123][101][IoT NTN] HARQ Enhancements (Nokia)

Initial scope: Discuss the proposals in the submitted contributions in AI 7.6.2.1

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

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

Deadline for companies' feedback: Wednesday 2023-08-23 08:00

Deadline for rapporteur’s summary (in R2-2308981): Wednesday 2023-08-23 14:00

Status: Ongoing

* [AT123][102][NTN Self Ev] CP/UP latency assumptions (Ericsson)

Initial scope: Converge on common assumptions for CP/UP latency (based on submitted contributions in AI 7.25.4)

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: Wednesday 2023-08-23 14:00 (F2F offline discussion might also happen afterwards, depending on companies’ feedback)

Deadline for rapporteur’s summary (in R2-2308982): Friday 2023-08-25 08:00

Status: To be started

## 4.2 NB-IoT and eMTC support for NTN Rel-17

(LTE\_NBIOT\_eMTC\_NTN; leading WG: RAN1; REL-17; WID: [RP-211601](file:///C%3A%5CData%5C3GPP%5Carchive%5CRAN%5CRAN%2392%5CTdocs%5CRP-211601.zip))

Tdoc Limitation: 1 tdocs

This Agenda Item is treated in the Breakout session that includes NTN

A single CR per TS with miscelaneous corrections is encouraged. Small editorial corrections should be sent directly to rapporteur. Big open issues can be discussed with contributions with CR in the appendix of the contribution

Reference point for timing info in IoT-NTN

[R2-2307499](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307499%20Discussion%20on%20UTC%20reference%20point%20in%20IoT%20NTN.docx) Discussion on UTC reference point in IoT NTN Huawei, HiSilicon discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

[R2-2308227](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308227%20Reference%20point%20for%20UTC%20timing%20in%20SIB16%28-NB%29.docx) Reference point for UTC timing in SIB16(-NB) Nokia, Nokia Shanghai Bell discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN-Core

[R2-2307188](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307188%20Clarify%20the%20reference%20point%20for%20timing%20info%20in%20SIB16%28-NB%29%20and%20DLInformationTransfer%20in%20IoT%20NTN.docx) Clarify the reference point for timing info in SIB16(-NB) and DLInformationTransfer in IoT NTN MediaTek Inc., Qualcomm Inc, Apple, Ericsson, Huawei CR Rel-17 36.331 17.5.0 4937 - F LTE\_NBIOT\_eMTC\_NTN-Core

Other RRC CRs

[R2-2307325](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307325%20Correct%20TrackingAreaList%20for%20selected%20PLMN%20for%20NB-IoT.docx) Correct TrackingAreaList for selected PLMN for NB-IoT MediaTek CR Rel-17 36.331 17.5.0 4938 - F LTE\_NBIOT\_eMTC\_NTN-Core

[R2-2308522](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308522%2036331%28R17%29_Miscellaneous%20RRC%20corrections%20for%20IoT%20NTN.docx) Miscellaneous RRC corrections for IoT NTN ZTE Corporation, Sanechips CR Rel-17 36.331 17.5.0 4945 - F LTE\_NBIOT\_eMTC\_NTN-Core

[R2-2308893](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308893%20RRC%20correction%20on%20including%20gnss%20validity%20duration%20and%20dedicated%20SIB31.docx) RRC Correction on including GNSS validity duration and dedicated SIB31 Samsung CR Rel-17 36.331 17.5.0 4952 - F LTE\_NBIOT\_eMTC\_NTN

MAC CR

[R2-2307324](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307324%20MAC%20correction%20on%20HARQ%20RTT%20timer%20%20for%20IoT%20NTN.docx) Corrections on the HARQ RTT timer for IoT NTN MediaTek CR Rel-17 36.321 17.5.0 1567 - F LTE\_NBIOT\_eMTC\_NTN-Core

Stage 2 CR

[R2-2308538](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308538%20-%2036300_CR1386_%28Rel-17%29%20-%20Correction%20to%20GNSS%20acquisition%20description%20for%20IoT%20NTN.docx) Correction to GNSS acquisition description for IoT NTN Ericsson CR Rel-17 36.300 17.5.0 1386 - F LTE\_NBIOT\_eMTC\_NTN-Core

## 6.3 NR Non-Terrestrial Networks (NTN)

(NR\_NTN\_solutions-Core; leading WG: RAN2; REL-17; WID: [RP-211557](file:///C%3A%5CData%5C3GPP%5Carchive%5CRAN%5CRAN%2392%5CTdocs%5CRP-211557.zip))

Tdoc Limitation: 1 tdocs

A single CR per TS with miscellaneous corrections is encouraged. Small editorial corrections should be sent directly to rapporteur. Big open issues can be discussed with contributions with CR in the appendix of the contribution

RRC CRs

[R2-2308253](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308253%2038331%20CR%20Different%20UE%20capability%20support%20between%20TN%20and%20NTN.docx) Clarification of UE configuration in TN and NTN Ericsson CR Rel-17 38.331 17.5.0 4239 - F NR\_NTN\_solutions-Core

[R2-2308520](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308520.docx) Correction on RRC Release for NR NTN Samsung CR Rel-17 38.331 17.5.0 4257 - F NR\_NTN\_solutions-Core

Other

[R2-2307113](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307113_CR0931_38306%20Correction%20on%20the%20Capability%20of%20TA%20Reporting.docx) Correction on the Capability of TA Reporting vivo CR Rel-17 38.306 17.5.0 0931 - F NR\_NTN\_solutions-Core

[R2-2307498](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307498%20Triggering%20of%20TA%20Report%20during%20handover.docx) Triggering of TA Report during handover Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

## 7.6 IoT NTN enhancements

(IoT\_NTN\_enh-Core; leading WG: RAN1; REL-18; WID: RP-223519)

Time budget: 1 TU

Tdoc Limitation: 4 tdocs

### 7.6.1 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.

Incoming LSs

[R2-2307003](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307003_R1-2304126.doc) LS on GNSS position fix during inactive state of Connected DRX for improved GNSS operations (R1-2304126; contact: MediaTek) RAN1 LS in Rel-18 IoT\_NTN\_enh-Core To:RAN2

[R2-2307005](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307005_R1-2306182.docx) Reply LS on HARQ Enhancements (R1-2306182; contact: OPPO) RAN1 LS in Rel-18 IoT\_NTN\_enh-Core To:RAN2

[R2-2307012](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307012_R1-2306222.docx) LS on Rel-18 RAN1 UE features list for LTE after RAN1#113 (R1-2306222; contact: NTT DOCOMO, AT&T) RAN1 LS in Rel-18 IoT\_NTN\_enh-Core To:RAN2 Cc:RAN4

[R2-2307016](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307016_R1-2306245.doc) LS on NPDCCH monitoring restriction for NB-IoT NTN (R1-2306245; contact: Lenovo) RAN1 LS in Rel-18 IoT\_NTN\_enh-Core To:RAN2

Running CRs

[R2-2308542](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308542%20-%2036300_%28Rel-18%29%20-%20Running%20CR%20for%20IoT%20NTN.docx) Running CR for IoT NTN Ericsson draftCR Rel-18 36.300 17.5.0 B IoT\_NTN\_enh-Core

[R2-2308939](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308939%20-%20Rapporteur%20input%20on%2036.300.docx) Rapporteur input on 36.300 Ericsson draftCR Rel-18 36.300 17.5.0 B IoT\_NTN\_enh-Core

[R2-2308046](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308046%2036331%20running%20CR%20for%20IOT%20NTN.docx) 36331 running CR for IOT NTN Huawei, HiSilicon draftCR Rel-18 36.331 17.5.0 B IoT\_NTN\_enh-Core

[R2-2308194](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308194-running-CR-36304.docx) 36.304 Running CR for Rel-18 IoT NTN Nokia Solutions & Networks (I) draftCR Rel-18 36.304 17.4.0 IoT\_NTN\_enh-Core

[R2-2308944](file:///C%3A%5CData%5C3GPP%5CRAN2%5CDocs%5CR2-2308944.zip) Stage-3 running CR for TS 36.321 for Rel-18 IoT-NTN MediaTek Inc. draftCR Rel-18 36.321 17.5.0 B IoT\_NTN\_enh-Core R2-2306962

[R2-2307625](file:///C%3A%5CData%5C3GPP%5CExtracts%5C36306_CRxxxx_%28Rel-18%29_R2-2307625%20UE%20capability%20running%20CR.docx) Running CR for TS 36.306 for Rel-18 IoT NTN Qualcomm Incorporated draftCR Rel-18 36.306 17.4.0 B IoT\_NTN\_enh-Core

[R2-2308904](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308904%20-%20On%20R18%20IoT%20NTN%20UE%20capabilities.docx) On R18 IoT NTN UE capabilities Ericsson discussion Rel-18 IoT\_NTN\_enh-Core

### 7.6.2 Performance Enhancements

#### 7.6.2.1 HARQ enhancements

* [AT123][101][IoT NTN] HARQ Enhancements (Nokia)

Initial scope: Discuss the proposals in the submitted contributions in AI 7.6.2.1

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

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

Deadline for companies' feedback: Wednesday 2023-08-23 08:00

Deadline for rapporteur’s summary (in R2-2308981): Wednesday 2023-08-23 14:00

R2-2308981 [offline-101] HARQ enhancements Nokia discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307105](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307105%20Discussion%20on%20HARQ%20Enhancement%20for%20IoT%20NTN.docx) Discussion on HARQ Enhancement for IoT NTN vivo discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307189](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307189%20On%20Disabling%20HARQ%20Feedback%20in%20IoT-NTN.docx) On Disabling HARQ Feedback in IoT-NTN MediaTek Inc. discussion

[R2-2307250](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307250%20-%20Discussion%20on%20HARQ%20enhancement%20for%20IoT%20NTN.doc) Discussion on HARQ enhancement for IoT NTN OPPO discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307251](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307251%20-%20Draft%20reply%20LS%20on%20NPDCCH%20monitoring%20restriction%20for%20NB-IoT%20NTN.docx) Draft reply LS on NPDCCH monitoring restriction for NB-IoT NTN OPPO LS out Rel-18 IoT\_NTN\_enh-Core To:RAN1

[R2-2307413](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307413-Discussion%20on%20HARQ%20enhancements%20in%20IoT%20NTN.docx) Discussion on HARQ enhancements in IoT NTN CATT discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307488](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307488%20Discussion%20on%20HARQ%20mode%20for%20PUR.DOCX) Discussion on HARQ mode for PUR Huawei, Turkcell, HiSilicon discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307506](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307506%20Discussion%20on%20HARQ%20enhancement.doc) Discussion on HARQ enhancement Xiaomi discussion Rel-18

[R2-2307587](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307587%20Further%20discussion%20on%20HARQ%20enhancements.docm) Further discussion on HARQ enhancements ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307626](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307626%20IoT%20HARQ%20process.doc) HARQ process enhancement Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308228](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308228%20On%20HARQ%20enhancements%20for%20IoT%20NTN.docx) On HARQ enhancements for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308288](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308288%20Discussion%20on%20the%20HARQ%20enhancement%20for%20IoT-NTN.docx) Discussion on the HARQ enhancement for IoT-NTN CMCC discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308541](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308541%20-%20R18%20IoT%20NTN%20HARQ%20enhancements.docx) R18 IoT NTN HARQ enhancements Ericsson discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308576](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308576%20%28R18%20IoT-NTN%20WI%20AI%207.6.2.1%29%20-%20disabling%20HARQ%20feedback.docx) Remaining Issues on Disabling HARQ feedback for IoT-NTN Interdigital, Inc. discussion Rel-18 IoT\_NTN\_enh-Core

#### 7.6.2.2 GNSS operation enhancements

[R2-2307106](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307106%20Discussion%20on%20GNSS%20Operation%20for%20IoT%20NTN.docx) Discussion on GNSS Operation for IoT NTN vivo discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307190](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307190%20Enhancements%20on%20GNSS%20operation.docx) Enhancements on GNSS operation MediaTek Inc. discussion

[R2-2307259](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307259%20GNSS%20operation.doc) Discussion on GNSS operation for IoT NTN OPPO discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307414](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307414%20Discussion%20on%20GNSS%20operation%20in%20connected%20mode.docx) Discussion on GNSS operation in connected mode CATT discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307477](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307477%20Discussion%20on%20the%20GNSS%20Validity%20Reporting.docx) Discussion on the GNSS Validity Reporting Google Inc. discussion Rel-18

[R2-2307489](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307489%20Discussion%20on%20the%20impact%20of%20GNSS%20measurement.doc) Discussion on the impact of GNSS measurement Huawei, Turkcell, HiSilicon discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307505](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307505%20Discussion%20on%20GNSS%20operation%20enhancement.doc) Discussion on GNSS operation enhancement Xiaomi discussion Rel-18

[R2-2307588](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307588%20Remaining%20issues%20of%20GNSS%20enhancements.docx) Remaining issues of GNSS enhancements ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307629](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307629%20GNSS%20operation.doc) GNSS fix in RRC\_CONNECTED Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307865](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307865_Improved%20GNSS%20Operation.doc) Improved GNSS Operation Apple discussion Rel-18 IoT\_NTN\_enh

[R2-2308008](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308008%20Some%20remaining%20issues%20of%20GNSS%20operations%20for%20IoT%20NTN.docx) Some remaining issues of GNSS operations for IoT NTN Lenovo discussion Rel-18

[R2-2308229](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308229%20GNSS%20operation%20enhancement%20in%20Rel-18%20IoT%20NTN.docx) GNSS operation enhancement in Rel-18 IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308289](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308289%20Discussion%20on%20GNSS%20enhancement%20for%20IoT-NTN.docx) Discussion on GNSS enhancement for IoT-NTN CMCC discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308540](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308540%20-%20R18%20IoT%20NTN%20GNSS%20operation%20enhancements.docx) R18 IoT NTN GNSS operation enhancements Ericsson discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308577](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308577%20%28R18%20IoT-NTN%20WI%20AI%207.6.2.2%29%20GNSS%20enhancements.docx) GNSS acquisition and reporting for IoT NTN Interdigital, Inc. discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308617](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308617.docx) Discussion of GNSS operation enhancements SHARP Corporation discussion

[R2-2308881](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308881_GNSS%20validity%20reporting.docx) GNSS Validity duration Reporting Nordic Semiconductor ASA discussion

Moved here from 7.6.2

[R2-2308890](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308890%20On%20improved%20GNSS%20operation%20and%20HARQ%20for%20IoT%20NTN.docx) On improved GNSS operation and HARQ for IoT NTN Samsung Electronics Czech discussion Rel-18 IoT\_NTN\_enh

### 7.6.3 Mobility Enhancements

#### 7.6.3.1 Enhancements for neighbour cell measurements

Including outcome of [Post122][112][IoT NTN Enh] Mobility enhancements (other contributions on issues handled in [Post122][112][ might not be treated at RAN2#123)

Remaining issues related to SIB handling

[R2-2307192](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307192%20Report%20of%20%5BPost122%5D%5B112%5D%5BIoT%20NTN%20Enh%5D%20Mobility%20enhancements.docx) Report of [Post122][112][IoT NTN Enh] Mobility MediaTek Inc. discussion

A. Proposals with Consensus:

Proposal 1 (14/14): For eMTC, the new SIB (SIBxx) is not an essential SIB. UE does not need to consider the cell barred if it is unable to acquire the SIB when scheduled.

Proposal 2 (14/14): RAN2 will not consider cell stop time of neighbor cell in the new SIB (SIBxx) in this release.

Proposal 8 (14/14): for NB-IoT NTN, location-based measurement initiation can also be optionally used in RRC\_IDLE for cell re-selection purposes (like in NR-NTN), with the assumption that it is up to the UE to update GNSS location.

B. Proposals with Majority:

Proposal 3 (12/14): The t-ServiceStart for quasi-earth fixed neighbour cells should be per neighbour cell.

Proposal 6 (10/14): validity duration is optional, and if this field is absent, the UE uses validity duration from the serving cell

Proposal 7 (7/9): Re-acquisition of SIBXX can reply on T317/T318 in connected mode.

C. Proposals for Further Discussions:

Proposal 4: RAN2 further discuss which SIB(s) can be used to broadcasted t-ServiceStart for quasi-earth fixed neighbour cells

Proposal 5: RAN2 further discuss if ephemeris is absent in a list in the new SIB (SIBxx), serving satellite ephemeris applies.

[R2-2307191](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307191%20Remaining%20Enhancements%20on%20neighbour%20cell%20measurement.docx) Remaining Enhancements on Neighbor Cell Measurements in IoT-NTN MediaTek Inc. discussion

[R2-2307252](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307252%20-%20Discussion%20on%20mobility%20enhancement%20for%20IoT%20NTN.doc) Discussion on mobility enhancement for IoT NTN OPPO discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307511](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307511%20Discussion%20on%20UE%20behavior%20when%20serving%20cell%20t-service%20expires.doc) Discussion on UE behavior when serving cell t-service expires Xiaomi discussion Rel-18

[R2-2307589](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307589%20Remaining%20issues%20of%20mobility%20enhancements.docx) Remaining issues of mobility enhancements ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307628](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307628%20mobility.doc) Measurement and Mobility enhancements Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307772](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307772-IoT-NTN-Mobility-Enhancements.docx) On remaining issues of IoT-NTN mobility enhancements Nokia, Nokia Shanghai Bell discussion

[R2-2307866](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307866_RLF%20in%20IoT%20NTN.doc) Neighbour cell measurements before RLF for NB-IoT Apple discussion Rel-18 IoT\_NTN\_enh

[R2-2308034](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308034%20Enhancements%20for%20neighbour%20cell%20measurements.doc) Enhancements for neighbour cell measurements Huawei, Turkcell, HiSilicon discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308578](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308578%20%28R18%20IoT-NTN%20WI%20AI%207.6.3.1%29%20-%20measurements.docx) Open issues on mobility enhancements (not covered by [Post122][112]) Interdigital, Inc. discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308811](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308811%20-%20Discussion%20on%20gaps%20for%20neighbour%20cell%20measurements%20in%20IoT%20NTN.docx) Discussion on gaps for neighbour cell measurements in IoT NTN Ericsson discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308891](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308891%20On%20enhancements%20for%20neighbour%20cell%20measurements.docx) On enhancements for neighbour cell measurements Samsung Electronics Czech discussion Rel-18 IoT\_NTN\_enh

#### 7.6.3.2 Other

[R2-2307107](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307107%20Discussion%20on%20Mobility%20Enhancement%20for%20R18%20IOT%20NTN.docx) Discussion on Mobility Enhancement for R18 IoT NTN vivo discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307867](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307867_Mobility%20enhancement%20in%20IoT%20NTN.doc) Mobility enhancement in IoT NTN Apple discussion Rel-18 IoT\_NTN\_enh

[R2-2308035](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308035%20Discussion%20on%20CHO%20enhancements.doc) Discussion on CHO enhancements Huawei, Turkcell, HiSilicon discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308290](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308290%20Discussion%20on%20CHO%20enhancements%20for%20eMTC%20NTN.docx) Discussion on CHO enhancements for eMTC NTN CMCC discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308892](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308892%20CHO%20and%20other%20mobility%20enhancements%20for%20IoT%20NTN.docx) On CHO and other mobility enhancements for IoT NTN Samsung Electronics Czech discussion Rel-18 IoT\_NTN\_enh

### 7.6.4 Enhancements to discontinuous coverage

Including outcome of [Post122][113][IoT NTN Enh] Discontinuous coverage (other contributions on issues handled in [Post122][113][ might not be treated at RAN2#123)

[R2-2307497](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307497%20Report%20of%20%5BPost122%5D%5B113%5D%5BIoT%20NTN%20Enh%5D%20Discontinuous%20coverage.doc) Report of [Post122][113][IoT NTN Enh] Discontinuous coverage (Huawei) Huawei, HiSilicon discussion Rel-18 IoT\_NTN\_enh-Core

Paging enhancements

Proposal 1: Send an LS to SA2 to ask for:

- SA2 opinion about the issue about misalignment between PTW and Coverage Window (e.g., whether it needs to be solved and if yes, whether it can be solved by NW implementation)

- SA2 opinion about the possible enhancement to UE and NW behaviour to adjust PH and PTW starting point (e.g., based on an offset configured by eNB or CN, or based on an predefined rule between UE and eNB ) , if it cannot be solved by NW implementation

RRC connection release

Proposal 2: UE performs autonomous RRC release based on a timer (e.g., similar as MUSIM mechanism) or upon detection of the coverage gap (e.g., stop AS operation related to NTN). No further enhancement is needed.

UE behaviour related to RLF

Proposal 3: UE may directly go to RRC\_IDLE after RLF is triggered, if there is not enough time for the UE to finish the procedure of RRC re-establishement due to the discontinuous coverage. FFS whether a NOTE is needed for this.

Additional information to UE

Proposal 4: Further discuss which (or none) of the following information is needed to be provided additionally:

- Ephemeris of more satellites (5/15)

- Footprint information of more satellites (5/15)

- Carrier frequency for cell searching after a coverage gap (6/15)

[R2-2307108](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307108%20Discussion%20on%20Discontinuous%20Coverage%20for%20R18%20IOT%20NTN.docx) Discussion on Discontinuous Coverage for R18 IoT NTN vivo discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307319](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307319%20Discontinuous%20coverage%20handling%20enhancement%20for%20IoT%20NTN.docx) Discontinuous coverage handling enhancement for IoT NTN THALES, Telit discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307415](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307415%20Discussion%20on%20enhancements%20to%20discontinuous%20coverage.docx) Discussion on enhancements to discontinuous coverage CATT discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307444](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307444%20Considerations%20on%20Supporting%20Discontinuous%20Coverage.docx) Considerations on Supporting Discontinuous Coverage NEC discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307590](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307590%20Remaining%20issues%20of%20discontinuous%20coverage.docx) Remaining issues of discontinuous coverage ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307627](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307627%20DC%20enhancement.doc) RRC release procedure in discontinuous coverage Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2307773](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307773-Discontinuous%20coverage%20for%20IoT%20NTN.docx) Further discussion on discontinuous coverage enhancements Nokia, Nokia Shanghai Bell discussion

[R2-2307868](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307868_Discontinuous%20coverage%20in%20IoT%20NTN.doc) Support on discontinuous coverage in IoT NTN Apple discussion Rel-18 IoT\_NTN\_enh

[R2-2308009](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308009%20Some%20remaining%20issues%20for%20discontinuous%20coverage.docx) Some remaining issues for discontinuous coverage Lenovo discussion Rel-18

[R2-2308217](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308217.docx) Discussion on enhancement to discontinuous coverage for IoT NTN Transsion Holdings discussion Rel-18

[R2-2308285](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308285.docx) Enhancements to discontinuous coverage Samsung R&D Institute UK discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308579](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308579%20%28R18%20IoT-NTN%20WI%20AI%207.6.4%29%20-%20discontinuous%20coverage.docx) Paging in discontinuous coverage Interdigital, Inc. discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2308580](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308580%20%28R18%20IoT-NTN%20WI%20AI%207.6.4%29%20draft%20LS%20to%20SA2%20on%20discontinuous%20coverage.docx) <draft> LS on PTW modification due to UE unreachability Interdigital, Inc. LS out Rel-18 IoT\_NTN\_enh-Core To:SA2 Cc:CT1

[R2-2308717](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308717%20Discussion%20on%20TN%20coverage%20for%20discontinuous%20coverage.docx) Discussion on TN coverage for discontinuous coverage ASUSTeK discussion Rel-18 IoT\_NTN\_enh-Core

## 7.7 NR NTN enhancements

(NR\_NTN\_enh -Core; leading WG: RAN1; REL-18; WID: RP-223534)

Time budget: 1 TU

Tdoc Limitation: 4 tdocs

### 7.7.1 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.

Workplan

[R2-2307323](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307323%20WP%20RAN2.docx) R18 WI NR-NTN-enh work plan at RAN1, 2 and 3 THALES Work Plan Rel-18 R2-2305391

Incoming LSs

[R2-2307008](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307008_R1-2306210.docx) Reply LS to RAN2 on unchanged PCI (R1-2306210; contact: CATT) RAN1 LS in Rel-18 NR\_NTN\_enh-Core To:RAN2

[R2-2307011](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307011_R1-2306217.docx) Reply LS on RACH-less Handover (R1-2306217; contact: Samsung) RAN1 LS in Rel-18 NR\_NTN\_enh-Core To:RAN2

[R2-2307035](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307035_R3-233527.doc) LS on time-based trigger condition in NG HO for NR NTN (R3-233527; contact: Ericsson) RAN3 LS in Rel-18 NR\_NTN\_enh-Core To:SA2 Cc:RAN2

Running CRs

[R2-2307318](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307318%2038.300_R18%20NR%20NTN%20Stage2%20CR%20v01_Rapp.docx) Stage 2 running CR for TS 38.300 for Rel-18 NTN enhancements THALES (Rapporteur) draftCR Rel-18 38.300 17.5.0 B NR\_NTN\_enh-Core R2-2306960

[R2-2308523](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308523%20NTN%20MAC%20running%20CR_post%20122.docx) Stage 3 NTN running CR for 38.321 - RAN2#122 InterDigital draftCR Rel-18 38.321 17.5.0 B NR\_NTN\_enh-Core R2-2306955

[R2-2308902](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308902%20-%2038331_CR4293_%28Rel-18%29%20-%20Stage%203%20Running%20RRC%20CR%20for%20NR%20NTN%20Rel-18.docx) Stage 3 Running RRC CR for NR NTN Rel-18 Ericsson CR Rel-18 38.331 17.5.0 4293 - B NR\_NTN\_enh-Core

* Revised in R2-2308937

[R2-2308937](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308937%20-%2038331_CR4293_%28Rel-18%29%20-%20Stage%203%20Running%20RRC%20CR%20for%20NR%20NTN%20Rel-18.docx) Stage 3 Running RRC CR for NR NTN Rel-18 Nanjing Ericsson Panda Com Ltd CR Rel-18 38.331 17.5.0 4293 1 B NR\_NTN\_enh-Core [R2-2308902](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308902%20-%2038331_CR4293_%28Rel-18%29%20-%20Stage%203%20Running%20RRC%20CR%20for%20NR%20NTN%20Rel-18.docx)

[R2-2308943](file:///C%3A%5CData%5C3GPP%5CRAN2%5CDocs%5CR2-2308943.zip) Running 38.304 CR for NTN ZTE Corporation, Sanechips draftCR Rel-18 38.304 17.5.0 B NR\_NTN\_enh-Core R2-2306961

UE capabilities

[R2-2308092](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308092_R18-NR-NTN-Enh_Capabilities.docx) UE Capability Discussion for Rel-18 NR NTN Enhancements WI Intel Corporation discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308093](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308093__38.306%20draftCR%20-%20NR%20NTN%20Enh%20-%20UE%20capabilities.docx) UE capabilities for Rel-18 NR NTN Enhancements WI Intel Corporation draftCR Rel-18 38.306 17.5.0 B NR\_NTN\_enh-Core

[R2-2308094](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308094__38.331%20draftCR%20-%20NR%20NTN%20Enh%20-%20UE%20capabilities.docx) UE capabilities for Rel-18 NR NTN Enhancements WI Intel Corporation draftCR Rel-18 38.331 17.5.0 B NR\_NTN\_enh-Core

### 7.7.2 Coverage Enhancements

[R2-2307195](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307195%20Discussion%20on%20PUCCH%20repetition%20for%20Msg4%20HARQ-ACK%20for%20NTN.docx) Discussion on PUCCH repetition for Msg4 HARQ-ACK for NTN NTT DOCOMO INC. discussion Rel-18

< support for higher layer signallling >

Observation 1. RAN1 assume that the UE requests PUCCH repetition for Msg4 HARQ-ACK via Msg3 higher layer signaling. The request is assumed to be a two-state information.

Observation 2. Two-state information in Msg3 to request PUCCH repetition for Msg4 HARQ-ACK is available by utilizing LCIDs.

Proposal 1. RAN2 confirm that the request of PUCCH repetition for Msg4 HARQ-ACK via Msg3 higher layer signaling is feasible.

Proposal 2. For request of PUCCH repetition for Msg4 HARQ-ACK, LCIDs are utilized.

(some alternative options are listed in other contributions, for instance in R2-2307313 and R2-2308230)

< interaction with other WIs >

Observation 3. If RAN2 try to book LCIDs for “repetition request & early indication by (e)RedCap”, we head shortage of remaining LCIDs.

Observation 4. eLCID is not desirable for features to extend coverage because basically eLCID increases the length of MAC header.

Proposal 3. RAN2 discuss how the request of PUCCH repetition for Msg4 HARQ-ACK via Msg3 co-exist with early indication by (e)RedCap UEs.

Proposal 4. RAN2 confirm that eLCIDs are not used for request of PUCCH repetition for Msg4 HARQ-ACK.

[R2-2307313](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307313.docx) Discussion on signalling for PUCCH repetition for Msg4 HARQ-ACK Samsung discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: RAN2 to discuss the following options for repetition request or UE capability indication of PUCCH repetition for Msg4 HARQ-ACK.

Option 1: PRACH resource partition

Option 2: indicate by one R bit in a MAC subheader in Msg3 MAC PDU

Option 3: new LCIDs for CCCH and CCCH1 for a non-RedCap UE in Msg3 MAC PDU

Option 4: a new MAC CE with fixed size of zero bits in Msg3 MAC PDU

Proposal 2: If Option 1 is selected, NW indicates enabling PUCCH repetition for Msg4 HARQ-ACK enabled in RACH configuration.

Proposal 3: If Option 2 is selected, if UL CCCH MAC SDU is included in Msg3 MAC PDU, the first or the second R bit in MAC subheader of UL CCCH MAC SDU in Msg3 MAC PDU is set to 1 to indicate the request/capability of PUCCH repetition for Msg4 HARQ-ACK.

Proposal 4: If Option 2 is selected, if C-RNTI MAC CE is included in Msg3 MAC PDU, the first or the second R bit in MAC subheader of C-RNTI MAC CE in Msg3 MAC PDU is set to 1 to indicate repetition request/capability of PUCCH repetition for Msg4 HARQ-ACK.

Proposal 5: If option 3 is selected, discuss how to indicate request/capability of PUCCH repetition for Msg4 HARQ-ACK when Msg3 does not contain UL CCCH SDU.

Proposal 6: If option 4 is selected, discuss whether LCID or eLCID is used for the new MAC CE of request/capability indication for PUCCH repetition for Msg4 HARQ-ACK.

Proposal 7: If Msg 3 includes the indication of UE capability of PUCCH repetition for Msg4 HARQ-ACK, discuss whether the indication is needed after initial access.

[R2-2308230](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308230%20On%20Msg3%20indication%20for%20PUCCH%20repetition%20for%20Msg4%20HARQ-ACK.docx) On Msg3 indication for PUCCH repetition for Msg4 HARQ-ACK Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core

Proposal 3: RAN2 to discuss below options for ‘repetition request or capability report’ for PUCCH repetition for Msg4 HARQ-ACK.

- Option1: define four new LCID(s) index indicating not only the size of CCCH in the Msg3 (48 and 64 bits) but also PUCCH repetition UE capability or request.

- Option2: re-purpose the reserved R bits in the MAC subheader of the Msg3.

- Option3: re-purpose the spare bit currently present in the RRC messages contained in UL CCCH or UL CCCH1.

Proposal 4: If option1 is to be used, whether and how to optimize the LCID usage can be discussed for Rel-18 (e.g., considering the cross WI coordination on LCID allocation).

[R2-2307253](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307253%20-%20Discussion%20on%20PUCCH%20enhancement%20for%20Msg4%20HARQ-ACK%20in%20NR%20NTN.doc) Discussion on PUCCH enhancement for Msg4 HARQ-ACK in NR NTN OPPO discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307416](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307416%20Discussion%20on%20PUCCH%20repetition%20for%20Msg4%20HARQ-ACK.docx) Discussion on PUCCH repetition for Msg4 HARQ-ACK CATT discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307512](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307512%20Discussion%20on%20coverage%20enhancement%20for%20NR%20NTN.doc) Discussion on coverage enhancement for NR NTN Xiaomi discussion Rel-18

[R2-2307526](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307526%20Higher%20layer%20signalling%20for%20PUCCH%20repetition%20for%20Msg4%20HARQ-ACK.doc) Higher layer signalling for PUCCH repetition for Msg4 HARQ-ACK Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307620](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307620%20UE%20capability%20for%20Msg4%20ACK%20repetition.doc) UE capability indication for Msg4 ACK repetition Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307839](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307839_HL%20signaling%20design%20for%20the%20PUCCH%20repetition%20request_v0.doc) HL signaling design for the PUCCH repetition request Apple discussion Rel-18 DUMMY

[R2-2308294](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308294%20Discussion%20on%20the%20LS%20on%20higher%20layer%20signaling%20in%20Msg3%20PUSCH%20for%20PUCCH%20repetition%20for%20Msg4%20HARQ-ACK.docx) Discussion on the LS on higher layer signaling in Msg3 PUSCH for PUCCH repetition for Msg4 HARQ-ACK CMCC discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308507](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308507%20Consideration%20on%20coverage%20enhancements.doc) Consideration on coverage enhancements ZTE Corporation, Sanechips discussion Rel-18

[R2-2308539](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308539%20-%20R18%20NR%20NTN%20Coverage%20enhancements.docx) R18 NR NTN Coverage enhancements Ericsson discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308604](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308604_Discussion%20on%20coverage%20enhancement_r1.DOCX) Discussion on coverage enhancement LG Electronics Inc. discussion NR\_NTN\_enh-Core

### 7.7.3 Network verified UE location

UE capability and NW behaviour

[R2-2307601](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307601.docx) UE support of Network Verified UE Location Feature Samsung R&D Institute UK discussion Rel-18 NR\_NTN\_enh-Core

Observation 1: RAN1 will work on multi-RTT for performing verification of the UE location.

Observation 2: the new feature of location verification is an optional UE feature.

Observation 3: A Rel-18 UE should support multi-RTT as part of its NR NTN capability.

Proposal 1: RAN2 to change the WA on “A Rel-18 UE capability is needed for indicating whether UE supports the feature of network verified UE location in NR NTN network” to a full agreement.

Proposal 2: RAN2 to discuss how the network handles the access to NR NTN cells for UEs that do not support the new Rel-18 NR NTN capability to support the new feature of network verified UE location.

[R2-2307487](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307487%20Discussion%20on%20the%20network%20verified%20UE%20location.doc) Discussion on the network verfied UE location Huawei, Turkcell, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Cell change handling

[R2-2307908](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307908%20-%20discussion%20on%20network%20verified%20UE%20location.docx) Discussion on network verified UE location Ericsson discussion Rel-18 NR\_NTN\_enh-Core

Observation 1 In the legacy RAT dependent positioning framework, when the requested measurements cannot be obtained, the UE and the gNB can provide an error cause to the LMF indicating that the required positioning measurements cannot be obtained.

Observation 2 Up reception of the error cause, it is up to the LMF’s implementation on how to handle the positioning procedure.

Proposal 1 Limited by work time in R18, RAN2 shall aim for a simple option to address the impact of cell change and/or satellite change on positioning procedures.

Proposal 2 Define a new error cause in LPP indicating that the requested positioning measurements cannot be obtained due to cell change and/or satellite change.

Proposal 3 Send a LS to RAN1 and RAN3 informing them of the RAN2 agreement on the error cause.

Proposal 4 Adopt the LS draft captured in the appendix.

Procedure / assistance information

[R2-2308263](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308263%20Discussion%20on%20network%20verified%20UE%20location.doc) Discussion on network verified UE location Xiaomi discussion

Proposal 1: The multi-RTT positioning procedure of TN without any neighbouring gNB/TRP involvement is the baseline for multi-RTT positioning of NTN when only a single satellite is visible.

Proposal 2: The serving gNB/TRP should provide multiple gNB Rx-Tx time difference measurements with different measurement time to LMF and UE should provide multiple UE Rx-Tx time difference measurements on the PRS from the serving gNB with multiple measurement times to LMF respectively.

Proposal 3: LMF could configure UE and gNB to report the positioning measurement periodically or configure the UE and gNB to report multiple positioning measurements in one shot report.

Proposal 4: The following solutions are considered for LMF acquiring the ephemeris data:

• gNB provides the ephemeris data to LMF by NRPPa message

• UE reports the ephemeris data to LMF by LPP message

• OAM configures the ephemeris data to LMF

Proposal 5: gNB reports the common TA with positioning measurement by NRPPa measurement response message.

[R2-2307320](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307320%20network%20verified%20UE%20location.docx) Discussion on network verified UE location in NR NTN THALES discussion Rel-18 NR\_NTN\_enh-Core R2-2305408

Observation 1:

The geometry relating the UE and positioning anchor points (TRP) affects the network verified UE location based on Multi-RTT method.

Proposal 1: For multi-RTT based positioning in NTN, the UE should include the calculated N\_"TA,adj" ^"common" to the measurement results that need be transferred from UE to the LMF.

Proposal 2: For multi-RTT based positioning in NTN, the UE includes the position of the satellite when DL-PRS measurements are performed to the measurement results that need be transferred from UE to the LMF.

Proposal 3: For multi-RTT based positioning in NTN, the following assistance data may be transferred from gNB to the LMF:

 The value of the 𝑘mac used by gNB

 The value of TACommon when the gNB Rx – Tx time difference measurement is performed

Proposal 4: For multi-RTT based positioning in NTN, the gNB includes the position of the satellite when UL-SRS measurements are performed to the assistance data that may be transferred from gNB to the LMF.

Proposal 5: For multi-RTT based positioning in NTN, the gNB may provide the LMF with assistance data including:

 Satellite ID

 Cell/beam reference point

 The ephemeris data in PVT state vector format or Keplerian format along with the associated epoch time.

Proposal 6: For multi-RTT based positioning in NTN, the LMF indicates to the UE the vTRP positions or the time intervals at which the PRS should be measured.

Proposal 7: For multi-RTT based positioning in NTN, the LMF indicates to the UE the vTRP positions or the time intervals at which the aperiodic SRS should be activated.

[R2-2308196](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308196%20Discussion%20on%20multiple-RTT%20based%20positioning%20in%20NTN.docx) Discussion on multiple-RTT based positioning in NTN Quectel discussion

[R2-2308277](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308277_NTN_NW_verified_UE_location_Disc.docx) Discussion on NTN NW verified UE location Lenovo discussion Rel-18

[R2-2308295](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308295%20Considerations%20on%20network%20verified%20UE%20location.doc) Considerations on network verified UE location CMCC discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308450](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308450_UE%20location%20verification%20by%20Network.docx) UE location verification by Network NEC Telecom MODUS Ltd. discussion

[R2-2308706](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308706.docx) Discussion on Network Verified UE Location TCL discussion

[R2-2308777](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308777-On%20Network%20verified%20UE%20location%20for%20NR%20NTN%20for%20NR%20NTN.docx) On Network verified UE location for NR NTN MediaTek Inc. discussion

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

#### 7.7.4.1 Cell reselection enhancements

[R2-2307321](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307321%20VSAT%20mobility%20enhancements.docx) Discussion on mobility enhancements for VSAT THALES discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307314](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307314.docx) Discussion on Cell Reselection Enhancements Samsung discussion Rel-18 NR\_NTN\_enh-Core

##### 7.7.4.1.1 NTN-TN enhancements

[R2-2308283](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308283_Signaling%20of%20the%20TN%20coverage%20area%20and%20the%20frequency%20information.docx) Signaling of the TN coverage area and the frequency information ZTE corporation, Sanechips discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Both of the NR TN coverage and EUTRA coverage can be provided.

Proposal 2: Introduce a new SIB to provide the TN coverage information and it is allowed to provide coverage information for frequencies not included in SIB4/5.

Proposal 3: The frequency info should be indicated under each TN coverage area and frequency index bitmap referring to the frequencies in SIB4 and 5 should be introduced to reduce the signaling overhead, i.e. option 1+3.

[R2-2307579](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307579%20On%20TN%20Coverage%20Definition%20and%20TN%20to%20NTN%20Reselections.docx) On TN Coverage Definition and TN to NTN Reselections Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core

Observation 1: As per RAN2#122 decisions, the information on the TN coverage area will be signaled either using Option 2 or the combination of Option 1 and Option 3.

Observation 2: Neither Option 2, nor the combination of Option 1 and 3 allow to signal other frequencies than already included in SIB4 or SIB5.

Observation 3: If the gNB wants the NTN UE to be aware of certain frequency for terrestrial coverage, this frequency can be listed in the legacy SIB4 or SIB5.

Observation 4: There may be up to 8 frequencies in the InterFreqCarrierFreqList in SIB4, each could be linked to more than a single TN coverage area.

Observation 5: In Option 2, 48 bits are needed if two areas per frequency are signaled, and each area ID consumes 3 bits.

Observation 6: Option 1+3 requires to always signal the same number of bits, equal to the number of frequencies in SIB4, even if for particular TN coverage area there is e.g. just a single frequency to indicate.

Proposal 1: Option 2 (A TN coverage area configuration is associated with a TN coverage Area ID. The frequency information for TN coverage area is indicated by adding TN coverage area IDs in SIB4 and SIB5) is adopted for signaling the TN coverage area information in Rel-18 NTN.

Observation 7: As per Rel-18 WID, cell reselection (mobility) enhancements for NTN to TN are prioritized.

Observation 8: NTN-capable UE while being in TN cell can measure on NTN frequencies even without NTN assistance information (such as ephemeris, common TA, etc.).

Observation 9: Providing NTN assistance information in the TN’s SIB, possibly for multiple NTN neighbour cells, will introduce a non-negligible signalling burden.

Proposal 2: In Rel-18 NTN WI RAN2 does not pursue enhancements for TN -> NTN cell reselection.

[R2-2307621](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307621%20TN%20coverage.doc) TN cell coverage info and measurement relaxation Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1 A new SIB is introduced to provide TN coverage information as a list of area center locations and their corresponding radius distance.

Proposal 2 Introduce coverage Area identity.

Proposal 3 In SIB4/5, if the frequency is TN frequency, the one or more area IDs are provided as inter-frequency carrier information for UE to decide whether the UE is required to perform measurement on this TN frequency.

Proposal 4 Introduce relaxed measurement for TN frequency for which the reselection priority is higher than current NTN cell reselection priority if the UE does not detect the cell for X number of measurement occasions.

Proposal 5 RAN2 consider solution to enable TN cell providing UE assistance information for NTN cell measurements.

[R2-2307101](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307101%20Remaining%20Issues%20on%20Power%20Saving%20for%20NTN-TN%20Mobility.docx) Remaining Issues on Power Saving for NTN-TN Mobility vivo discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307166](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307166%20-%20NTN%20neighbour%20cell%20information%20in%20TN%20cells.docx) NTN neighbour cell information in TN cells PANASONIC R&D Center Germany discussion

[R2-2307167](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307167.docx) Considerations on TN-NTN cell re-selection Telit Communications S.p.A. discussion

[R2-2307217](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307217%20%5BNTN%5D%20Discussion%20on%20providing%20TN%20coverage%20area%20information.docx) Discussion on providing TN coverage area information LG Electronics France discussion Rel-18 38.331 NR\_NTN\_enh

[R2-2307254](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307254%20Discussion%20on%20NTN-TN%20cell%20reselection%20enhancement.doc) Discussion on NTN-TN cell reselection enhancement OPPO discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307417](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307417%20Discussion%20on%20the%20mechanism%20for%20providing%20TN%20coverage%20information.docx) Discussion on the mechanism for providing TN coverage information CATT discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307739](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307739.docx) Discussion on NTN to TN cell reselection enhancements TCL discussion

[R2-2307840](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307840_NTN-TN%20cell%20reselection%20enhancement_v0.doc) NTN-TN cell reselection enhancement Apple discussion Rel-18 DUMMY

[R2-2308010](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308010%20Some%20remaining%20issues%20for%20TN%20area%20information%20%28Revision%20of%20R2-2305715%29.docx) Some remaining issues for TN area information Lenovo discussion Rel-18

[R2-2308054](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308054.doc) Discussion on the NTN – TN cell reselection enhancement Turkcell, Huawei, HiSilicon discussion Rel-18

[R2-2308116](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308116_Discussion%20on%20NTN-TN%20enhancements.doc) Discussion on NTN-TN enhancements NTT DOCOMO, INC. discussion Rel-18

[R2-2308218](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308218%20Discussion%20on%20remaining%20issues%20of%20NTN-TN%20cell%20reselection%20enhancements.doc) Discussion on remaining issues of NTN-TN cell reselection enhancements Transsion Holdings discussion Rel-18

[R2-2308239](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308239%20Discussion%20on%20TN%20coverage%20description.docx) Discussion on TN coverage description ETRI discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308264](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308264%20Cell%20reselection%20enhancements%20for%20NTN-TN%20mobility.doc) Cell reselection enhancements for NTN-TN mobility Xiaomi discussion

[R2-2308296](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308296%20Discussion%20on%20open%20issues%20for%20NTN-TN%20cell%20reselection.docx) Discussion on open issues for NTN-TN cell reselection CMCC discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308524](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308524%20%28R18%20NR%20NTN%20WI%20AI%207.7.4.1.1%29%20NTN-TN%20mobility.docx) NTN-TN mobility and service continuity InterDigital discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308701](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308701.docx) Discussion on NTN-TN Cell re-selection ITL discussion Rel-18

##### 7.7.4.1.2 NTN-NTN enhancements

[R2-2307255](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307255%20Discussion%20on%20NTN-NTN%20cell%20reselection%20enhancement.doc) Discussion on NTN-NTN cell reselection enhancement OPPO discussion Rel-18 NR\_NTN\_enh-Core

Observation 1 For earth moving cell, the broadcasted serving cell reference location needs to be updated frequently with the change of serving satellite ephemeris and epochTime.

Observation 2 Regardless of quasi-earth-fixed cell and earth moving cell, time-based measurement initiation works in the same way.

Based on the discussion above, we give the following proposals:

Proposal 1 The change of serving cell reference location for earth moving cell should neither result in system information change notifications nor in a modification of valueTag in SIB1.

Proposal 2 It is up to UE implementation to maintain a valid serving cell reference location in RRC\_IDLE mode.

Proposal 3 For the IE used to trigger UE neighbor cell measurements prior to cell replacement due to feeder link switch, re-use the same field of t-Service-17 as in Rel-17 and update the field description accordingly.

Moved here from 7.7.4.1

[R2-2308901](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308901%20-%20Idle%20mode%20mobility%20enhancements.docx) Idle mode mobility enhancements Ericsson discussion Rel-18 NR\_NTN\_enh-Core

Proposal 7 In case of NTN cell hard switch (either changing or keeping the PCI), UE need not to start neighbour cell measurements of the new cell before t-service expires.

Proposal 8 The network informs (either implicitly or explicitly) the UE whether the next NTN cell switch is a soft or a hard switch.

Proposal 9 Use ReferenceLocation IE for the parameter in SIB19 (movingReferenceLocation-r18) used to indicate the serving cell reference location for Earth-moving cells.

[R2-2308525](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308525%20%28R18%20NR%20NTN%20WI%20AI%207.7.4.1.2%29%20Earth%20moving%20cell.docx) Cell reselection enhancements for Earth moving cell InterDigital discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Confirm that for Earth-moving cells, location-based measurement initiation and time-based measurement initiation due to feeder-link switch are optional UE features.

Observation 1: Broadcasting multiple future reference point coordinates and associated timestamp can reduce frequency of SIB update and improve trajectory calculation.

Proposal 2: For Earth-moving cells, multiple future reference location coordinates and associated timestamp information can be broadcast simultaneously.

Proposal 3: If multiple future reference location coordinates are supported, timestamp information for each future reference point is provided by broadcasting an offset to epochTime.

Proposal 4: A new name t-ServiceFeederLink is used for the IE which triggers UE neighbour cell measurements prior to feeder-link switch.

Observation 2: During a hard switch, the service interruption extends to all cells originating from the satellite. Prior to the switch, UE should only measure cells originating from a different satellite with a stable feeder-link.

Proposal 5: RAN2 to discuss whether the UE can relax (e.g., not perform) measurements on neighbouring cell(s) originating from the same feeder-link about to be switched.

[R2-2307102](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307102%20Further%20discussion%20on%20NTN-NTN%20Mobility%20for%20Earth-moving%20cell.docx) Further discussion NTN-NTN Mobility for Earth-moving Cell vivo discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307218](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307218%20%5BNTN%5D%20Discussion%20on%20NTN-NTN%20cell%20reselection%20enhancements.docx) Discussion on NTN-NTN cell reselection enhancements LG Electronics France discussion Rel-18 38.331 NR\_NTN\_enh R2-2306032

[R2-2307740](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307740.docx) Discussion on NTN to NTN cell reselection enhancements TCL discussion

[R2-2308011](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308011%20Feeder%20link%20switch%20time%20and%20reference%20location%20of%20NTN%20moving%20cells.docx) Feeder link switch time and reference location of NTN moving cells Lenovo discussion Rel-18

[R2-2308033](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308033%20Discussion%20on%20location-based%20measurement%20initiation%20in%20moving%20cells.doc) Discussion on location-based measurement initiation in moving cells Huawei, Turkcell, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308124](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308124.doc) Discussion on NTN-NTN mobility enhancements Spreadtrum Communications discussion Rel-18

[R2-2308265](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308265%20Cell%20reselection%20enhancements%20for%20NTN-NTN%20mobility.doc) Cell reselection enhancements for NTN-NTN mobility Xiaomi discussion

[R2-2308297](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308297%20Discussion%20on%20remaining%20issues%20for%20NTN-NTN%20reselection.docx) Discussion on remaining issues for NTN-NTN reselection CMCC discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308700](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308700%20Discussion%20on%20NTN-NTN%20cell%20reselection%20enhancements.docx) Discussion on NTN-NTN cell reselection enhancements CAICT discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308718](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308718%20Discussion%20on%20description%20of%20movingReferenceLocation.docx) Discussion on description of movingReferenceLocation ASUSTeK discussion Rel-18 38.331 NR\_NTN\_enh-Core

#### 7.7.4.2 Handover enhancements

Including outcome of [Post122][114][NR NTN Enh] Unchanged PCI (other contributions on issues handled in [Post122][114][ might not be treated at RAN2#123)

Unchanged PCI

[R2-2308329](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308329%20Report%20of%20%5BPost122%5D%5B114%5D%5BNR%20NTN%20Enh%5D%20Unchanged%20PCI.docx) Report of [Post122][114][NR NTN Enh] Unchanged PCI CMCC discussion Rel-18 NR\_NTN\_enh-Core

List of proposals for agreement:

Proposal 2: If new parameter (t-star or t-gap) is supported, system information (option 1) is used to provide the time information.

Proposal 3: If new parameter (t-start or t-gap) is supported, implicit indication manner is enough(17/19).

Proposal 4: If t-service is reused, explicit indication manner is needed.(14/15)

Proposal 5: 4-step RACH or 2-step RACH is up to NW configuration.

Proposal 6: the selection of CFRA or CBRA is up to NW configuration.

Proposal 7: RACH-less operation(i.e. skip RA) can be combined with PCI unchanged solution in NTN system.

Proposal 8: For back-ward compatibility, network could handle the legacy UE using the existing mechanism and there is no spec. impact.

List of proposals that require online discussions:

Proposal 1: the unchanged PCI mechanism can be applied to both the continuous coverage where the coverage gap can be ignored and the coverage gap is not zero. FFS the indication is t-gap or t-start. (13/19)

[R2-2307104](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307104%20Further%20Discusison%20on%20Service%20Link%20Switch%20with%20Unchanged%20PCI.docx) Further Discusison on Service Link Switch with Unchanged PCI vivo discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307193](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307193_On%20Triggering%20Unchanged%20PCI%20for%20Handover%20Enhancement%20in%20LEO%20NTN.docx) On Triggering Unchanged PCI for Handover Enhancement in LEO NTN MediaTek Inc. discussion

[R2-2307418](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307418%20Discussion%20on%20unchanged%20PCI%20scenario.docx) Discussion on unchanged PCI scenario CATT discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307476](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307476%20Discussion%20on%20the%20Unchanged%20PCI%20Satellite%20Switch.docx) Discussion on the Unchanged PCI Satellite Switch Google Inc. discussion Rel-18

[R2-2307581](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307581%20On%20Unchanged%20PCI%20and%20Satellite%20Switching%20without%20L3%20Mobility.docx) On Unchanged PCI and Satellite Switching without L3 Mobility Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307623](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307623%20PCI%20unchanged.doc) Details on satellite switch with PCI unchange Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307741](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307741%20NTN%20unchanged%20PCI.docx) Discussion on satellite switch with unchanged PCI Panasonic discussion

[R2-2307841](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307841_Hard%20satellite%20switching%20with%20unchanged%20PCI_v0.doc) Hard satellite switching with unchanged PCI Apple discussion Rel-18 DUMMY

[R2-2307893](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307893_unchanged_PCI.docx) Discussion on gap time of unchanged PCI ITRI discussion NR\_NTN\_enh-Core

[R2-2307896](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307896%20Discussion%20on%20soft%20satellite%20switching%20with%20PCI%20unchanged.docx) Discussion on soft satellite switching with PCI unchanged FGI discussion

[R2-2308373](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308373%20Satellite%20switch_PCI%20change%20without%20L3%20handover.docx) Satellite Switch, PCI change without L3 handover NEC discussion NR\_NTN\_enh-Core

[R2-2308527](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308527%20%28R18%20NR%20NTN%20WI%20AI%207.7.4.2%29%20same%20PCI.docx) Satellite switching without PCI change InterDigital discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308609](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308609_NTN_HO-enh_PCI_fj.docx) Discussion on NTN handover enhancements Fujitsu discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308752](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308752%20Discussion%20on%20random%20access%20in%20the%20unchanged%20PCI.docx) Discussion on random access in the unchanged PCI scenario ETRI discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308753](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308753_) “Unchanged PCI” solution vs “PCI change only” solution Sequans Communications discussion Rel-18 NR\_NTN\_enh-Core R2-2306517

RACH-less HO

[R2-2307315](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307315.docx) Discussion on Handover Enhancements Samsung discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: The association between pre-allocated grant and SSB(s) is configured for initial UL transmission in RACH-less HO.

Proposal 2: In a pre-allocated grant, CG occasions are mapped to SSB indexes, configured by SSB-Subset and SSB-PerCG-PUSCH.

Proposal 3: A RSRP threshold is configured for SSB selection for initial UL transmission with pre-allocated grant. UE selects an SSB associated to a pre-allocated grant with RSRP above the threshold, and use that pre-allocated grant and the selected SSB for initial UL transmission.

Proposal 4: Beam indication (i.e., SSB index(es)) is provided to monitor target cell PDCCH for dynamic grant for initial UL transmission. Wait for RAN1 further response for the case where multiple beams are indicated.

Proposal 5: Wait for RAN1 further response on power control for initial UL transmission.

Proposal 6: If configured with RACH-less configuration, the MAC entity applies the configured N\_TA for the TAG of the serving cell, and starts the timerAlignmentTimer associated with this TAG.

Proposal 7: The pre-allocated grant is configured for NUL or SUL, and UE selects the corresponding UL carrier for the initial UL transmission.

Proposal 8: For dynamic grant provided in PDCCH, NW indicates NUL or SUL carrier for initial UL transmission.

Proposal 9: If SUL is configured and if the UL carrier for initial UL transmission is not explicitly signaled, UE selects NUL or SUL carrier based on a RSRP threshold of the downlink pathloss reference.

Proposal 10: The BWP indicated by firstActiveUplinkBWP is selected for the initial UL transmission. If the firstActiveUplinkBWP is not signaled, initialUplinkBWP is selected.

Proposal 11: If ta-Report enabled is included in ServingCellConfigCommon for RACH-less HO, a TA report shall be triggered.

Proposal 12: For the pre-allocated grant, support autonomous retransmission of the initial UL transmission with a retransmission timer configured. UE retransmits by pre-allocated grant when the timer expires.

Proposal 13: Both HARQ mode A and HARQ mode B are supported for the HARQ process of RACH-less initial UL transmission.

Proposal 14: HARQ process ID 0 is used for initial UL transmission.

Proposal 15: Before the successful completion of the RACH-less HO, the MAC entity shall not select the logical channel(s) corresponding to DRB(s) for the uplink grant for the HARQ process of initial UL transmission.

Proposal 16: If DRX is configured, the Active time for Serving Cells in a DRX group includes the time while UE is monitoring the PDCCH that provides dynamic grant for the initial UL transmission.

Proposal 17: If a PDCCH addressed to C-RNTI scheduling DL/UL is received after the initial UL transmission, consider RACH-less HO completed.

[R2-2307219](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307219%20NTN%20Discussion%20on%20handover%20enhancements._r1.docx) Discussion on handover enhancements LG Electronics France discussion Rel-18 38.331 NR\_NTN\_enh R2-2306033

[R2-2307580](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307580%20Resolving%20Open%20Points%20on%20RACH-less%20HO%20in%20Rel-18%20NTN.docx) Resolving Open Points on RACH-less HO in Rel-18 NTN Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307622](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307622%20RACH-less%20HO.doc) RACH-less handover for NTN Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307943](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307943_RACH-less%20signal%20design%20for%20NTN.doc) RACH-less signaling design for NTN China Telecom discussion Rel-18

[R2-2308012](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308012%20Some%20remaining%20issues%20for%20RACH-less%20HO%20in%20NTN.docx) Some remaining issues for RACH-less HO in NTN Lenovo discussion Rel-18

[R2-2308032](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308032%20Remaining%20issues%20on%20RACH-less%20HO%20in%20NTN.docx) Remaining issues on RACH-less HO in NTN Huawei, Turkcell, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308146](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308146-NTN_Discussion_on_RACH-less_HO.doc) Discussion on RACH-less HO Sharp discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308266](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308266%20Discussion%20on%20handover%20enhancements%20for%20NTN-NTN%20mobility.doc) Discussion on handover enhancements for NTN-NTN mobility Xiaomi discussion

[R2-2308374](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308374%20Support%20RACH-less%20CHO.docx) Support RACH-less CHO NEC discussion NR\_NTN\_enh-Core

[R2-2308526](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308526%20%28R18%20NR%20NTN%20WI%20AI%207.7.4.2%29%20CONN%20mobility%20enh.docx) NTN mobility enhancements for RRC\_CONNECTED InterDigital discussion Rel-18 NR\_NTN\_enh-Core

[R2-2308900](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308900%20-%20Handover%20enhancements.docx) Handover enhancements Ericsson discussion Rel-18 NR\_NTN\_enh-Core

Common HO configuration

[R2-2307419](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307419%20Discussion%20on%20RACH-less%20and%20common%20%28C%29HO%20configuration.docx) Discussion on RACH-less and common (C)HO configuration CATT discussion Rel-18 NR\_NTN\_enh-Core

Proposal 6: RAN2 first focuses on intra-gNB scenario for common configuration.

Proposal 7: The serving cell broadcast the target cell’s servingCellConfigCommon (as common (C)HO signalling)

Proposal 8: Define one new SIB, i.e. SIBx, to transfer the common (C)HO configuration.

Proposal 9: The network broadcasts the common configuration of the adjacent target cell(s) based on the trajectory of the satellite, the number is FFS.

Proposal 10： The procedure in Figure 1 can be adopted as the baseline for common (C)HO configuration mechanism:

- Step 1: The UE acquires the scheduling information for common (C)HO configuration from SIB1 upon the specified time e.g. upon t-service-offsetHO, or upon reception of indication from network.

- Step 2: The UE starts to monitor SIBx according to the scheduling information in SIB1 if the UE supports common (C)HO configuration.

- Step 3: The network send (C)HO command without common (C)HO configuration.

- Step 4: the UE starts HO using the target cell common configuration in SIBx.

Notes: The order of step 2 and step 3 is up to network implementation.

[R2-2307103](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307103%20Discussion%20on%20Handover%20Enhancement%20with%20Common%20HO%20Configuration%20in%20NR%20NTN.docx) Discussion on Handover Enhancement with Common HO Configuration in NR NTN vivo discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307258](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307258%20NTN%20HO%20enhancement.doc) Discussion on NTN handover enhancements OPPO discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307894](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307894_Group_HO.docx) Discussion on common information of group handover ITRI discussion NR\_NTN\_enh-Core

[R2-2308159](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308159.docx) Signaling overhead reduction during NTN-NTN HOs Sony discussion Rel-18 NR\_NTN\_enh

[R2-2308219](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308219%20Discussion%20on%20NTN-NTN%20handover%20enhancements.doc) Discussion on open issues of NTN-NTN handover Transsion Holdings discussion Rel-18

[R2-2308755](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308755_Common%20signalling%20of%20HO%20common%20information.docx) Common signalling of HO common information Sequans Communications discussion Rel-18 NR\_NTN\_enh-Core

CHO/Other

[R2-2307842](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307842_%20NR%20NTN%20specific%20handover%20enhancement_v0.doc) NR NTN specific HO enhancement Apple discussion Rel-18

Observation 1: For the earth moving cell, the target cell for subsequent handover can be predicted.

Observation 2: Subsequent SCG change scheme will be specified in R18.

Proposal 1: Support Subsequent CHO as one of the NR NTN specific handover enhancements in R18.

Proposal 2: In subsequent CHO, UE will keep all the candidate CHO configurations after CHO execution, until receiving the explicit release indication from network.

Proposal 3: R18 subsequent CHO is limited in intra-gNB handover scenario, and HO with security key change is not supported.

[R2-2308719](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308719%20Discussion%20on%20moving%20cell%20reference%20location%20for%20CHO.docx) Discussion on moving cell reference location for CHO ASUSTeK discussion Rel-18 NR\_NTN\_enh-Core

[R2-2307343](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307343%20-%20Handover%20enhancements.docx) Handover enhancements Continental Automotive discussion Rel-18

### 7.25.4 Self-Evaluation NTN

(FS\_IMT-2020\_Sat\_eval; leading Group: TSG RAN; REL-18; WID: RP-230754)

This will be treated in NTN breakout session (Sergio).

Study on Self-Evaluation towards the 3GPP submission of a IMT-2020 Satellite Radio Interface Technology, including both NR NTN and IoT-NTN. Note that the time allocated will be very limited, and this is expected to be mostly an offline activity.

* [AT123][102][NTN Self Ev] CP/UP latency assumptions (Ericsson)

Initial scope: Converge on common assumptions for CP/UP latency (based on submitted contributions in AI 7.25.4)

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: Wednesday 2023-08-23 14:00 (F2F offline discussion might also happen afterwards, depending on companies’ feedback)

Deadline for rapporteur’s summary (in R2-2308982): Friday 2023-08-25 08:00

R2-2308982 [offline-102] CP/UP latency assumptions Ericsson discussion Rel-18 FS\_IMT2020\_SAT\_eval

[R2-2307322](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307322%20Discussion%20self-evaluation.docx) Discussion on IMT-2020 Satellite self-evaluation for Latency and Mobility THALES discussion Rel-18 NR\_NTN\_enh-Perf R2-2305410

[R2-2307496](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307496%20Self-Evaluation%20for%20NR%20NTN.doc) Self-Evaluation for NR NTN Huawei, HiSilicon discussion Rel-18 FS\_IMT2020\_SAT\_eval

[R2-2307586](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307586%20On%20CP%20and%20UP%20Latency%20for%20IMT-2020%20NTN%20Self%20Evaluation.docx) On CP and UP Latency for IMT-2020 NTN Self Evaluation Nokia, Nokia Shanghai Bell discussion Rel-18 FS\_IMT2020\_SAT\_eval

[R2-2307624](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2307624%20IMT-2020%20Satellite.docx) RAN2 aspects on evaluation methodology for IMT-2020 Satellite Qualcomm Incorporated discussion Rel-18 FS\_IMT2020\_SAT\_eval

[R2-2308508](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308508%20Self-Evaluation%20towards%20the%203GPP%20submission%20of%20a%20IMT-2020%20Satellite%20Radio%20Interface%20Technology.docx) Self-Evaluation towards the 3GPP submission of a IMT-2020 Satellite Radio Interface Technology ZTE Corporation, Sanechips discussion Rel-18

[R2-2308903](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308903%20-%20Satellite%20IMT-2020%20self-evaluation%20CP%20latency.docx) Satellite IMT-2020 self-evaluation: CP latency Ericsson discussion Rel-18

[R2-2308905](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2308905%20-%20Satellite%20IMT-2020%20self-evaluation%20UP%20latency.docx) Satellite IMT-2020 self-evaluation: UP latency Ericsson discussion Rel-18

# Summary

Agreed CRs

NR-NTN

Stage 2

38.306

38.321

38.331

IoT-NTN

Stage 2

36.321

36.331

Approved LSs out

[Post123] Email discussions

Short

Long