3GPP TSG-RAN WG2 Meeting #125 R2-2401543

Athens, Greece, Feb 26th – Mar 1st, 2024

**Agenda item: 8.3**

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

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

**Document for: Approval**

Organizational

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

* [AT125][300] Organizational – NR-NTN and IoT-NTN session

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 February 26th** | | | | |
| 09:00 – 10:30 | [**1], [2], [3],**  **[7.0] R18 common (Diana)**  **[7.0.1][7.0.2]**  **[7.0.3] ASN.1 Review common**  **[7.0.4] Others**  **NR151617 UP (Diana)**  [5.1.2.1] R15-R16 MAC UP  [6.1.2] R17 User Plane corrections | Breakout to start after common session including ASN.1 review  **MUSIM [1] (Erlin) (if ASN.1 common session ends early)** | Breakout to start after common session:  **(if ASN.1 common session ends early)**  **NRLTE1516 Pos (Nathan)**  **NR17 Positioning and SL Relay (Nathan)** |  |
| 11:00 – 13:00 |  |
| 14:30 – 16:30 | **NR18 Network Energy Saving [1] (Diana)**  [7.3.1] Organizations  [7.3.3] Control Plane  [7.3.2] User Plane | **@14:30-15:30 MUSIM [1] (Erlin)**  [7.17.1] Organizations, RIL list, etc.  [7.17.2] Listed open issues, other topics if time allows  **@15:30 NR18 MIMO evo [0.75] (Erlin)**  [7.20.1] Organizations, RIL list, etc.  [7.20.2] Listed open issues, other topics if time allows  IDC (Yi) (email discussion only)  NCR(Sasha) (email discussion only) | **NRLTE1516 V2X/SL (Kyeongin)**  **NR17 SL (Kyeongin)**  **NR18 SL (if time allows)** | Rel-18 Positioning offline for MAC open issues [offline 401] |
| 17:00 – 19:00 | **EUTRA&NR151617 (Mattias)**  **Note** we start with Rel-17 capabilities (per request)  [6.1.3.2]  [6.1]  [6.1.1]  [6.1.1.1]  [6.1.3.1]  [6.1.3.3] | **NR18 fCovEnh [0.5] (Eswar)**  [7.21.1] Organizational- Incoming LSs and rapporteur input  [7.21.2] CP issues  - CP Issues  - ASN.1 open issues and RIL list  [7.21.2] UP issues | **NR18 SL evolution [1] (Kyeongin)** |  |
|  |
| **Tuesday February 27th** | | | | |
| 08:30 – 10:30 | **NR18 feMob [2] (Johan)** | **NR 18 MBS [0.5] (Dawid):**  [7.11.1] Organizational: LS in, Rapporteur CRs, RIL resolution confirmation  [7.11.2.1] Inactive CP: Focus on ToDo RILs  [7.11.2.2] Inactive UP: Remaining issues for state transitions  [7.11.3] Remaining issues for shared processing  [7.11.4] Remaining issues for capabilities (resumption due to bad quality, intra-slot TDM)  If time allows:  [7.24.2] MBS TEI18: eDRX/MICO, RedCap CFR | **NR18 SL Relay [1.5] (Nathan)**  [7.9.1] Organizational: LS in, proposal for LS out, RIL list  [7.9.3] RRC: ToDo RILs, open issue list, rapporteur CR  [7.9.4] SRAP: open issue list (if time) |  |
| 11:00 – 13:00 | **NR18 feMob con’t [2] (Johan)**  **@12:00 NR18 Mobile IAB [0.5] (Johan)** | **NR18 UAV [1] (Diana)**  [7.8.x] All AIs in order) | **NRLTE1516 Pos (Nathan)**  [5.3] All documents  **NR17 Positioning and SL Relay (Nathan)**  [6.2][6.4.x] All documents  **NR18 Pos (Nathan)**  [7.2.1] Organizational: LSs in, new LSs out (if time) |
| 14:30 -16:30 | **NR18 XR [2] (Diana)**  [7.5.2] RRC corrections  [7.5.3] UP corrections  **@16:00 [7.24.2.1] TEI18 2Rx XR** | **NR17 NR NTN and IoT NTN Maint (Sergio)**  [4.2] R17 IoT NTN  [6.3] R17 NR NTN  **NR18 NTN enh [1] (Sergio)**  [7.7.1] Organizational (LSs and RIL lists)  [7.7.2] Stage 2 corrections  [7.7.3] RRC corrections | **NR18 Pos [2] (Nathan)**  [7.2.1] Organizational: rapporteur CRs, RIL lists, remaining documents after AM session  [7.2.3] SLPP: open issues and RIL resolutions  [7.2.4] LPP: open issues and RIL resolutions  Break between this session and the next is approximate |  |
|  |
|  |
| 17:00– 19:00 | **NR18 Other [2] Diana** | **NR18 NTN enh [1] (Sergio)**  [7.7.3] RRC corrections (cont)  [7.7.4] MAC corrections  [7.7.5] Other corrections | **NR18 Pos [2] (Nathan)**  [7.2.5] RRC: open issues and RIL resolutions  [7.2.6] MAC: open issues  [7.2.7] UE cap: open issues  [7.2.8] Other specs: document by document, as time permits  [7.2.2] Stage 2 (if time) |  |
|  |
| **Wednesday February 28th** | | | | |
| 08:30 – 10:30 | **NR18 feMob [2] (Johan)** | **NR18 eQoE [0.5] (Dawid):**  [7.14.1] Organizational: LS in, Rapporteur CRs, RIL resolution confirmation  [7.14.2/7.14.3] QoE in IDLE/INACTIVE and QoE in NR-DC: Focus on ToDo RILs  [7.14.5] QoE Other: Focus on ToDo RILs  [7.14.4] UE capabilities: Memory requirement for RedCap UE | **NR18 SL relay [1.5] (Nathan)**  [7.9.4] SRAP (if left after Tuesday session)  [7.9.5] MAC: open issues  [7.9.6] RLC/PDCP: open issues  [7.9.7] UE cap: open issues  **TEI Relay/POS (Nathan) (30minutes)**  [7.24.2.2] Relay and positioning documents  [7.24.1] LCS user plane (if time) |  |
|  |
|  |
| 11:00 – 13:00 | **NR18 XR [2] (Diana)** | **EUTRA&NR151617 (Mattias)**  Leftovers from Monday-session if any  [4.1]  [4.1.1]  [5.1.3.1]  [5.1.3.2] | **NR17 SONMDT (Sasha)**  **NR18 SONMDT [1] (Sasha)** |  |
|  |
| 14:30 – 16:30 | **NR18 URLLC [0.5] (Diana)**  **NR18 Network Energy Saving [1] (Diana)** | **NR18 RedCap [1] (Mattias)**  [7.19.1]  [7.19.2]  [7.19.3] | **NR18 Pos (Nathan)**  **TBD if needed and if offline sessions are scheduled instead** |  |
|  |
|  |
| 17:00 – 19:00 | **R18 IoT-NTN [1] (Sergio)**  [7.6.1] Organizational (LSs and RIL lists)  [7.6.3] RRC corrections  [7.6.4] MAC corrections | **@17:00-18:00 MUSIM**  [7.17.2]  [7.17.3] Only if time allows  **@18:00 MIMO**  [7.20.2]  [7.20.3] | **TBD** |  |
| **Thursday February 29th** | | | | |
| 08:30 – 10:30 | **SDT related topics:**  [7.18.x] MT- SDT  [7.24.1] TEI 18 RRCRelease enhancements)  [7.24.2.2] (TEI 18 beam failure)  **NR18 TEI [1] (Diana)**  [7.24.1] TEI18 from other WGs  [7.24.2.2] TEI18 from RAN2 (remaining)  [7.24.3] TEI18 from RAN1 | **CB NR18 NTN Enh (Sergio)**  [7.7.3] RRC corrections (cont) | CB Kyeongin  Comebacks |  |
|  |
|  |
|  |
| 11:00 – 13:00 | **NR18 Other [2] (Diana)** | CB Erlin  MU-SIM  MIMO evo | CB Kyeongin  Comebacks |  |
|  |
|  |
| 14:30 – 16:30 | **CB Diana** | CB Dawid:  - QoE  - MBS  - MBS TEI18 | CB Nathan |  |
|  |
| 17:00 – 19:00 | **CB Eswar (until ~18:00)**  **CB R18 IoT-NTN (Sergio) (from ~18:00)**  [7.6.4] MAC corrections (cont) | CB Johan  - mIAB  - feMob | CB Nathan |  |
|  |
|  |
| **Friday Mar 1st** | | | | |
| 08:30 – 10:30 | **CB Johan FeMob (If needed)**  CB Diana ASN.1 Review common session | CB **EUTRA&NR151617** Mattias  CB eRedCap Mattias | 8:30-9:30 CB Kyeongin  9:30-11:30 CB Nathan |  |
| 11:00 – 13:00 | CB Diana  @ 12:00 Report of offline session | (Until ~12:00)  **CB NR18 NTN Enh (Sergio)**  - Report of [303], [305]  - [7.7.3/7.7.5] Issues marked “CB Friday”  - [7.7.3] Remaining ToDo RILs: [H009/S481], [V507], [C602/C622], [O600]  **CB R18 IoT NTN Enh (Sergio)**  - Report of [304]  - [7.6.5] Corrections to other specs | 11:00-11:30 Nathan CB  11:30 – 12:00 CB Sasha |
| 14:30 – 16:00 |  |  |  |
| 16:00 – 17:00 |  |  |  |  |

List and details of [AT125] offline discussions

NOTE: No offline email discussions will be kicked off before Monday Feb 26th, 09:00 local time

* [AT125][301][IoT NTN Enh] Flagged RILs (Huawei)

Scope: Allow flagging the PropAgree and PropReject RILs in R2-2400693, if really needed, before the online discussion. No technical discussion is expected to happen via email (just the flagging), but F2F discussion between the WI RRC rapporteur and the disagreeing companies is invited before the online session.

Intended outcome: List of flagged PropAgree and PropReject RILs (if any)

Deadline for rapporteur's summary in R2-2401581 (if needed): Tuesday 2024-02-27 13:00

Status: closed

* [AT125][302][NR NTN Enh] Flagged RILs (Ericsson)

Scope: Allow flagging the PropAgree and PropReject RILs in R2-2401411, if really needed, before the online discussion. No technical discussion is expected to happen via email (just the flagging), but F2F discussion between the WI RRC rapporteur and the disagreeing companies is invited before the online session.

Intended outcome: List of flagged PropAgree and PropReject RILs (if any)

Deadline for rapporteur's summary in R2-2401582 (if needed): Tuesday 2024-02-27 13:00

Status: closed

* [AT125][303][NR NTN Enh] Stage 2 corrections (Thales)

Scope: discuss Stage 2 corrections

Intended outcome: agreeable Stage 2 CR

Deadline for companies' feedback: Thursday 2024-02-29 18:00

Deadline for rapporteur's summary (in R2-2401583): Friday 2024-03-01 08:00

Status: closed

* [AT125][304][IoT NTN Enh] Stage 2 corrections (Ericsson)

Scope: discuss Stage 2 corrections

Intended outcome: agreeable Stage 2 CR

Deadline for companies' feedback: Thursday 2024-02-29 18:00

Deadline for rapporteur's summary (in R2-2401584): Friday 2024-03-01 08:00

Status: closed

* [AT125][305][NR NTN Enh] VSAT support (ZTE)

Scope: discuss TPs to reflect the decisions on VSAT support

Intended outcome: agreeable TPs

Deadline for companies' feedback: Thursday 2024-02-29 18:00

Deadline for rapporteur's summary (in R2-2401585): Friday 2024-03-01 08:00

Status: closed

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

(LTE\_NBIOT\_eMTC\_NTN; leading WG: RAN1; REL-17; WID: [RP-211601](http://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_92e/Docs/RP-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

[R2-2401224](file:///C:\Data\3GPP\Extracts\R2-2401224%2036.331%20CR_Correction%20on%20reception%20of%20SIB32.docx) 36.331 CR\_Correction on reception of SIB32 ZTE Corporation, Sanechips CR Rel-17 36.331 17.7.0 4998 - F LTE\_NBIOT\_eMTC\_NTN-Core

* Not pursued

## 6.3 NR Non-Terrestrial Networks (NTN)

(NR\_NTN\_solutions-Core; leading WG: RAN2; REL-17; WID: [RP-211557](http://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_92e/Docs/RP-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

[R2-2400610](file:///C:\Data\3GPP\Extracts\R2-2400610_Minor%20correction%20for%20NTN%20in%2038.304-R17.docx) Minor correction for NTN in 38.304 ZTE Corporation, Sanechips CR Rel-17 38.304 17.7.0 0377 - F NR\_NTN\_solutions-Core

* Ericsson wonders if the second and third changes are needed
* First and last change are agreed
* Fix the formatting issues in the coverpage
* Considered as a basis for possible further updates this week
* Revised in R2-2401588

[R2-2401588](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401588.zip) Minor correction for NTN in 38.304 ZTE Corporation, Sanechips CR Rel-17 38.304 17.7.0 0377 1 F NR\_NTN\_solutions-Core

* Agreed unseen

[R2-2400997](file:///C:\Data\3GPP\Extracts\R2-2400997%20-%20Correction%20to%2038.331%20for%20NR%20NTN.doc) Correction to 38.331 for NR NTN OPPO CR Rel-17 38.331 17.7.0 4581 - F NR\_NTN\_solutions-Core

* Ericsson supports the CR, but “if enabled” should be changed to “if true”
* LG thinks the MAC spec is already clear about this
* CR is agreed in principle (fixing the wording) but can be merged with other changes into a rapporteur CR
* Revised in R2-2401586

[R2-2401586](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401586.zip) Correction to 38.331 for NR NTN OPPO, Google, Ericsson CR Rel-17 38.331 17.7.0 4581 1 F NR\_NTN\_solutions-Core

* Agreed unseen

[R2-2400998](file:///C:\Data\3GPP\Extracts\R2-2400998%20-%20Correction%20to%2038.331%20for%20NR%20NTN.doc) Correction to 38.331 for NR NTN OPPO CR Rel-18 38.331 18.0.0 4582 - A NR\_NTN\_solutions-Core

* CR is agreed in principle but can be merged with other changes into a rapporteur CR
* Revised in R2-2401587

[R2-2401587](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401587.zip) Correction to 38.331 for NR NTN OPPO, Google, Ericsson CR Rel-18 38.331 18.0.0 4582 1 A NR\_NTN\_solutions-Core

* Revised in R2-2401979 to fix the coversheet

[R2-2401979](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401979.zip) Correction to 38.331 for NR NTN OPPO, Google, Ericsson CR Rel-17 38.331 18.0.0 4582 2 A NR\_NTN\_solutions-Core

* Agreed unseen

[R2-2401335](file:///C:\Data\3GPP\Extracts\R2-2401335%20Clarification%20on%20HARQ%20mode%20for%20SRB4_R17.docx) Clarification on HARQ mode for SRB4 Google Inc. CR Rel-17 38.331 17.7.0 4600 - F NR\_NTN\_solutions-Core, NR\_QoE-Core

* LG thinks we can also remove the reference to specific SRBs. Ericsson agrees
* Modify the change to “applies to SBRs and DRBs”
* Merged into R2-2401586

[R2-2401336](file:///C:\Data\3GPP\Extracts\R2-2401336%20Clarification%20on%20HARQ%20mode%20for%20SRB4_R18.docx) Clarification on HARQ mode for SRB4 Google Inc. CR Rel-18 38.331 18.0.0 4601 - A NR\_NTN\_solutions-Core, NR\_QoE-Core

* Modify the change to “applies to SBRs and DRBs”
* Merged into R2-2401587

[R2-2401118](file:///C:\Data\3GPP\Extracts\R2-2401118_38.306_R17_CR1042_GSO_GEO.docx) Corrections on usage of LEO, GEO, GSO and NGSO MediaTek Inc., Nokia, Nokia Shanghai Bell, Intel (Rapporteur) CR Rel-17 38.306 17.7.0 1042 - F NR\_NTN\_solutions-Core

* Samsung wonders if for the second change we need to check with RAN4
* Ericsson thinks we don’t need the first change
* Second and third change are agreed
* First change is not needed (at least for now) and not agreed
* MTK reminds that there is a capability referring to LEO and wonders if we need to refer to LEO there. QC thinks we need to come back to this and possibly check/fix this in RAN4
* We will come back in the next meeting to the naming of the capability referring to LEO
* Revised in R2-2401922

[R2-2401922](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401922.zip) Corrections on usage of LEO, GEO, GSO and NGSO MediaTek Inc., Nokia, Nokia Shanghai Bell, Intel (Rapporteur) CR Rel-17 38.306 17.7.0 1042 1 F NR\_NTN\_solutions-Core

* Agreed unseen

[R2-2401120](file:///C:\Data\3GPP\Extracts\R2-2401120_38.306_R18_CR1043_GSO_GEO.docx) Corrections on usage of LEO, GEO, GSO and NGSO MediaTek Inc., Nokia, Nokia Shanghai Bell, Intel (Rapporteur) CR Rel-18 38.306 18.0.0 1043 - A NR\_NTN\_solutions-Core

* Second and third change are agreed
* First change is not agreed
* Revised in R2-2401923

[R2-2401923](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401923.zip) Corrections on usage of LEO, GEO, GSO and NGSO MediaTek Inc., Nokia, Nokia Shanghai Bell, Intel (Rapporteur) CR Rel-18 38.306 18.0.0 1043 - A NR\_NTN\_solutions-Core

* Agreed unseen

## 7.6 IoT NTN enhancements

(IoT\_NTN\_enh-Core; leading WG: RAN1; REL-18; WID: [RP-223519](http://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_98e/Docs/RP-223519.zip))

Time budget: 0 TU

Tdoc Limitation: 4 tdocs

### 7.6.1 Organizational

LSs, rapporteur inputs and other organizational documents.

Editorials/clarifications should not be included in any tdoc but sent to the WI spec rapporteurs, who can submit a rapporteur CR as part of this AI.

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

Incoming LSs

[R2-2400005](file:///C:\Data\3GPP\Extracts\R2-2400005_C1-239363.docx) LS on UE Location Information for NB-IoT NTN (C1-239363; contact: Ericsson) CT1 LS in Rel-18 IoT\_NTN\_enh To:RAN2, SA2 Cc:RAN3

* Noted

[R2-2400022](file:///C:\Data\3GPP\Extracts\R2-2400022_R1-2312571.docx) LS on Rel-18 RAN1 UE features list for LTE after RAN1#115 (R1-2312571; contact: NTT DOCOMO, AT&T) RAN1 LS in Rel-18 IoT\_NTN\_enh To:RAN2 Cc:RAN4

* Noted

[R2-2400034](file:///C:\Data\3GPP\Extracts\R2-2400034_R1-2312696.docx) LS on improved GNSS operations in Rel-18 IoT NTN (R1-2312696; contact: MediaTek) RAN1 LS in Rel-18 IoT\_NTN\_enh-Core To:RAN2

* Noted

[R2-2400071](file:///C:\Data\3GPP\Extracts\R2-2400071_S2-2313795.docx) Reply LS on misalignment between PTW and Coverage Window (S2-2313795; contact: Huawei) SA2 LS in Rel-18 IoT\_NTN\_enh-Core To:RAN2

* ZTE does not agree with the analysis in the LS but agrees there is no time to further discuss this in Rel-18
* We don’t further address this issue in R18 IoT NTN
* Noted

[R2-2401925](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401925.zip) LS on improved GNSS operations in Rel-18 IoT NTN (R1-2401754; contact: Mediatek) RAN1 LS in Rel-18 IoT\_NTN\_enh-Core To:RAN2

* We no longer consider Alt2 and continue the discussion between Alt1 and Alt 1a as part [Post125][307] (if there is no consensus we will come back in the next meeting)
* **Noted**

WI RRC rapporteur input

[R2-2400693](file:///C:\Data\3GPP\RAN2\Docs\R2-2400693.zip) IOT NTN ASN1 RIL List Huawei, HiSilicon report Rel-18 IoT\_NTN\_enh-Core

* [AT125][301][IoT NTN Enh] Flagged RILs (Huawei)

Scope: Allow flagging the PropAgree and PropReject RILs in R2-2400693, if really needed, before the online discussion. No technical discussion is expected to happen via email (just the flagging), but F2F discussion between the WI RRC rapporteur and the disagreeing companies is invited before the online session.

Intended outcome: List of flagged PropAgree and PropReject RILs (if any)

Deadline for rapporteur's summary in R2-2401581 (if needed): Tuesday 2024-02-27 13:00

[R2-2401581](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401581.zip) Summary of [AT125][301][IoT-NTN Enh] Flagged RILs Huawei discussion Rel-18 IoT\_NTN\_enh-Core

Proposal: Except S065, S063, P002, P003, RAN2 confirm the PropAgree and PropReject states in R2-2400693.

* Except S065, S063, P002, P003, Z360, the PropAgree and PropReject statuses in R2-2400693 are confirmed
* S065 is agreed (actual change can be discussed in the CR review)
* S063 is agreed
* Z360 is rejected

[R2-2400692](file:///C:\Data\3GPP\Extracts\R2-2400692%20Corrections%20to%20IOT%20NTN.docx) Corrections to IOT NTN Huawei, HiSilicon CR Rel-18 36.331 18.0.0 4990 - F IoT\_NTN\_enh-Core

* Revised in R2-2401595

R2-2401595 Corrections to IOT NTN Huawei, HiSilicon CR Rel-18 36.331 18.0.0 4990 1 F IoT\_NTN\_enh-Core

* [Post125][306][IoT-NTN Enh] 36.331 CR (Huawei)

Scope: update the RRC CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401595): short

[R2-2400694](file:///C:\Data\3GPP\Extracts\R2-2400694%20RRC%20open%20issue%20list.docx) RRC open issue list Huawei, HiSilicon discussion Rel-18 IoT\_NTN\_enh-Core

Proposal: Discuss the following RILs:

• GNSS

- C600/Z364 (T390 related)

- N015 (whether to trigger location-based CHO after GNSS expires)

- V502 (default value for autonomous gap)

- V500/X043/X044/X045 (place GNSS parameters in RadioResourceConfigDedicated)

- Z365 (miscellaneous)

• HARQ

- M057 (whether DL HARQ feedback disabling indication applies to the message that carries the indication)

• Mobility/System information

- H001/C603 (location-based CHO)

- Q631 (not exclude GSO from location-based enhancements)

- S061/Z367 (signalling optimization)

• UE capability

- H002 (differentiation between GSO/NSO)

* [Post125][307][NR-NTN Enh] 36.321 CR (Mediatek)

Scope: draft a MAC CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401596): short

R2-2401596 Corrections to IOT NTN Mediatek CR Rel-18 36.331 18.0.0 XXXX - F IoT\_NTN\_enh-Core

### 7.6.2 Stage 2 corrections

GNSS operation related

[R2-2401402](file:///C:\Data\3GPP\Extracts\R2-2401402%20-%2036300_CR1396_(Rel-18)%20-%20R18%20IoT%20NTN%20corrections%20to%20stage%202.docx) R18 IoT NTN corrections to stage 2 Ericsson CR Rel-18 36.300 18.0.0 1396 - F IoT\_NTN\_enh-Core

* Discuss in offline 304
* Revised in R2-2401584

R2-2401584 R18 IoT NTN corrections to stage 2 Ericsson CR Rel-18 36.300 18.0.0 1396 1 F IoT\_NTN\_enh-Core

* [Post125][310][IoT-NTN Enh] Stage 2 CR (Ericsson)

Scope: Update the Stage 2 CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401584): short

[R2-2401127](file:///C:\Data\3GPP\Extracts\R2-2401127%20Discussion%20on%20stage%202%20open%20issue%20UE%20behavior%20at%20failed%20GNSS%20acquisition.docx) Discussion on stage 2 open issue UE behavior at failed GNSS acquisition Nokia, Nokia Shanghai Bell discussion Rel-18 IoT\_NTN\_enh-Core

Observation 1: The network may trigger a GNSS measurement long before the GNSS validity duration expires, because the network observes the UE is not properly uplink synchronized.

Proposal 1: The UE shall move directly to idle mode upon a failed GNSS acquisition, triggered by the network, independently of the GNSS position status.

Proposal 2: If the GNSS measurement fails the UE always moves to RRC Idle unless the measurement is triggered autonomously by the UE during C-DRX inactive time.

Proposal 3: For autonomous GNSS acquisition in C-DRX inactive time, the UE shall move to idle mode if the GNSS position is outdated and uplink transmission extension is not active.

Proposal 4: RAN2 to discuss the Annex TP for TS36.300.

* Discuss in offline 304

[R2-2400715](file:///C:\Data\3GPP\Extracts\R2-2400715_GNSS_validity_duration_and_duration_X.docx) GNSS validity duration and duration X PANASONIC discussion

* Discuss in offline 304

[R2-2401461](file:///C:\Data\3GPP\Extracts\R2-2401461%20Correction%20to%20Stage%202%20on%20IoT%20NTN.docx) Correction to Stage 2 on IoT NTN Huawei, HiSilicon CR Rel-18 36.300 18.0.0 1397 - F LTE\_NBIOT\_eMTC\_NTN Late

* Revised in [R2-2401514](file:///C:\Data\3GPP\Extracts\R2-2401514%20Correction%20to%20Stage%202%20on%20IoT%20NTN.docx)

[R2-2401514](file:///C:\Data\3GPP\Extracts\R2-2401514%20Correction%20to%20Stage%202%20on%20IoT%20NTN.docx) Correction to Stage 2 on IoT NTN Huawei, HiSilicon CR Rel-18 36.300 18.0.0 1397 1 F IoT\_NTN\_enh-Core Late

* Discuss in offline 304

[R2-2401463](file:///C:\Data\3GPP\Extracts\R2-2401463.docx) Miscellaneous corrections for IoT NTN Samsung discussion Rel-18 IoT\_NTN\_enh-Core Late

* Discuss in offline 304
* [AT125][304][IoT NTN Enh] Stage 2 corrections (Ericsson)

Scope: discuss Stage 2 corrections

Intended outcome: agreeable Stage 2 CR

Deadline for companies' feedback: Thursday 2024-02-29 18:00

Deadline for rapporteur's summary (in R2-2401584): Friday 2024-03-01 08:00

[R2-2401584](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401584.zip) [AT125][304][IoT NTN Enh] Stage 2 corrections Ericsson discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1 (7 vs 1) The starting point of GNSS-ValidityDuration is not further discussed.

* **Agreed**

Proposal 2 The UE abilities related to obtaining location information through non-GNSS means is not further discussed.

* **Agreed**

Proposal 3 RAN2 discuss whether The UE shall move directly to idle mode upon a failed GNSS acquisition, triggered by the network, independently of the GNSS position status.

* **Continue in the next meeting**

Proposal 4 RAN2 discuss whether if the GNSS measurement fails, the UE always moves to RRC Idle unless the measurement is triggered autonomously by the UE during C-DRX inactive time.

* **Continue in the next meeting**

Proposal 5 RAN2 to discuss For autonomous GNSS acquisition in C-DRX inactive time, the UE shall move to idle mode if the GNSS position is outdated and uplink transmission extension is not active.

* **Continue in the next meeting**

Proposal 6 RAN2 to discuss whether UE triggers GNSS remaining validity duration report after autonomous GNSS acquisition in C-DRX inactive time if the UE is communicating in a network not supporting releases later than Release 17.

* **Continue in the next meeting**

Proposal 7 RAN2 to discuss whether to add Feeder Link RTT and Service link RTT to the abbreviations.

* **Continue in [Post125][310]**

Proposal 8 RAN2 to discuss how to align kmac, Kmac, and k-Mac between RAN1 spec, stage 2 and MAC spec and difference between NR NTN and IoT NTN.

* **Continue in [Post125][310]**

Proposal 9 In 36.300 23.21.4.1, change the sentence “UEs may by UE implementation also check whether a TAC has been removed.” to “The UEs may, by UE implementation, check whether a TAC has been removed.”.

* **Agreed**

Proposal 10 In 36.300 23.21.4.3 Measurements, change the reference from 10.1.3.0 to 10.1.3.

* **Agreed**

Proposal 11 In 36.300 23.21.9 Coarse UE location reporting, change “its” to “theirs”

* **Continue in [Post125][310]**

Proposal 12 In 36.300 at end of 23.21.1 Coarse UE location reporting, add “In NTN, the distance refers to Euclidean distance.”

* **Agreed**

Proposal 13 In 36.300 23.21.4.3 Measurements, do this change:…

* **Agreed**

Proposal 14 RAN2 to discuss In 36.300 23.21.4.3 Measurements, consider adding this at the end:

* **Continue in [Post125][310]**

Proposal 15       RAN2 to discuss In 36.300 23.21.4.3 Measurements, consider adding this (same as in NR NTN):

“The time-based measurement initiation may be applicable for the feeder link switchover case for cell (re)selection.”

* **Continue in [Post125][310]**

Withdrawn

R2-2401280 Correction to Stage 2 on IoT NTN Huawei, HiSilicon CR Rel-18 38.300 18.0.0 0803 - F LTE\_NBIOT\_eMTC\_NTN Withdrawn

### 7.6.3 RRC Corrections

GNSS

[C600/Z364] (T390 handling - MAC timer vs RRC timer) (Marked ToDo)

[Z365] (Coexistence of multiple triggers for GNSS reacquisition) (Marked ToDo)

[R2-2400255](file:///C:\Data\3GPP\Extracts\R2-2400255%20%5bC600%5d%20Remaining%20issues%20on%20UL%20transmission%20extension%20timer%20handling%20after%20GNSS%20expiry.docx) [C600] Remaining issues on UL transmission extension timer handling after GNSS expiry CATT discussion

Proposal 1: For the case that timeAlignmentTimer value is set to infinity, TA command MAC CE is used to restart ULTransmissionExtentionTimer with length equal to Y

Proposal 2: For the case that timeAlignmentTimer is not infinity, ULTransmissionExtentionTimer is restarted by TA command MAC CE with the length equal to timeAlignmentTimer.

Proposal 3: Maintain ULTransmissionExtentionTimer in MAC other than in RRC.

* CATT thinks that having the timer in MAC reduces the inter-layer dependencies. Ericsson agrees.
* Samsung thinks that if we put this in MAC there are a lot of indications that need to be added so it’s ok to keep it in RRC. MTK thinks there is nothing broken to keep it in RRC
* Oppo prefers to have it in MAC
* Vivo thinks there is no issue with the current modelling, we should only change if there is a critical issue. ZTE agrees and if we move it to MAC we have a different handling in R17 and R18. Ericsson thinks the timer was not there in R17
* QC agrees with Samsung and prefers to keep it as it is. Xiaomi agrees
* CATT thinks if we leave it in RRC we need to clarify more details
* HW thinks there are inevitable interactions between layers and moving this to MAC simply means moving the same description from RRC to MAC
* Maintain ULTransmissionExtentionTimer in RRC

Proposal 4: If Proposal 3 is agreed, adopt the TP in Annex A.

[R2-2401232](file:///C:\Data\3GPP\Extracts\R2-2401232%20RRC%20corrections%20on%20GNSS%20enhancements%20for%20IoT%20NTN%20(RILZ364,%20Z365).docx) RRC corrections on GNSS enhancements for IoT NTN (RILZ364, Z365) ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

[Z364]

Proposal 1: It’s suggested to explicitly stop the T390 (if running) when receiving the NW trigger for GNSS measurement in section 5.5.9. The text proposal can be found in Proposal 2.

[Z365]

Proposal 2: It’s suggest to adopt the following changes for section 5.5.9…

* On the stop of T390, HW agrees it makes sense to put in in the procedural text. Samsung and Ericsson agree
* First change on stopping T390 is agreed
* Samsung does not agree on the second change. Ericsson/CMCC support also the second change
* QC thinks we should cover the case when the UE fails to decode the MAC CE
* CB on the second change

Proposal 3: A duration D can be configured by NW. After successful GNSS measurement, UE should finish the remaining GNSS validity duration report within the duration D after the end of the measurement gap.

Proposal 3a: UE should go to IDLE or trigger RLF if the remaining GNSS validity duration report cannot be finished within the duration D.

[N015] (whether to trigger location-based CHO after GNSS expires) (Marked ToDo)

[R2-2401128](file:///C:\Data\3GPP\Extracts\R2-2401128%20On%20RIL%20%5bN015%5d%20Location-based%20CHO%20evaluation%20in%20duration%20X.docx) On RIL [N015] Location-based CHO evaluation in duration X Nokia, Nokia Shanghai Bell discussion Rel-18 IoT\_NTN\_enh-Core

Observation 1: For location-based CHO, UE should evaluate the distance between the UE and the reference points based on its own GNSS location and the NW configured reference points.

Observation 2: For earth-moving cell, UE should predict the movement of reference locations based on the ephemeris information and epoch time.

Observation 3: In duration X, UE may trigger a wrong handover decision for location-based CHO if the outdated GNSS is used to evaluate the distance between UE and the reference point. This is more critical in earth moving cell because the evaluation is based on a fast-moving cell reference point.

Observation 4: NW and UE implementation may not avoid a wrong handover execution for location-based CHO if UE uses the outdated GNSS to evaluate the distance between UE and the reference point.

Proposal 1: UE should stop the location-based CHO evaluation (if it is configured) within duration X, at least in earth moving cell.

* QC wonders how far can the UE move and then whether there is really an issue.
* We don’t introduce constraints on the location-based CHO evaluation (if it is configured) within duration X

Proposal 2: RAN2 to discuss the Annex TP for Proposal 1.

[R2-2401294](file:///C:\Data\3GPP\Extracts\R2-2401294_Improved%20GNSS%20Operation.doc) Remaining issues on GNSS fix Apple discussion Rel-18 IoT\_NTN\_enh

Proposal: RAN2 to discuss the two alternative solutions as below and down select one.

Solution 1: Network does not configure ul-TransmissionExtensionEnabled and location based CHO simultaneously;

Solution 2: UE indicates a new capability whether the two features can be configured simultaneously.

[R2-2400117](file:///C:\Data\3GPP\Extracts\R2-2400117%20Discussion%20on%20CHO%20within%20UL%20Transmission%20Extention.docx) Discussion on CHO within UL Transmission Extention vivo discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2400287](file:///C:\Data\3GPP\Extracts\R2-2400287%20Discussion%20on%20IOT%20NTN%20RRC%20open%20issues.doc) Discussion on IOT NTN RRC open issues Xiaomi discussion Rel-18 IoT\_NTN\_enh-Core

[V502] (default value for autonomous gap) (Marked ToDo)

[R2-2400119](file:///C:\Data\3GPP\Extracts\R2-2400119%20%5bV502%5d%20Remaining%20Issues%20on%20Autonomous%20GNSS%20Measurement.docx) [V502] Remaining Issues on Autonomous GNSS Measurement vivo discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1: RAN2 discusses whether the UE performs autonomous GNSS measurement when gnss-AutonomousEnabled is configured but the first GNSS Measurement Command MAC CE has not been received (i.e. no gap length is received from the network).

Proposal 2: If RAN2 confirms UE can perform autonomous GNSS measurement when gnss-AutonomousEnabled is configured but the first GNSS Measurement Command MAC CE has not been received, then the default value 31 seconds is used for gap length.

* Google thinks the behaviour is clear from RAN1 agreements and we should align to them

Proposal 3: If Proposal 2 is not agreeable, RAN2 confirms autonomous GNSS measurement is performed by UE only if gnss-AutonomousEnabled is configured and gap length for GNSS measurement was indicated from the lower layers.

[R2-2400499](file:///C:\Data\3GPP\Extracts\R2-2400499%20Open%20Issues%20on%20the%20GNSS%20Opeartion%20Enhancements.docx) Open Issues on the GNSS Operation Enhancements Google Inc. discussion Rel-18

Proposal 1 The gap length of an autonomous GNSS measurement is equal to the latest reported GNSS position fix time duration, if the gap length is not provided by the eNB.

* The gap length of an autonomous GNSS measurement is equal to the latest reported GNSS position fix time duration, if the gap length is not provided by the eNB.

Proposal 2 If proposal 1 is agreed, adopt the text proposal in Section 3.

Proposal 3 An ‘empty’ GNSS measurement command MAC CE (i.e., only the MAC subheader is present) is used to trigger an aperiodic GNSS measurement gap whose length is equivalent to the GNSS position fix time duration reported by the UE. RAN2 uses a new LCID to refer to such an empty MAC CE.

* Nokia wonders what is the benefit of sending an empty MAC CE.
* Oppo thinks this is an optimization
* Vivo doesn’t see the need for this

Proposal 4 RAN2 to discuss the exceptions (e.g., a very short GNSS position fix duration) that allow UE to remain in RRC\_CONNECTED when UE’s GNSS position becomes outdated or when T390 expires, even if the UE is neither configured with autonomous GNSS measurement nor provided with an aperiodic GNSS measurement gap.

[R2-2401139](file:///C:\Data\3GPP\Extracts\R2-2401139%20Discussion%20on%20IoT-NTN%20and%20TP%20for%20TS%2036.331.docx) Discussion on IoT-NTN and TP for TS 36.331 CMCC discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 3: RAN2 capture the following modification on the first bullet 1> in clause 5.3.3.21.

1> if the UE does not support performing GNSS fix in RRC\_~~CONNECTED and ul-TransmissionExtensionEnabled is not configured~~:

* HW and Samsung don’t think this is correct
* Oppo also thinks we don’t need to remove this part
* P3 is rejected (P002, P003 are rejected)

[V500/X043/X044/X045] (place GNSS parameters in RadioResourceConfigDedicated) (Marked ToDo)

Proposal 2 gnss-AutonomousEnabled/ul-TransmissionExtensionEnabled/ul-TransmissionExtensionValue are put in RadioResourceConfigDedicated(RadioResourceConfigDedicated-NB)

* ZTE supports this. vivo/HW also agree
* gnss-AutonomousEnabled/ul-TransmissionExtensionEnabled/ul-TransmissionExtensionValue are put in RadioResourceConfigDedicated(RadioResourceConfigDedicated-NB)

Agreements:

1. Maintain ULTransmissionExtentionTimer in RRC
2. We don’t introduce constraints on the location-based CHO evaluation (if it is configured) within duration X
3. The gap length of an autonomous GNSS measurement is equal to the latest reported GNSS position fix time duration, if the gap length is not provided by the eNB.
4. gnss-AutonomousEnabled/ul-TransmissionExtensionEnabled/ul-TransmissionExtensionValue are put in RadioResourceConfigDedicated(-NB)

HARQ

[M057] (whether DL HARQ feedback disabling indication applies to the message that carries the indication) (Marked ToDo)

[R2-2400429](file:///C:\Data\3GPP\Extracts\R2-2400429%20Discussions%20of%20Remaining%20RRC%20Corrections%20in%20IoT-NTN.docx) Discussions of Remaining RRC Corrections in IoT-NTN MediaTek Inc. discussion

Proposal 1: RAN2 clarifies that the HARQ feedback configuration does not apply to the RRC signalling which carries the indication.

* Apple agrees with the proposal but not the actual text change.
* Vivo thinks we can simply clarify this in the notes
* Oppo is not sure this is a specific issue for this case but a general aspect for L1 reconfiguration. QC agrees
* RAN2 understand that, as for other similar cases, when to apply downlinkHARQ-FeedbackDisabledBitmap(-NB) is not exactly specified.

Proposal 2: RAN2 agree on M057

Mobility/System information

[H001/C603] (location-based CHO) (Marked ToDo)

[R2-2400193](file:///C:\Data\3GPP\Extracts\R2-2400193%20%5bH001%5d%20Clarification%20for%20CondEvent%20D1.docx) [H001] Clarification for CondEvent D1 Huawei, HiSilicon discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1: In CondEvent D1, clarify that Ml1 corresponds to serving cell and Ml2 corresponds to neighbour cell, and clarify the assistance information for reference location prediction.

* HW highlights that this is aligned to the agreements in NR
* Ericsson thinks the description is not the same for NR NTN and Io NTN
* In CondEvent D1, clarify that Ml1 corresponds to serving cell and Ml2 corresponds to neighbour cell, and clarify the assistance information for reference location prediction.

Proposal 2: Adopt the TP in the Annex.

* Agreed

[R2-2400254](file:///C:\Data\3GPP\Extracts\R2-2400254%20%5bC603%5d%20Corrections%20on%20location-based%20CHO%20for%20earth%20moving%20cell.docx) [C603] Corrections on location-based CHO for earth moving cell CATT discussion

Observation 1: It is technically infeasible to use the ephemerisInfo and epochTime in SIB31, and the referenceLocation1 in dedicated signalling as the serving cell information for condEventD1 evaluation.

Proposal 1: For condEventD1 evaluation, RAN2 agrees that UE always rely on the ephemerisInfo, epochTime and associated referenceLocation in SIB31 for serving cell which is EMC, taking into account TP in Annex.

[R2-2400118](file:///C:\Data\3GPP\Extracts\R2-2400118%20Remaining%20Issues%20on%20Location%20Based%20CHO.docx) Remaining Issues on Location Based CHO vivo discussion Rel-18 IoT\_NTN\_enh-Core

[Q631] (not exclude GSO from location-based enhancements) (Marked ToDo)

[R2-2400856](file:///C:\Data\3GPP\Extracts\R2-2400856%20Discussion%20on%20RIL%20Q631.doc) Discussion on RIL Q631 Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh-Core

*Proposal 1 Remove restriction “quasi” from the field description of referenceLocation in SIB31.*

* Change “quasi-earth” to “(quasi-)earth” in the field description of referenceLocation in SIB31

[S061/Z367] (signalling optimization) (Marked ToDo)

[R2-2401494](file:///C:\Data\3GPP\Extracts\R2-2401494%20%5bS061%5d%5bS063%5d%20Correction%20on%20SatelliteInfo%20frequency%20lists.docx) [S061][S063] Correction on SatelliteInfo frequency lists Samsung discussion Rel-18 IoT\_NTN\_enh-Core Late

Proposal 1: Agree RIL S061.

Proposal 2: The maximum number of frequencies in CarrierFreqList-v1800 of SIB32 is maxFreq.

* Apple supports this
* The maximum number of frequencies in CarrierFreqList-v1800 of SIB32 is maxFreq.

[R2-2401234](file:///C:\Data\3GPP\Extracts\R2-2401234%20RRC%20corrections%20on%20other%20aspects%20for%20IoT%20NTN%20(RILZ367).docx) RRC corrections on other aspects for IoT NTN (RILZ367) ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1: The ephemerisInfo-r18 IE in the NeighSatelliteInfo-r18 can be optional. That means the ephemerisInfo-r18 can be absent from one or some entries in the neighbor satellite list in SIB33. The need code “Need OP” for ephemerisInfo-r18 should be used.

* HW thinks in IoT NTN we already optimized the signalling by using a satellite ID as a reference and no further optimization is needed
* Samsung thinks this is used for short term orbital characteristics and it’s unlikely they would be the same and then optimizations are not needed.
* Can come back to this in the next quarter if actual scenarios are found where optimizations are useful

Proposal 2: RAN2 discuss which option can be adopted for IoT NTN:

• Option 1 (Similar as NR NTN): Network provides ephemerisInfo-r18 for the first entry of NeighSatelliteInfoList-r18. If the ephemerisInfo-r18 is absent for any entry of NeighSatelliteInfoList-r18, the ephemerisInfo-r18 provided in the previous entry in NeighSatelliteInfoList-r18 applies.

• Option 2: It’s suggested to introduce satelliteId as one choice for the structure of ephemerisInfo-r18. If a satelliteId is indicated in the ephemerisInfo-r18 for any entry of NeighSatelliteInfoList-r18, the ephemerisInfo-r18 of the satellite with this indicated satelliteId would be applied to the current entry of NeighSatelliteInfoList-r18. Otherwise, if ephemerisInfo-r18 is totally absent from an entry of NeighSatelliteInfoList-r18, the ephemerisInfo-r18 provided in the previous entry in NeighSatelliteInfoList-r18 applies (it relies on network implementation to ensure the ephemerisInfo-r18 in the previous entry exists).

Proposal 3: When ephemerisInfo-r18 is absent for any entry of of NeighSatelliteInfoList-r18 (e.g., the ephemerisInfo-r18 of another satellite will applies), whether epochTime for this entry is configured can be left to NW implementation.

UE capability

[H002] (differentiation between GSO/NSO) (Marked ToDo)

[R2-2400194](file:///C:\Data\3GPP\Extracts\R2-2400194%20%5bH002%5d%20UE%20capability%20differentiation%20for%20GSO%20and%20NGSO.docx) [H002] UE capability differentiation for GSO and NGSO Huawei, HiSilicon discussion Rel-18 IoT\_NTN\_enh-Core

Observation 1: According to current 36.331 and 36.306, UE cannot indicate the support of HARQ/GNSS enhancements for NGSO only.

Proposal 1: Change ntn-HarqEnhNGSO-Support-r18 and ntn-GNSS-EnhNGSO-Support-r18 from “ENUMERATED {supported}” to “ENUMERATED {ngso,gso}”.

* ZTE is fine with this
* Apple also supports this
* Change ntn-HarqEnhNGSO-Support-r18 and ntn-GNSS-EnhNGSO-Support-r18 from “ENUMERATED {supported}” to “ENUMERATED {ngso,gso}”.

Proposal 2: Adopt the TP in the Annex.

* Discuss in the CR review (including a possible change of the field name)

Connection release for DC

[R2-2400502](file:///C:\Data\3GPP\Extracts\R2-2400502%20Corrections%20Relevant%20to%20the%20RRC%20Connection%20Release.docx) Corrections Relevant to the RRC Connection Release Google Inc. discussion Rel-18

Proposal 1 Upon detecting discontinuous coverage, if T311 is running, the UE shall stop T311 and perform the actions upon leaving RRC\_CONNECTED, with release cause 'other'.

- Apple supports this as a needed correction

- Ericsson don't support this

- Oppo prefers to have a general procedure saying that upon detecting DC the UE moves to idle. Samsung does not agree

Proposal 2 If proposal 1 is agreed, adopt the text proposal (1st change) in Section 3.

Proposal 3 Upon receiving RRCConnectionRelease, The UE can perform the actions for entering RRC\_IDLE without waiting for 10 seconds, if RRCConnectionRelease is received on a HARQ process with disabled HARQ feedback, and if the STATUS reporting has not been triggered.

- Apple supports this as well, aligning to NR NTN

- Ericsson also supports this

* Upon receiving RRCConnectionRelease, the UE can perform the actions for entering RRC\_IDLE without waiting for 10 seconds, if RRCConnectionRelease is received on a HARQ process with disabled HARQ feedback, and if the STATUS reporting has not been triggered.

Proposal 4 If proposal 3 is agreed, adopt the text proposal (2nd change) in Section 3.

* Agreed

[R2-2400859](file:///C:\Data\3GPP\Extracts\R2-2400859%20DC%20moving%20cell.doc) Leftover issue on UE Autonomous release in moving cell Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1 In moving cell scenario, if UE determines it is going out of coverage soon, UE triggers DCQR and AS RAI MAC control element with AS RAI codepoint of 01 before autonomously going into discontinuous coverage. Adopt the text proposal provided as baseline.

* ZTE supports this proposal
* Nokia does not think this is needed. HW agrees
* Vivo thinks this is not needed

(Moved here from 7.6.4)

[R2-2401004](file:///C:\Data\3GPP\Extracts\R2-2401004%20discontinuous%20coverage.doc) Discussion on open issues for discontinuous coverage OPPO discussion Rel-18 IoT\_NTN\_enh-Core

Misc issues

[R2-2400846](file:///C:\Data\3GPP\Extracts\R2-2400846%20RRC%20corrections%20for%20IoT%20NTN%20and%20discussions%20on%20RILs.docx) RRC Corrections and discussion on RILs Samsung discussion Rel-18 IoT\_NTN\_enh

Proposal 1: SatelliteId can be tied to a cell in MeasObjectEUTRA.

Proposal 2: SatelliteId is configured as part of CellsToAddModList-v18xx as the example in Appendix A.

Proposal 3: UE evaluates CHO CondEvent D1 regardless if the GNSS position is outdated.

Proposal 4: Reject RIL N015.

Proposal 5: Network can correctly configure the gap length before any autonomous GNSS position fix is performed.

Proposal 6: Reject RIL V502.

Proposal 7: Agree RIL H002.

Proposal 8: Agree RIL Q631 to remove “quasi-”.

Proposal 9: Reject RIL Z367 and keep ephemerisInfo-r18 mandatory in NeighSatelliteInfo-r18.

Proposal 10: Reject RIL M057.

Proposal 11: Chairman notes capture: UE does not apply downlinkHARQ-FeedbackDisabledBitmap-NB until after as specified in 36.331 Section 11.2 - Processing delay requirements for RRC.

Other

[C601] (Marked PropAgree)

[R2-2400253](file:///C:\Data\3GPP\Extracts\R2-2400253%20%5bC601%5d%20TP%20on%20CHO%20recovery%20for%20time-based%20CHO%20in%20Rel-18%20IoT%20NTN.docx) [C601] TP on CHO recovery for time-based CHO in Rel-18 IoT NTN CATT discussion

### 7.6.4 MAC corrections

New MAC CE vs TAC MAC CE

TAC MAC CE

[R2-2400120](file:///C:\Data\3GPP\Extracts\R2-2400120%20Remaining%20Issues%20on%20UL%20Transmission%20Extention.docx) Remaining Issues on UL Transmission Extention vivo discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1: Reuse TA Command MAC CE to reset the ULTransmissionExtentionTimer (i.e., T390).

Proposal 2: When a TA Command MAC CE is received, MAC entity indicates the UL transmission extension update is applied to upper layers.

Proposal 3: If Proposal 1 and Proposal 2 are agreed, RAN2 adopts the TP in Annex.

[R2-2401002](file:///C:\Data\3GPP\Extracts\R2-2401002%20GNSS%20operation.doc) Discussion on remaining open issues on GNSS enhancement OPPO discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1 The Differential Koffset is cleared when UE is performing GNSS measurement.

Proposal 2 The legacy TAC MAC CE is used to reset the ULTransmissionExtentionTimer with length equal to Y, when timeAlignmentTimer is infinity.

Proposal 3 Send LS to RAN1 and ask when timeAlignment is not infinity, whether ULTransmissionExtentionTimer is reset every time when a TAC MAC CE is received.

Proposal 4 Handling of ULTransmissionExtentionTimer X is captured in MAC spec.

(Moved here from 7.6.5)

[R2-2400847](file:///C:\Data\3GPP\Extracts\R2-2400847%20Uplink%20transmission%20extension%20and%20related%20RILs.docx) On uplink transmission extension and related RILs Samsung discussion Rel-18 IoT\_NTN\_enh

Proposal 1: The feature should be re-named to reflect the behavior of the network and the UE.

Proposal 2: Feature should be named “GNSS invalidity duration”.

Proposal 3: Legacy MAC CE reused to update TA during the period when GNSS is not valid.

Proposal 4: Reject RIL C600.

Proposal 5: The period when the GNSS is not valid is modelled in RRC (as T390 in 36.331 V18.0.0), with MAC->RRC indication upon receiving MAC CE when the timer is running.

Proposal 6: The timer T390 is stopped upon receiving indication to perform GNSS position fix from lower layers in Section 5.5.9 according to RIL Z364.

Proposal 7: Agree RIL V500 – i.e uplink transmission extension configuration is implemented in RadioResourceConfigDedicated.

(Moved here from 7.6.5)

[R2-2401277](file:///C:\Data\3GPP\Extracts\R2-2401277%20Open%20issues%20on%20GNSS%20enhancements.docx) Open issues on GNSS enhancements Huawei, HiSilicon discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN

Proposal 1: The TA command MAC CE is used to reset ULTransmissionExtentionTimer with the length equal to Y when the TAT is infinite and is used to reset duration X with the TAT length when the TAT is finite.

Proposal 2: Confirm that the previous agreement “UE may use the outdated GNSS position within the duration X at least for mobility” is correct and applies for both earth-fixed cell case and earth-moving cell case.

Proposal 3: Before sending the TA report triggered during the GNSS measurement gap, the triggering condition should be re-evaluated after the GNSS measurement gap.

[R2-2400286](file:///C:\Data\3GPP\Extracts\R2-2400286%20Discussion%20on%20IOT%20NTN%20MAC%20open%20issues.doc) Discussion on IOT NTN MAC open issues Xiaomi discussion Rel-18 IoT\_NTN\_enh-Core

[R2-2401003](file:///C:\Data\3GPP\Extracts\R2-2401003%20GNSS%20LS.docx) DRAFT LS on GNSS validity duration OPPO LS out Rel-18 IoT\_NTN\_enh-Core To:RAN1

New MAC CE

[R2-2401130](file:///C:\Data\3GPP\Extracts\R2-2401130%20Discussion%20on%20MAC%20open%20issues%20for%20IoT%20NTN.docx) Discussion on MAC open issues for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-18 IoT\_NTN\_enh-Core

Observation 1: During T390 for UL transmission extension, TA adjustment via TAC MAC CE may be needed to maintain UL Time Alignment. Otherwise, the UL transmission of the UE may cause interference to other UEs.

Observation 2: Using the legacy TAC MAC CE to restart T390 may disable the autonomous GNSS measurement during the UL extension period, which may result in an additional but unnecessary GNSS measurement MAC CE to trigger the GNSS measurement.

Observation 3: Using the legacy TAC MAC CE to restart T390 will force the NW to always extend UL transmissions once it performs UL TA adjustment.

Proposal 1: TAC MAC CE should not be used for UL transmission extension timer T390 restarts.

* Samsung doesn’t see the real need for decoupling
* MTK thinks this is for a new function and we should not reuse a legacy MAC CE for this.
* HW thinks that if a new MAC CE only controls the new timer they are fine to introduce a new MAC CE
* Legacy TAC MAC CE shall not be used for UL transmission extension timer T390 restart

Proposal 2: Introduce a new MAC CE or use the spare bits in the GNSS Measurement Command MAC CE to restart timer T390 for UL transmission extension.

* HW agrees with Nokia that we should split the functions and then have a separate MAC CE
* Ericsson thinks it would lead to a waste of resources to send two separate MAC CEs
* QC thinks that we can support split functionalities by using a new TAC MAC CE and setting the value to 0
* ZTE thinks that if we introduce multiple new MAC CEs we waste LCIDs. QC thinks this is not an issue for DL
* Consider one of the two options:

1. New MAC CE only to extend X
2. New TAC MAC CE to extend both TA and X with the possibility for this TAC MAC CE to only extend X (in the infinity case)

(in any case the legacy MAC CE can be used to extend TA)

* Samsung supports option 1. ZTE/MTK also.
* Show of hands:

Option 1: 10

Option 2: 3

* We go for option 1: Introduce a new zero-byte MAC CE only to extend X

Observation 4: In Rel-17, when multiple TBs are scheduled for NB-IoT, the drx-InactivityTimer will be (re)started when all HARQ RTT Timers (corresponding to all HARQ processes of the scheduled TBs) have expired.

Observation 5: For NB-IoT over NTN, if one HARQ process scheduled in DL multi-TB scheduling is configured with HARQ feedback enabled and the other HARQ process is configured with HARQ feedback disabled, according to current specification the drx-inactivity timer is (re)started upon the expiry of HARQ RTT timer associated with the HARQ process with feedback enabled.

Proposal 3: For NB-IoT over NTN, if one HARQ process scheduled in DL multi-TB scheduling is configured with HARQ feedback enabled and the other HARQ process is configured with HARQ feedback disabled, RAN2 does not change the operation of drx-inactivity timer.

Proposal 4: For NB-IoT over NTN, if one HARQ process scheduled in UL multi-TB scheduling is configured with HARQ mode A and the other HARQ process is configured with HARQ mode B, RAN2 does not change the operation of drx-inactivity timer.

[R2-2401295](file:///C:\Data\3GPP\Extracts\R2-2401295_UL%20extension.doc) New MAC CE for UL transmission extension Y Apple discussion Rel-18 IoT\_NTN\_enh

Observation: It is not crystal clear if the leftover issue on UL transmission extension triggering MAC CE is only for Case 2 (TAT is infinity) or for both cases.

Proposal 1: For the case where TAT is infinity, introduce a new MAC CE to trigger UL transmission extension.

Proposal 2: For the case where TAT is not infinity, the same new MAC CE (instead of TAC MAC CE) is used to trigger UL transmission extension.

[R2-2401235](file:///C:\Data\3GPP\Extracts\R2-2401235%20Remaining%20issues%20of%20MAC%20spec%20for%20IoT%20NTN.docx) Remaining issues of MAC spec for IoT NTN ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

Observation 1: If legacy TA command is used to trigger the reset of T390:

- In earth-fixed cell case, the TA timer may be generally set to infinity value and TA command would seldom be sent to UE during connected mode. Even NW may want to extend the T390 for a few times, the NW has no way to do this unless NW sends “fake” TA command.

- In earth-moving cell case, the TA command may need to be sent frequently which will cause many times T390 extension. The autonomous GNSS measurement cannot take effect and it’s also difficult to initiate NW-triggered GNSS measurement. Such situation will delay or stall the GNSS reacquisition at suitable timing. As a result, GNSS gets worse and worse, which in turn affects other location-related functions.

According to observation 1, the following proposals are given:

Proposal 1: A new MAC CE is introduced for network to further extend the UL transmission.

Proposal 1a: Upon reception of the new MAC CE for further extend the UL transmission, MAC layer indicates to upper layers that UL transmission extension update is applied.

New TAC MAC CE

(Moved here from 7.6.5)

[R2-2401401](file:///C:\Data\3GPP\Extracts\R2-2401401%20-%20R18%20IoT%20NTN%20GNSS%20extension.docx) R18 IoT NTN GNSS extension Ericsson discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1 A new TAC MAC CE is introduced with the same TA field as legacy TAC MAC CE.

Proposal 2 When UL transmission extension is active and a UE receives the new TAC MAC CE, the UE adjust the TA and extend X, with TAT if TAT is finite or with Y is TAT is infinite.

Proposal 3 When UL transmission extension is active and a UE receives a legacy TAC MAC CE, the UE adjust the TA but do not extend X.

Proposal 4 The UEs consider the GNSS position as valid during UL transmission extension.

Proposal 5 Locate the handling of GNSS validity duration in RRC and the GNSS extension handling in MAC.

Proposal 6 Name the period X “extended GNSS validity”.

Proposal 7 Name the new TAC MAC CE as “Extension Timing Advance Command MAC CE”.

Proposal 8 Adopt the text proposals above for RRC and MAC.

New LCID for TAC MAC CE

(Moved here from 7.6.5)

[R2-2400857](file:///C:\Data\3GPP\Extracts\R2-2400857%20GNSS%20extension.doc) Open issues on out-of-date GNSS fix Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1 Use a new DL LCID code point for TA command MAC CE with UL transmission extension. Existing TA command MAC CE format is not changed.

Proposal 2 No need to restrict the use of location-based features such as location-based CHO when T390 is running.

Proposal 3 UE resets the value of N\_TA before resuming UL operation after GNSS is fixed. Text proposal is provided above.

Proposal 4 If the UE receives GNSS measurement trigger too early (i.e., remaining GNSS validity is still long), the UE is allowed not to trigger the GNSS measurement but trigger the GNSS Validity Duration Report. Text proposal is provided above.

Agreements:

1. Legacy TAC MAC CE shall not be used for UL transmission extension timer T390 restart. We introduce a new zero-byte MAC CE only to extend X

GNSS validity reporting

[R2-2401129](file:///C:\Data\3GPP\Extracts\R2-2401129%20Correction%20to%2036.321%20on%20GNSS%20validity%20duration%20reporting.docx) Correction to 36.321 on GNSS validity duration reporting Nokia, Nokia Shanghai Bell CR Rel-18 36.321 18.0.0 1581 - F IoT\_NTN\_enh-Core

1. When UE has initiated the Random Access procedure due to GNSS validity duration reporting, the UE shall include the corresponding MAC CE in an uplink transmission after RAR.

2. GNSS validity duration reporting is cancelled if the UE has included the GNSS Validity Duration report MAC CE in a transmission or if the UE has initiated the Random Access procedure.

* GNSS validity duration reporting is cancelled if the UE has included the GNSS Validity Duration report MAC CE in a transmission
* Discuss in the MAC CR review whether the second part (“or if the UE has initiated the Random Access procedure”) is also needed

[R2-2401459](file:///C:\Data\3GPP\Extracts\R2-2401459%20Correction%20on%20GNSS%20validity%20duration%20reporting.docx) Correction on GNSS validity duration reporting Huawei, HiSilicon CR Rel-18 36.321 18.0.0 1582 - F IoT\_NTN\_enh-Core Late

* Revised in [R2-2401515](file:///C:\Data\3GPP\Extracts\R2-2401515%20Correction%20on%20GNSS%20validity%20duration%20reporting.docx)

[R2-2401515](file:///C:\Data\3GPP\Extracts\R2-2401515%20Correction%20on%20GNSS%20validity%20duration%20reporting.docx) Correction on GNSS validity duration reporting Huawei, HiSilicon CR Rel-18 36.321 18.0.0 1582 1 F IoT\_NTN\_enh-Core Late

According to current 36.331, once a GNSS validity duration reporting is triggered, it cannot be cancelled. The corresponding cancellation procedure is missing from the current spec. The cancellation procedure should be similar as SR/BSR etc.

[R2-2400121](file:///C:\Data\3GPP\Extracts\R2-2400121%20Cancellation%20of%20Triggered%20GNSS%20Validity%20Duration%20Reporting.docx) Remaining Issues on GNSS Validity Duration Reporting vivo discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1: The triggered GNSS validity duration report shall be cancelled when a GNSS validity duration Report MAC CE is included in a MAC PDU for transmission.

Proposal 2: If MAC entity has enough resource for GNSS validity duration report MAC CE, MAC entity shall cancel, if any, initiated RACH procedure for GNSS validity duration report.

Proposal 3: If Proposal 1 and Proposal 2 are agreed, RAN2 adopts the TP in the Annex.

HARQ enhancements

[R2-2401001](file:///C:\Data\3GPP\Extracts\R2-2401001%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 1 For DL multiple TB scheduling for a NB-IoT UE, if only one of the HARQ processes is configured with disabled HARQ feedback, UE starts drx-InactivityTimer in the subframe containing the last repetition of the PDSCH corresponding to the last scheduled TB plus 12 subframes plus deltaPDCCH.

* Agreed

Proposal 2 For UL multiple TB scheduling for a NB-IoT UE, if only one of the HARQ processes is configured with HARQ mode B, UE starts drx-InactivityTimer in the subframe containing the last repetition of the PUSCH corresponding to the last scheduled TB plus 1 subframe plus deltaPDCCH.

* Agreed

Proposal 3 For multiple TB scheduling for a NB-IoT UE, if the HARQ processes are configured as HARQ feedback disabled by RRC and further reversed to HARQ feedback enabled by DCI, UE behaviour on DRX follows the case when HARQ feedback is enabled.

* Check during the MAC CR review if anything else is needed on top of what already agreed

Proposal 4 For multiple TB scheduling with mixed HARQ feedback enabled/disabled configuration for NB-IoT, if HARQ-ACK bundling is not configured, HARQ RTT Timer for HARQ process with HARQ feedback enabled is k+3+N plus RTToffset + deltaPDCCH.

* Continue the discussion during the MAC CR review

[R2-2400428](file:///C:\Data\3GPP\Extracts\R2-2400428%20MAC%20correction%20on%20Rel-18%20IoT%20NTN.docx) Discussion on MAC corrections on Rel-18 IoT-NTN MediaTek Inc. discussion

Proposal 1: When an NB-IoT UE is scheduled with multiple TBs with HARQ-ACK bundling configured, and mixed HARQ feedback enabled/disabled is scheduled, for TB with HARQ feedback disabled, there is no RAN2 impact on DRX timer.

Proposal 2: When an NB-IoT UE is scheduled with multiple TBs with HARQ-ACK bundling not configured and mixed HARQ feedback enabled/disabled is scheduled, for the HARQ feedback disabled TB, start or restart drx-InactivityTimer in the subframe containing the last repetition of the scheduled PDSCH reception + 12 subframes + deltaPDCCH.

Proposal 3: For UL multiple TB scheduling in an NB-IoT UE, if only one of the HARQ processes is configured with HARQ mode B, UE starts drx-InactivityTimer in the subframe containing the last repetition of the PUSCH corresponding to the last scheduled TB plus 1 subframe plus deltaPDCCH.

Proposal 4: A new MAC CE is used reset ULTransmissionExtentionTimer with length equal to Y.

Proposal 5: Capture the above agreement in MAC specification clause 5.7.

[R2-2400858](file:///C:\Data\3GPP\Extracts\R2-2400858%20DRX%20inactivity.doc) Open issue: DRX inactivity timer start Qualcomm Incorporated discussion Rel-18 IoT\_NTN\_enh-Core

Proposal 1 if the HARQ feedback is disabled by downlinkHARQ-FeedbackDisabled for the corresponding HARQ process and further reversed to enabled by lower layers, a NB-IoT UE is configured with a single HARQ process or multi-TB scheduling starts or restarts drx-InactivityTimer in the subframe containing the last repetition of the corresponding HARQ feedback transmission + 1 subframe + deltaPDCCH.

Proposal 2 Adopt the text proposal provided in Annex.

[R2-2400211](file:///C:\Data\3GPP\Extracts\R2-2400211%20Discussion%20on%20remaining%20issues%20on%20HARQ%20enhancements.docx) Discussion on remaining issues on HARQ enhancements Transsion Holdings discussion Rel-18

Agreements:

1. For DL multiple TB scheduling for a NB-IoT UE, if only one of the HARQ processes is configured with disabled HARQ feedback, UE starts drx-InactivityTimer in the subframe containing the last repetition of the PDSCH corresponding to the last scheduled TB plus 12 subframes plus deltaPDCCH.
2. For UL multiple TB scheduling for a NB-IoT UE, if only one of the HARQ processes is configured with HARQ mode B, UE starts drx-InactivityTimer in the subframe containing the last repetition of the PUSCH corresponding to the last scheduled TB plus 1 subframe plus deltaPDCCH.

GNSS measurement gap length

[R2-2401138](file:///C:\Data\3GPP\Extracts\R2-2401138%20Discussion%20on%20IoT-NTN%20and%20TP%20for%20TS%2036.321.docx) Discussion on IoT-NTN and TP for TS 36.321 CMCC discussion Rel-18 IoT\_NTN\_enh-Core

Withdrawn

R2-2401279 Correction on GNSS validity duration reporting Huawei, HiSilicon CR Rel-18 38.321 18.0.0 1769 - F LTE\_NBIOT\_eMTC\_NTN Withdrawn

### 7.6.5 Corrections to other specs

Corrections to other affected specs, including corrections on UE capabilities

Corrections on issues affecting multiple Stage 3 specs (e.g. RRC and MAC) can also be submitted here

36.304 corrections

[R2-2400252](file:///C:\Data\3GPP\Extracts\R2-2400252%20Corrections%20on%20the%20location%20based%20cell%20reselection%20for%20IoT%20NTN%20in%20TS%2036.304.docx) Corrections on location based cell reselection for IoT NTN in TS 36.304 CATT discussion

[R2-2401043](file:///C:\Data\3GPP\Extracts\R2-2401043-Misc-corrections-for-IoT-NTN%20Enhancements.docx) Miscellanious corrections for IoT-NTN Nokia Solutions & Networks (I) CR Rel-18 36.304 18.0.0 IoT\_NTN\_enh-Core 0871 - F

* Revised in R2-2401597

R2-2401597 Miscellanious corrections for IoT-NTN Nokia Solutions & Networks (I) CR Rel-18 36.304 18.0.0 IoT\_NTN\_enh-Core 0871 1 F

* [Post125][308][IoT-NTN Enh] 36.304 CR (Nokia)

Scope: update the 36.304 CR based on input papers at RAN#125

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401597): short

36.306 corrections

[R2-2400848](file:///C:\Data\3GPP\Extracts\R2-2400848%20On%20GNSS%20position%20fix%20during%20C-DRX.docx) On GNSS measurements during C-DRX Samsung discussion Rel-18 IoT\_NTN\_enh

Observation 1: Signalling support for “GNSS measurement during inactive time” is useful for the network to configure the UE and to manage the UEs GNSS validity duration.

Proposal 1: Clarify that UE can simultaneously support “GNSS measurements during inactive time” and autonomous and triggered GNSS position fix.

Proposal 2: “GNSS measurement during inactive” time is changed to a signalled capability.

* QC, Nokia, Oppo this is up to UE implementation and does not need a signalled capability
* **Can come back in the next meeting**

Proposal 3: Clarify that UE reports GNSS Validity Duration Report MAC CE after successful GNSS position fix during C-DRX.

* QC thinks this is already supported
* **Can check the need to add something for this in [Post125][310]**

Proposal 4: Clarify that a UE capable of GNSS position fix during C-DRX, will completely tune away, i.e not perform GNSS position fix during C-DRX, if GNSS position fix is triggered by network or autonomously through gnss-AutonomousEnabled.

* **Can come back in the next meeting**

Proposal 5: Agree text proposal to 36.306 in Appendix A.

[R2-2401041](file:///C:\Data\3GPP\Extracts\R2-2401041-Discussion%20on%20UE%20capabilities%20for%20IoT%20NTN.docx) Clarifications for GNSS measurement related UE capabilities Nokia, Nokia Shanghai Bell discussion

* QC thinks RAN1 didn’t say anything about this
* **Can come back in the next meeting**

[R2-2401238](file:///C:\Data\3GPP\Extracts\R2-2401238%20Corrections%20on%20UE%20capability%20for%20IoT%20NTN.docx) Corrections on UE capability for IoT NTN ZTE Corporation, Sanechips discussion Rel-18 IoT\_NTN\_enh-Core

* **To be discussed in [Post125][309]**
* [Post125][309][IoT-NTN Enh] 36.306 CR (Qualcomm)

Scope: Draft a 36.306 CR based on input papers at RAN#125

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401598): short

R2-2401598 Corrections for IoT-NTN Qualcomm CR Rel-18 36.304 18.0.0 IoT\_NTN\_enh-Core XXXX - F

Discontinuous coverage

[R2-2401278](file:///C:\Data\3GPP\Extracts\R2-2401278%20Remaining%20issues%20on%20discontinuous%20coverage.docx) Remaining issues on discontinous coverage Huawei, HiSilicon discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN

Proposal 1: No enhancement is pursued on autonomous RRC connection release.

* **Agreed**

Proposal 2: No paging enhancement is pursued on discontinuous coverage.

* **Agreed**

Agreements:

1. No enhancement is pursued on autonomous RRC connection release.
2. No paging enhancement is pursued on discontinuous coverage.

## 7.7 NR NTN enhancements

(NR\_NTN\_enh -Core; leading WG: RAN1; REL-18; WID: RP-232669)

Time budget: 0 TU

Tdoc Limitation: 4 tdocs

### 7.7.1 Organizational

LSs, rapporteur inputs and other organizational documents.

Editorials/clarifications should not be included in any tdoc but sent to the WI spec rapporteurs, who can submit a rapporteur CR as part of this AI.

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

Incoming LSs

[R2-2400033](file:///C:\Data\3GPP\Extracts\R2-2400033_R1-2312681.docx) LS on NR-NTN TP for TS 38.300 (R1-2312681; contact: Thales RAN1 LS in Rel-18 NR\_NTN\_enh-Core To:RAN2

* Noted (already considered in the last meeting CR review)

[R2-2400036](file:///C:\Data\3GPP\Extracts\R2-2400036_R3-238056.docx) LS on OAM requirements for UE location verification (R3-238056; contact: CATT) RAN1 LS in Rel-18 NR\_NTN\_enh-Core To:SA5 Cc:SA2, RAN1, RAN2

* Noted

[R2-2400045](file:///C:\Data\3GPP\Extracts\R2-2400045_R3-238024.docx) Reply LS on NW verified UE location failure during cell change (R3-238024; contact: Qualcomm) RAN3 LS in Rel-18 NR\_NTN\_enh-Core To:RAN2

* Noted

[R2-2400068](file:///C:\Data\3GPP\Extracts\R2-2400068_S1-233296.docx) Reply LS on the service requirement of restricting satellite access RAT type (S1-233296; contact: Apple) SA1 LS in Rel-18 5GSAT\_Ph2 To:CT1 Cc:SA2, RAN2

* Noted

[R2-2400085](file:///C:\Data\3GPP\Extracts\R2-2400085_S2-2401650.docx) Response to “Reply LS on the service requirement of restricting satellite access RAT type” (S2-2401650; contact: Vodafone) SA2 LS in Rel-17 IoT\_SAT\_ARCH\_EPS, 5GSAT\_ARCH To:RAN3 Cc:CT1, CT4, SA1, RAN2

* Noted

[R2-2400054](file:///C:\Data\3GPP\Extracts\R2-2400054_R4-2321576.docx) LS on Handover Times for NTN UEs with mechanically steered beams in FR2-NTN (R4-2321576; contact: Nokia) RAN4 LS in Rel-18 NR\_NTN\_enh To:RAN2

* Noted

[R2-2401449](file:///C:\Data\3GPP\Extracts\R2-2401449%20Response%20LS%20on%20Handover%20delay%20in%20FR2%20NTN%20with%20mechanically%20steered%20beams.docx) Draft LS response on Handover delay in FR2 NTN with mechanically steered beams Nokia LS out Rel-18 NR\_NTN\_enh-Core To:RAN4 Late

* Inmarsat suggests to move the last sentence in the reply LS. IDC agrees. QC also agrees and wonders if we need a reply LS at all
* Nokia agrees that if we remove the last sentence it’s not so essential to send the reply LS
* Ericsson thinks we could also change our specs (modify the meaning of T304) to modify the behaviour. Oppo thinks that no matter how we change the description the same interruption time will be there.
* HW supports sending the LS also without the last sentence
* Ericsson thinks we need to do something
* No reply LS is sent for now, but we can come back to this (in this or future meetings)

[R2-2400061](file:///C:\Data\3GPP\Extracts\R2-2400061_R4-2321975.docx) LS on NTN VSAT capability (R4-2321975; contact: ZTE) RAN4 LS in Rel-18 NR\_NTN\_enh-Core To:RAN1, RAN2

* Noted

[R2-2400534](file:///C:\Data\3GPP\Extracts\R2-2400534%20Consideration%20on%20VSAT%20support%20requested%20in%20R4-2321975.doc) Consideration on VSAT support requested in R4-2321975 ZTE Corporation, Sanechips discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Introduce two per-UE capabilities for FR2-only band as below to indicate VSAT UE’s mobility and antenna types:

* A UE capability to indicate whether UE uses electronic or mechanical steering antenna
* A UE capability to indicate whether UE is a fixed or mobile VSAT
* Agreed

Proposal 2: Introduce two separate indications in SIB1 to indicate whether current cell is barred for mobile VSAT, or barred for fixed VSAT.

* HW thinks this could be done with a single bit
* Inmarsat thinks in RAN4 it’s clear that we need to bar different UE types independently and then we need multiple bits
* Inmarsat thinks we need to be future compatible
* HW can accept to go for this for now but if RAN4 provides further update to the feature list we might need to come back
* HW wonders if there is any impact on the mobility procedure
* Introduce two separate indications in SIB1 to indicate whether current cell is barred for mobile VSAT, or barred for fixed VSAT.

Proposal 3: New introduced barred bits for mobile/fixed VSAT are only applicable for NTN cell.

* Agreed

Proposal 4: RAN2 discusses and agrees on the TPs provided in Annex 1 and Annex 2 to support capabilities signalling and NW signalling for VSAT UE in NTN respectively.

* Continue in offline 305

Proposal 5: Send reply LS to RAN4 to inform them about RAN2 agreements and the corresponding approved CRs.

* IDC thinks that if we send a reply LS we could ask the question if this will be only for Ka band or applicable in general
* Come back to this after the conclusion of offline 305

Agreements:

1. Introduce two per-UE capabilities for FR2-only band as below to indicate VSAT UE’s mobility and antenna types:

* A UE capability to indicate whether UE uses electronic or mechanical steering antenna
* A UE capability to indicate whether UE is a fixed or mobile VSAT

1. Introduce two separate indications in SIB1 to indicate whether current cell is barred for mobile VSAT, or barred for fixed VSAT
2. Introduce two separate indications in SIB1 to indicate whether current cell is barred for mobile VSAT, or barred for fixed VSAT

* [AT125][305][NR NTN Enh] VSAT support (ZTE)

Scope: discuss TPs to reflect the decisions on VSAT support

Intended outcome: agreeable TPs

Deadline for companies' feedback: Thursday 2024-02-29 18:00

Deadline for rapporteur's summary (in R2-2401585): Friday 2024-03-01 08:00

[R2-2401585](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401585.zip) Summary of [AT125][305][NR NTN Enh] VSAT support ZTE discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: TPs in Annexes for TS 38.306, 38.331 and 38.304 are endorsed for merging into the rapporteur CR.

* HW suggests to update the explanation of for the conditional presence “NTN” to: “The field is optionally present, Need S, ~~in a cell that~~ if cellBarredNTN is set to~~included with~~ ~~value~~notBarred~~,.~~ ~~o~~Otherwise it is absent.”
* All TPs are endorsed and will be considered in the post meeting CR review for all the 3 specs

[R2-2400062](file:///C:\Data\3GPP\Extracts\R2-2400062_R4-2321976.docx) LS on UE capability to support DMRS bundling for GSO and NGSO (R4-2321976; contact: Ericsson) RAN4 LS in Rel-18 NR\_NTN\_enh-Core To:RAN1, RAN2

* Ericsson thinks that RAN1 is discussing this and we might need to come back based on their decision
* QC thinks the LS is straightforward and we should just implement it
* Consider this in the CRs update in the Post email discussions (if we receive the updated feature list from RAN1)

WI RRC rapporteur input

[R2-2401411](file:///C:\Data\3GPP\Extracts\R2-2401411%20-%20Rapporteur%20input%20R18%20NR%20NTN%20RRC%20RIL.docx) Rapporteur input R18 NR NTN RRC RIL Ericsson discussion Rel-18 NR\_NTN\_enh-Core

* [AT125][301][IoT NTN Enh] Flagged RILs (Ericsson)

Scope: Allow flagging the PropAgree and PropReject RILs in R2-2400693, if really needed, before the online discussion. No technical discussion is expected to happen via email (just the flagging), but F2F discussion between the WI RRC rapporteur and the disagreeing companies is invited before the online session.

Intended outcome: List of flagged PropAgree and PropReject RILs (if any)

Deadline for rapporteur's summary in R2-2401582 (if needed): Tuesday 2024-02-27 13:00

[R2-2401582](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401582.zip) Summary of [AT125][302][NR NTN Enh] Flagged RILs Ericsson discussion Rel-18 NR\_NTN\_enh-Core

For the following RILs, the conclusion proposed by the rapporteur can be considered for agreement:

C600, C601, C603, C617, C618, C620, C623, H002, H003, H006, H007, H011, H013, H014, H015, H061, H062, I118, I135, K004, N003, O601, Q572, Q631, Q633, Q634, S481, S482, S483, S484, S485, V500, V501, V502, V504, V505, V506, V508, X041, X042, X044, X403, Z330, and Z332.

* The proposed conclusion for C600, C601, C603, C617, C618, C620, C623, H002, H003, H006, H007, H011, H013, H014, H015, H061, H062, I118, I135, K004, N003, O601, Q572, Q631, Q633, Q634, S481, S482, S483, S484, S485, V500, V501, V502, V504, V505, V506, V508, X041, X042, X044, X403, Z330, and Z332 is agreed

The following RILs need further discussion:

C602, C604, C605, C619, C622, O600, O602, Q571, H063, H790, H791, H004, H008, H012, V500, V501, V503, and V507.

* We continue the discussion on C602, C604, C605, C619, C622, O600, O602, Q571, H063, H790, H791, H004, H008, H012, V500, V501, V503, and V507

[R2-2401410](file:///C:\Data\3GPP\Extracts\R2-2401410%20-%2038331_CR4610_(Rel-18)%20-%20Rapporteur%20input%20R18%20NR%20NTN%20RRC.docx) Rapporteur input R18 NR NTN RRC Ericsson CR Rel-18 38.331 18.0.0 4610 - F NR\_NTN\_enh-Core

* Considered as baseline for further updates
* Revised in R2-2401589

R2-2401589 Rapporteur input R18 NR NTN RRC Ericsson CR Rel-18 38.331 18.0.0 4610 1 F NR\_NTN\_enh-Core

* [Post125][301][NR-NTN Enh] 38.331 CR (Ericsson)

Scope: update the RRC CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401589): short

WI 37.355 rapporteur input

[R2-2400711](file:///C:\Data\3GPP\RAN2\Docs\R2-2400711.zip) RIL List on 37.355 for NR NTN CATT discussion

* A001 is agreed
* A002 and A003 are rejected

[R2-2400712](file:///C:\Data\3GPP\Extracts\R2-2400712%20Correction%20on%20NR%20NTN%20in%20TS%2037.355.docx) Correction on NR NTN in TS 37.355 CATT CR Rel-18 37.355 18.0.0 0489 - F NR\_NTN\_enh-Core

* CATT indicates that the first change is the implementation of A001 and the second change depends on RAN4 discussion on FR2-NTN
* First change is agreed
* We will wait for RAN4 progress before agreeing the second change
* The CR is considered as baseline for further updates
* Revised in R2-2401592

R2-2401592 Correction on NR NTN in TS 37.355 CATT CR Rel-18 37.355 18.0.0 0489 1 F NR\_NTN\_enh-Core

* [Post125][304][NR-NTN Enh] 37.355 CR (CATT)

Scope: update the 37.355 CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401592): short

WI 34.304 rapporteur input

[R2-2400609](file:///C:\Data\3GPP\Extracts\R2-2400609_Miscellaneous%20Corrections%20for%20NTN%20in%2038.304-R18.docx) Miscellaneous Corrections in 38.304 ZTE Corporation, Sanechips CR Rel-18 38.304 18.0.0 0376 - F NR\_NTN\_enh-Core

* Use bold for the first change
* The CR is considered as baseline for further updates based on the progress this week
* Revised in R2-2401591

R2-2401591 Miscellaneous Corrections in 38.304 ZTE Corporation, Sanechips CR Rel-18 38.304 18.0.0 0376 1 F NR\_NTN\_enh-Core

* [Post125][303][NR-NTN Enh] 38.304 CR (ZTE)

Scope: update the 38.304 CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401591): short

* [Post125][305][NR-NTN Enh] UE Caps CRs (Intel)

Scope: draft CRs with meeting agreements

Intended outcome: Endorsed CRs

Deadline for agreed CR (in R2-2401593 and R2-2401594): very-short

R2-2401593 UE capabilities update for NR NTN Intel draftCR Rel-18 38.331 18.0.0 NR\_NTN\_enh-Core

R2-2401594 UE capabilities update for NR NTN Intel draftCR Rel-18 38.306 18.0.0 NR\_NTN\_enh-Core

### 7.7.2 Stage 2 corrections

[R2-2400771](file:///C:\Data\3GPP\Extracts\R2-2400771%20Corrections%20to%2038300%20for%20network%20verified%20UE%20location.docx) 38.300 corrections for network verified UE location Nokia, Nokia Shanghai Bell draftCR Rel-18 38.300 18.0.0 F NR\_NTN\_enh-Core

* Ericsson supports the principle of the CR but would like to remove the reference to 5-10km.
* Samsung wonders if we need to keep the sentence “It is up to the network to determine which services the UE is allowed to access before the UE verification procedure has been completed”. QC agrees
* Continue the discussion on the detailed wording in offline 303

[R2-2400772](file:///C:\Data\3GPP\Extracts\R2-2400772%20On%20CHO%20and%20RACH%20less.docx) On combining CHO and RACH-less Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core

Observation 1: Current specifications allow the combination of RACH-less HO and time-based CHO in NR NTN.

Observation 2: If the access to a CHO candidate cell fails, the UE can apply a valid stored condRRCReconfig to a selected cell.

Observation 3: In case of RACH-less HO failure, the UE falls back to RRC Re-establishment procedure.

Observation 4: in case of combining time-based CHO and RACH-less HO the UE failure behaviour is unclear according to current specifications.

Proposal 1: In case of failure of a time-based RACH-less CHO procedure, the UE initiates RRC Re-establishment procedure.

Proposal 2: RAN2 to adopt the TP in Annex A to resolve the time-based RACH-less CHO failure ambiguity.

* Oppo thinks the actual TP is misleading
* Vivo thinks that even if combined with RACH-less the procedure is still CHO and we just need to follow the CHO rules, nothing else is needed. Samsung/Oppo agree.
* Proposal is not pursued

[R2-2401282](file:///C:\Data\3GPP\Extracts\R2-2401282%20Correction%20to%20Stage%202%20on%20NTN%20mobility.docx) Correction to Stage 2 on NTN mobility Huawei, HiSilicon CR Rel-18 38.300 18.0.0 0804 - F LTE\_NBIOT\_eMTC\_NTN

* Revised in [R2-2401513](file:///C:\Data\3GPP\Extracts\R2-2401513%20Correction%20to%20Stage%202%20on%20NTN%20mobility.docx)

[R2-2401513](file:///C:\Data\3GPP\Extracts\R2-2401513%20Correction%20to%20Stage%202%20on%20NTN%20mobility.docx) Correction to Stage 2 on NTN mobility Huawei, HiSilicon CR Rel-18 38.300 18.0.0 0804 1 F NR\_NTN\_enh-Core

* Nokia thinks we can postpone the changes about RACH-less HO for now, as we might need a common discussion with other WIs
* Samsung thinks the last change is not needed
* QC thinks that satellite switch could happen without RACH and this needs to be reflected in the CR
* Continue the discussion in offline 303

[R2-2401403](file:///C:\Data\3GPP\Extracts\R2-2401403%20-%2038300_(Rel-18)%20-%20Corrections%20to%20stage%202%20for%20NR%20NTN%20R18.docx) Corrections to stage 2 for NR NTN R18 Ericsson draftCR Rel-18 38.300 18.0.0 F NR\_NTN\_enh-Core

* Second change (“UE maintains”) is agreed and merged into the rapporteur CR outcome of offline 303

[R2-2401462](file:///C:\Data\3GPP\Extracts\R2-2401462.docx) Miscellaneous Stage 2 corrections for NR NTN Samsung discussion Rel-18 NR\_NTN\_enh-Core Late

* Skip the change regarding kmac
* Other changes are endorsed in principle and merged into the rapporteur CR outcome of offline 303
* [AT125][303][NR NTN Enh] Stage 2 corrections (Thales)

Scope: discuss Stage 2 corrections

Intended outcome: agreeable Stage 2 CR

Deadline for companies' feedback: Thursday 2024-02-29 18:00

Deadline for rapporteur's summary (in R2-2401583): Friday 2024-03-01 08:00

[R2-2401583](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401583.zip) Stage 2 corrections for NR NTN Thales, … CR Rel-18 38.300 18.0.0 XXXX - F NR\_NTN\_enh-Core

* Modify the change in 16.14.10 to “The core network may trigger a network verification procedure for a UE in RRC\_CONNECTED to verify it is consistent with the network-based assessed location. It is up to network implementation how to handle UEs which does not support the location verification.
* Revised to R2-2401599

R2-2401599 Stage 2 corrections for NR NTN Thales, … CR Rel-18 38.300 18.0.0 XXXX - F NR\_NTN\_enh-Core

* Agreed unseen

### 7.7.3 RRC corrections

CHO

CondEventD2

* On candidate cell referenceLocation

[C606] (Marked ToDo)

[R2-2401084](file:///C:\Data\3GPP\Extracts\R2-2401084%20%5bC606%5d%20Further%20discussion%20on%20CHO%20in%20EMC.docx) [C606] Further discussion on CHO in EMC CATT, Thales, vivo, Samsung, Ericsson, Nokia, Nokia Shanghai Bell, Huawei, HiSilicon, ITL, OPPO discussion

Proposal 0: RAN2 discusses whether the agreement "UE may use the corresponding neighbour information from SIB19" for EMC CHO can be supported by the signaling in current Spec (considering that the NW may be unable to associate in condEventD2 a correct moving reference location with the neighbor cell ephemerisInfo/epochTime provided in SIB19 for each UE).

Proposal 1: RAN2 down-selects following options, if it is confirmed that the agreement cannot be supported by current Spec in Proposal 0 for EMC CHO:

* Option 1: Introduce moving reference location (which is associated with the epochTime) for each neighbor cell indicated in SIB19, and stick to previous agreement.
* Option 2: Change the epochTime in MO associated with condEventD2 to be mandatorily present, and revise previous agreement to allow UE to use only ephemerisInfo of corresponding neighbor cell in SIB19.
* Option 3: Revert previous agreement and no more support the use of neighbor cell ephemerisInfo/epochTime in SIB19.

- HW agrees the meeting agreement was problematic but it was not reflected in the specs so we can simply revert the agreement and not introduce any changes (option 3).

- QC prefers option 2 but can also accept option 3

- CATT prefers option 1 but could also accept option 2 but we would need additional changes

- ZTE thinks option 3 is the simplest option as it does not need any changes. Vivo agrees with HW and ZTE. Apple also agrees. Oppo also suggests to revert the previous agreement and is ok to go for option 3

- CATT thinks that if we go for option 3 we need to change the condition for the presence in the MO

- Oppo thinks an alternative solution is to put ephemeris and epochTime directly in the CHO configuration, not in the MO.

* We go for option 3, reverting the agreement from the last meeting, which is replaced by: for the EMC case, ephemeris and epochTime information for candidate CHO cell need to be provided in RRC Reconfiguration
* Make the relevant fields conditionally mandatory in ASN.1 (i.e. for the EMC case)

Proposal 2: If RAN2 agrees option 1 or 2 in Proposal 1, further down-select the following solutions on how to associate the condEventD2 of a candidate cell with the corresponding neighbor cell information in SIB19:

* Solution A: Define an index in condEventD2 for candidate target cell, referring to the corresponding neighbor cell in SIB19. Use a Choice signaling structure, the NW configures in condEventD2 either a referenceLocation directly or this index.
* Solution B: Use "PCI" and "Frequency Information" included in the candidate cell CHO configuration and in the neighbor cell configuration in SIB19 to do the association.

Proposal 3: If a solution is agreed above to use neighbor cell ephemerisInfo and/or epochTime in SIB19 for EMC CHO, RAN2 discusses whether the same solution can be reused for serving cell.

[R2-2400497](file:///C:\Data\3GPP\Extracts\R2-2400497%20%5bNTN%5d%20Discussion%20on%20open%20issue%20for%20NTN%20CHO_final.docx) Discussion on open issue for NTN CHO LG Electronics France discussion Rel-18 38.331 NR\_NTN\_enh-Core

Proposal 1 Introduce Event D2 to provide robust measurement report for earth moving cell.

Proposal 2 Event D2 and condEvent D2 only support mobility between earth moving cells in this release.

Proposal 3 [C619] and [C609] are not pursued.

[R2-2400670](file:///C:\Data\3GPP\Extracts\R2-2400670%20Further%20Thoughts%20on%20CHO%20in%20EMC%20%5bC606%5d.docx) Further Thoughts on CHO in EMC [C606] Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: If RAN2 confirms [C606] is an issue that needs to be addressed in the specification, consider adopting Option 2 (make epochTime a mandatory part of RRC Reconfiguration with condEventD2).

[R2-2401134](file:///C:\Data\3GPP\Extracts\R2-2401134%20Considerations%20on%20left%20issues%20on%20EMC%20CHO.docx) Considerations on left issues on EMC CHO CMCC discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: It is proposed to introduce an indication in SIB19 to indicate UE to derive the real-time reference location information of candidate cells and ignore the referenceLocation2 configured in the condEventD2 for the case that ephemeris and epochTime information for candidate CHO cell is not provided in RRC Reconfiguration and UE may use the corresponding neighbour information from SIB19.

Proposal 2: If Proposal 1 is supported, suggest RAN2 to agree the TP in annex.

Proposal 3: Remove the Editor's Note that FFS whether location-based conditional handover (condEventD2) applies only to moving cells or a combination of moving and quasi-Earth fixed cells for the choice of source and target cells.

Proposal 4: It is proposed to only configure the condEventD2 for the scenario that both the source and candidate cells are earth moving cells.

* On serving cell referenceLocation

[C619] (Marked PropReject-Flagged)

[R2-2400250](file:///C:\Data\3GPP\Extracts\R2-2400250%20%5bC619%5d%20On%20serving%20cell%20configuration%20for%20EMC%20CHO.docx) [C619] On serving cell configuration for EMC CHO CATT discussion

Proposal 1: For condEventD2 evaluation, RAN2 agrees that UE always relies on the ephemerisInfo, epochTime and associated movingReferenceLocation in SIB19 for serving cell, taking into account TP in Annex.

- CATT supports p1 for the serving cell reference location. LG agrees.

- Oppo thinks we should not require the NW to always provide this in SIB19

- HW thinks that for serving cell the UE uses the Epoch time (same for both serving and target cell) and reference location in dedicated signalling and ephemeris in SIB19.

- CB Friday to choose between the following options:

1. For serving cell reference location evaluation for condEventD2, besides the reference location the UE also receives the reference time from dedicated signalling and serving satellite ephemeris (and corresponding Epoch time) from SIB19.

2. For condEventD2 evaluation, the UE always relies on the ephemerisInfo, epochTime and associated movingReferenceLocation in SIB19 for serving cell. (the description of movingReferenceLocation needs to be updated accordingly and reference location1 removed from dedicated signalling, TP in R2-2400250 is used as a reference). This also needs a clarification in the field description of movingReferenceLocation to indicate that if there is no associated threshold the feature is not supported for idle.

* **We go for option 2**
* **RAN2 understands that for CHO evaluation in EMC it’s up to UE to update the serving cell reference location based on new SIB19 acquisition (no spec impact)**
* **Same behaviour is adopted for IoT-NTN**

[O601] (Marked PropReject)

[R2-2401006](file:///C:\Data\3GPP\Extracts\R2-2401006%20location-based%20CHO%20for%20EMC.doc) [O601] Discussion on location-based CHO for earth moving cells OPPO discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1 Within the configuration of condEventD2-r18, serving cell’s and candidate cell’s epoch time and ephemeris information are included, in addition to referenceLocation1-r18 and referenceLocation1-r18.

Proposal 2 If ephemeris, epochTime, or referenceLocation1 for serving cell is not provided in RRC Reconfiguration, the UE may use the corresponding serving cell information from SIB19 to derive serving cell’s reference location.

* Other issues

[H400] (Marked ToDo) (applicability of CondEventD2)

[R2-2400702](file:///C:\Data\3GPP\Extracts\R2-2400702%20%5bH400%5d%20Correction%20to%20CondEvent%20D2.docx) [H400] Correction to CondEvent D2 Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Remove the Editor’s Note in clause 5.5.4.15a.

Proposal 2: Adopt the TP in the Annex.

* CondEventD2 is only applicable to moving cell to moving cell scenario

[R2-2400182](file:///C:\Data\3GPP\Extracts\R2-2400182_Consideration%20of%20remaining%20open%20issues%20of%20NTN.doc) Consideration of remaining open issues of NTN China Telecom discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: No enhancement of condEventD2 to support the combination of moving and quasi-Earth fixed cells..

Proposal 2: RAN2 to agree the following TP of ntn-Config in SatSwitchWithReSync for satellite switch with re-sync.

Proposal 3: RAN2 to discuss connection of source satellite is UL or UL/DL when obtaining DL synchronization from the target satellite. If the connection is UL/DL, the feature is supported. Otherwise, the feature is not supported.

[R2-2400802](file:///C:\Data\3GPP\Extracts\R2-2400802%20(R18%20NR%20NTN%20WI%20AI%207.7.3)%20RRC.docx) RRC corrections for NTN InterDigital discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: condEventD2 only applies if both source and target are Earth-moving cells.

Proposal 2: The following options are considered to restrict condEventD2 to when both source and target are Earth-moving cells:

Option 1: Clarify in the event description (i.e., Section 5.5.4.15a).

Option 2: It is up to NW implementation to ensure proper configuration.

* No need to clarify this further in the specs

Proposal 3: condEventD1 only applies if both source and target are quasi-Earth fixed cells.

Proposal 4: Clarify condEventD1 only applies to when both source and target are quasi-Earth fixed cells in the same way as condEventD2 (i.e., clarify in the event description or leave to NW implementation, depending on outcome of Proposal 2).

[R2-2400808](file:///C:\Data\3GPP\Extracts\R2-2400808%20Issues%20on%20condEventD2%20and%20RACH-less%20HO.docx) Issues on condEventD2 and RACH-less HO Samsung discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: CondEventD2 is configured and applied if at least one of the serving cell and the candidate cell is an earth moving cell.

Observation 1: The issue of condEventD2: 1) how to determine earth-moving cell(s) so that UE estimates the real-time reference location for the cell(s); 2) how to provide the epoch time(s) for the reference location(s) of the earth moving cell(s).

Proposal 2: For condEventD2, select one from Option 1, 2, 3 to solve the issue in Observation 1, and adopt the TP.

Proposal 3: If T304 expires for RACH-less HO, release rach-LessHO and release the configured grant in cg-NTN-RACH-Less-Configuration if configured. Adopt the TP in the Appendix.

[R2-2400938](file:///C:\Data\3GPP\Extracts\R2-2400938_Open%20issues%20on%20NR%20NTN%20Enhancements_v0.doc) Open issues on NR NTN Enhancements Apple discussion Rel-17 DUMMY

< Issue 1: Measurement event D2>

Proposal 1: Introduce a new measurement event D2 targeted for the location-based RRM measurement for EMC case.

< Issue 2: The applicable scenario of condEventD2 and event D2>

Proposal 2a: The condEventD2 and eventD2 can be applicable for the moving cells for source cell and/or target cell.

Proposal 2b: For condEventD2 and eventD2, UE determines whether to use the configured referenceLocation1 or the estimated moving reference location 1 based on the movingReferenceLocation-r18 configuration in SIB19.

Proposal 2c: For condEventD2 and eventD2, UE determines whether to use the configured referenceLocation2 or the estimated moving reference location 2 based on the CellsToAddModListExt-v1800 configuration in MeasObjectNR.

< Issue 3: The usage of TN coverage information in RRC\_CONNECTED state state >

Proposal 3: TN coverage information can be used for UE to perform TN neighbor measurement in connected mode, i.e., UE doesnot need to perform connected measurement on the TN neighbor frequencies if it's not in the TN coverage area where the UE is located.

[V503] (Marked PropReject-Flagged)

[R2-2400122](file:///C:\Data\3GPP\Extracts\R2-2400122%20%5bV503%5d%20Remaining%20Issues%20on%20Location%20Based%20CHO%20for%20Moving%20Cell.docx) [V503] Remaining Issues on Location Based CHO for Moving Cell vivo discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: condEventD2 applies to the following scenarios:

a) The serving cell is earth-moving cell and the candidate cell is quasi-earth-fixed cell;

b) The serving cell is quasi-earth-fixed cell and the candidate cell is earth-moving cell;

c) Both the serving cell and candidate cell are earth-moving cell.

Proposal 2: For determining the serving cell’s reference location for location-based CHO, epochTime and ephemeris from SIB19 are used.

Proposal 3: RAN2 to adopt the TP in the Annex, if the corresponding proposals above are agreeable.

EventD2

[H005 ] (Marked ToDo)

[H004 ] (Marked PropReject-Flagged)

[H008 ] (Marked PropReject-Flagged)

[R2-2400696](file:///C:\Data\3GPP\Extracts\R2-2400696%20%5bH005%5d%5bH004%5d%5bH008%5d%20Event%20D2%20for%20earth-moving%20cell.docx) [H005][H004][H008] Event D2 for earth-moving cell Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Event D2 is supported for moving cell.

* Agreed

Proposal 2: Adopt the TP in the Annex.

* TP is endorsed

[R2-2400535](file:///C:\Data\3GPP\Extracts\R2-2400535%20%5bRILH005,H400%5d%20Consideration%20on%20location-based%20CHO%20remaining%20issues.doc) [RILH005,H400] Consideration on location-based CHO remaining issues ZTE Corporation, Sanechips discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Introduce location based triggered measurements (i.e., event D2) in connected mode for earth moving scenarios.

Proposal 2: Only consider earth moving cells for source and target cells/neighbor cells for CondEvent D2/eventD2.

Proposal 3: Introduce a UE capability to indicate support of event D2. It is conditional mandatory for UE to support event D2 based measurement trigger if UE indicates supports locationBasedCondHandoverEMC in any NTN band.

- HW supports this

* Agreed

Proposal 4: RAN2 discusses and agrees on the TPs of p1 to p3, provided in the annexes.

* TP is endorsed

[R2-2401256](file:///C:\Data\3GPP\Extracts\R2-2401256.docx) Open issues on location based CHO ITL discussion

Proposal 1: Change CondEvent D2 to Event D2, and introduce Event D2 in reportConfigNR

Proposal 2: CondEvent D2 is only applied to moving cell scenario

Agreements:

1. For the EMC case, ephemeris and epochTime information for candidate CHO cell need to be provided in RRC Reconfiguration. Make The relevant fields conditionally mandatory in ASN.1 (i.e. for the EMC case)
2. CondEventD2 is only applicable to moving cell to moving cell scenario (No need to clarify this further in the specs)
3. Event D2 is supported for moving cell
4. Introduce a UE capability to indicate support of event D2. It is conditional mandatory for UE to support event D2 based measurement trigger if UE indicates supports locationBasedCondHandoverEMC in any NTN band.
5. For condEventD2 evaluation, the UE always relies on the ephemerisInfo, epochTime and associated movingReferenceLocation in SIB19 for serving cell. (the description of movingReferenceLocation needs to be updated accordingly and reference location1 removed from dedicated signalling). This also needs a clarification in the field description of movingReferenceLocation to indicate that if there is no associated threshold the feature is not supported for idle. Same behaviour is adopted for IoT-NTN

Satellite switch with re-sync

Switching time

[H001] (marked as ToDo)

[R2-2400251](file:///C:\Data\3GPP\Extracts\R2-2400251%20Discussion%20on%20Remaining%20Open%20Issue%20for%20Unchanged%20PCI%20Mechanism%20(H001).docx) Discussion on Remaining Open Issue for Unchanged PCI Mechanism CATT, Huawei, HiSilicon, CMCC discussion

Observation 1: For soft satellite switch, UE re-synchronization procedure in the current Spec leads to difficulty for NW scheduling during t-ServiceStart and t-Service:

 At a UE level, NW does not know whether to schedule the UE using source or target satellite’s timing, which leads to resource waste or UE’s service interruption if wrong timing is applied for scheduling;

 At a system level, NW does not know which UEs have or have not re-synchronized to the target satellite and has no way to avoid interference caused by the scheduling among UEs sychronized with different satellites, which results in obvious system-level performance degradation.

Observation 2: The ambiguity period (where the NW does not know if UE already gets synced with the target satellite) does not last long, e.g. at a millisecond or tens of millisecond level, so a relative simple solution is preferred to address the issue caused to NW scheduling by the ambiguity issue for performance improvement.

Observation 3: For soft satellite switch, delaying the UE’s switch to the target satellite (including operations to apply the DL sync, restart T430, reset N\_TA, resume UL operations, etc.) to t-Service can resolve the problems in Observation 1.

Observation 4: Feasibility to support a UE simultaneously acquiring DL sync of the target satellite while keeping communication with the source can already be justified by related Rel-17 RAN4 UE capability, and this operation is not as complex as DAPS, since the UE just needs to maintain DL sync information but does not need to maintain a full protocol stack for data communication with the target satellite.

Proposal 1: For soft satellite switch, UE shall apply the acquired DL timing and access to the target satellite with related operations (e.g. restart T430, reset N\_TA, resume UL operations) at t-Service.

* For soft satellite switch, UE shall apply the acquired DL timing and start accessing the target satellite with related operations (e.g. restart T430, reset N\_TA, resume UL operations) not before t-Service

Proposal 2: For soft satellite switch, UE shall acquire and maintain the DL synchronization information for the target satellite during t-ServiceStart and t-Service, while maintaining the connection with source satellite.

* For soft satellite switch, UE shall start acquiring the DL synchronization information for the target satellite from t-ServiceStart, while maintaining the connection with source satellite.

Proposal 3: Adopt the TP on the procedure of satellite switch with UE re-synchronization in the Annex.

- Samsung prefers to switch at t-serviceStart.

- Sequans is not sure there is an issue

- CATT thinks there is a serious network issue that needs to be solved

- Google thinks the NW could rely on PDCCH order

- QC supports that switching time happens at t-service

- Apple is not sure the problem is very serious

* Discuss the TP in Post meeting email discussion [Post125][301]

[R2-2400695](file:///C:\Data\3GPP\Extracts\R2-2400695%20%5bH001%5d%20Discussion%20on%20unchanged%20PCI.docx) [H001] Discussion on unchanged PCI Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Observation 1: Compared with hard satellite switching, the advantage of soft satellite switching lies in shorter interruption time due to cell search and fine time tracking before t-Service. Even in soft satellite switching scenarios, it is preferred that all UEs switch to target satellite at t-Service.

Proposal 1: In soft satellite switching scenarios, UEs switch to target satellite at t-Service.

Proposal 2: Adopt the TP in R2-2400251.

Proposal 3: The feasibility that a UE supporting soft satellite switch can start synchronizing to the DL of the SpCell served by the target satellite while still being connected to the source satellite depends on UE capability, and the corresponding capability can be viewed as a component of softSatelliteSwitchResyncNTN-r18. Whether scheduling restriction is caused depends on the UE capability parallelMeasurementWithoutRestriction-r17, and has no RAN2 impacts.

[R2-2400498](file:///C:\Data\3GPP\Extracts\R2-2400498%20%5bNTN%5d%20Discussion%20on%20open%20issue%20for%20satellite%20swithcing%20with%20re-sync_final.docx) Discussion on open issue for satellite swithcing with re-sync LG Electronics France discussion Rel-18 38.331 NR\_NTN\_enh-Core

Observation 1 TAR is always triggered by UE when NW configures kmac for target satellite having TA value difference larger than TA offset threshold.

Proposal 1 NW can confirm the completion of satellite switching by NW implementation.

Proposal 2 In soft satellite switching, UE may perform satellite switching during the time from t-ServiceStart to t-Service.

Observation 2 UE performs satellite switching upon obtaining DL synchronization from the target satellite.

Proposal 3 UE does not need to maintain UL synchronization to the source satellite and DL synchronization from the target satellite simultaneously.

Observation 3 UE capability of RACH-less HO is different from that of satellite switching with re-sync without RACH.

Proposal 4 UE is able to perform satellite switching with re-sync without RACH without UE capability of RACH-less HO.

Proposal 5 It is UE implementation whether UE performs satellite switching with re-sync with RACH or without RACH.

[R2-2400538](file:///C:\Data\3GPP\Extracts\R2-2400538%20%5bRILH001%5d%20Consideration%20on%20the%20PCI%20unchanged%20switch%20timing.doc) [RILH001]Discussion on the switch timing for soft-switch case ZTE Corporation, Sanechips discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: When t-serviceStart is provided, UE supporting PCI unchanged performs re-synchronization procedure as specified in 5.7.19 of TS 38.331 at time indicated by t-serviceStart.

[R2-2401183](file:///C:\Data\3GPP\Extracts\R2-2401183%20Synchronisation%20for%20soft%20switch%20scenario%20for%20RIL%20%5bH001%5d.docx) On first UL transmission for unchanged PCI RIL H001 Nokia, Nokia Shanghai Bell discussion NR\_NTN\_enh-Core

Observation 1: If left to UE implementation, the network is unaware of when a UE triggers the resynchronisation towards the new satellite during a soft satellite switch.

Observation 2: Alignment between the resynchronisation performed by the UE may lead to poor network performance due to e.g. a sudden burst of SR.

Observation 3: Delaying first UL transmissions of all UEs at t-Service may cause NW overload and worse UE experience.

Proposal 1: RAN2 to modify agreement in RAN2#123bis with the following:

• For soft satellite switching, the exact time when the UE starts synchronizing with target satellite (between T-start and T-service) is at least assisted by NW implementation.

Proposal 2: RAN2 to agree that network should be able assist the UE in determining a time within the time period to perform the first UL transmission.

Proposal 2; RAN2 to discuss a solution to so NW and UE can determine the time for the first UL transmission based on the following options:

Option 1: using a formula i.e. T=floor((t-Service - t-ServiceStart)/N)\*(C-RNTI mod N) with N being an indication of a UEs group

Option 2: based on indicated satellite ID or change of satellite ID

Option 3: NW indication of the current transmission being the last transmission over the source satellite

[R2-2401400](file:///C:\Data\3GPP\Extracts\R2-2401400%20-%20Remaining%20issue%20on%20soft%20satellite%20switch%20with%20re-sync.docx) Remaining issue on soft satellite switch with re-sync Ericsson discussion Rel-18 NR\_NTN\_enh-Core

Observation 1 For the soft switch scenario, the choice of the switch time within the overlap period is left to UE implementation which is unknown to the gNB and results in prolonged service interruption.

Observation 2 The solution in which the UE reports TA after completing the switch is insufficient to remove the uncertainty at the network side.

Observation 3 To minimize interruption time, the time of the switch needs to be aligned without any extra per-UE signaling.

Proposal 1 For the soft switch scenario, UE derives the UE-specific switch time based on a (pre)configured rule without dedicated signaling.

Proposal 2 For the soft switch scenario, the overlap period is divided in 2N time slots, where N is informed in SIB19, and the UE-specific switch time is determined based on the N least significant bits of the UE’s C-RNTI.

Proposal 3 Introduce a new UE capability (with signaling) to indicate the support of deterministic switch time for the soft satellite switch with re-synchronization.

[R2-2400853](file:///C:\Data\3GPP\Extracts\R2-2400853%20DL%20sync%20PCI%20unchanged.docx) DL sync and switch time in Satellite switch with re-sync Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh-Core

[R2-2400123](file:///C:\Data\3GPP\Extracts\R2-2400123%20Remaining%20Issues%20on%20Satellite%20Switch%20with%20Re-sync.docx) Remaining Issues on Satellite Switch with Re-sync vivo discussion Rel-18 NR\_NTN\_enh-Core

Measurement related

* On inclusion of measurement results of new satellite

[H792] (marked as ToDo)

[R2-2400697](file:///C:\Data\3GPP\Extracts\R2-2400697%20%5bH792%5d%20Measurement%20results%20reporting%20for%20unchanged%20PCI%20cell.docx) [H792] Measurement results reporting for unchanged PCI cell Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Discuss where to include the measurement results of the unchanged PCI cell served by the incoming satellite:

- Option1: Included in neighbour cell measurement result list.

- Option2: Add a new IE for reporting unchanged PCI cell served by the incoming satellite.

Proposal 2: Adopt the TP in the Annex.

* We don’t introduce the support for configuring and reporting measurements on the target cell (from target satellite) in the soft switch case

[Q571] (marked as PropReject-Flagged)

[R2-2400852](file:///C:\Data\3GPP\Extracts\R2-2400852%20PDD%20and%20MR.docx) RIL Q571 and H792 on issue of serving satellite change Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1 Clarify that if PDD is immediately triggered after the satellite switch with resync and at least one PDD = 0, whether it should be reported or cancelled as the serving satellite has changed.

Proposal 2 After satellite switch with sync, the UE reports only the serving cell measurement associated with the new satellite.

- HW thinks we could wait to see if this would be useful for RAN4 discussion

* RAN2 understands that the NW is not expected to configure PDD reporting between serving and target satellites involved in the satellite switch
* On SMTC and PDD

[H790] (marked as PropReject-Flagged)

[H791] (marked as PropReject-Flagged)

[R2-2400699](file:///C:\Data\3GPP\Extracts\R2-2400699%20%5bH791%5d%20SMTC%20for%20measuring%20unchanged%20PCI%20cell.docx) [H791] SMTC for measuring unchanged PCI cell Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Indicate to the UE which SMTC of the smtc4list-r17 is for the unchanged PCI cell served by the incoming satellite:

- Option 1: use the index of SMTC

- Option 2: add a separate SMTC field, this SMTC is counted in the maximum supported SMTCs per frequency

Proposal 2: Adopt the TP in the Annex.

[R2-2400700](file:///C:\Data\3GPP\Extracts\R2-2400700%20%5bH790%5d%20Applicable%20events%20for%20unchanged%20PCI%20cell.docx) [H790] Applicable events for unchanged PCI cell Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: For soft satellite switching scenario in unchanged PCI mechanism, the unchanged PCI cell served by the incoming satellite can trigger event A4 as “neighbour cell”.

Proposal 2: For soft satellite switching scenario in unchanged PCI mechanism, for periodical reporting, the unchanged PCI cell served by the incoming satellite is considered as “neighbour cell”.

Proposal 3: Adopt the TP in the Annex.

[R2-2400937](file:///C:\Data\3GPP\Extracts\R2-2400937_Open%20issues%20on%20satellite%20switch%20with%20unchanged%20PCI_v0.doc) Open issues on satellite switch with unchanged PCI Apple discussion Rel-17 DUMMY

< Issue 1: about the condition for UE to initiate the satellite switch procedure >

Proposal 1: Clarify in spec the condition for RRC\_CONNECTED UE to initiate satellite switch procedure as follows:

- UE in RRC\_CONNECTED only initiates the satellite switch with re-synchronization procedure when AS security has been activated, and SRB2 with at least one DRB or multicast MRB are setup.

- QC thinks there is no dedicated signalling involved so there seems to be no issue. Oppo agrees

* P1 is not agreed.
* There is no need for the network to activate the use of the feature. If the UE supports satellite switch with re-sync it can perform it at any time during RRC Connected (up to UE implementation to use the information in broadcast signalling to switch to the new satellite in other states than RRC connected)

< Issue 2: about the network impact of satellite switch time >

Proposal 2: It’s up to network implementation to stop providing service to UE via source satellite’s link during the soft satellite switch.

< Issue 3: Measurement related issues >

< Issue 3-1: about the target satellite’s SSB provision>

Proposal 3: Clarify in RRC spec that the ssb-TimeOffset is to provide the Tx timing difference of the same SSB index between source and target satellite in network side.

Proposal 4: NW should provide the SSB index of target satellite for UE to acquire the DL sync in target satellite.

< Issue 3-2: about the UE operation on SMTC adjustment>

Proposal 5: Clarify that same PCI can be carried in more than one SMTC in SSB-MTC4List-r17 of the serving MO, to cover the measurement on source and target satellites with the same PCI.

Proposal 6: Introduce the association between the satellite and SMTC in SSB-MTC4List-r17 would be helpful for UE to perform measurement on different satellites.

Proposal 7: When the satellite switch procedure is initiated, UE uses the SMTC associated with the target satellite to perform the DL sync detection for target satellite.

Proposal 8: The PDD between source and target satellite shall be introduced, which is reported by UE upon the satellite switch procedure completion.

< Issue 3-3: about the RRM measurement during satellite switch>

Proposal 9: Confirm there is no measurement report initiated based on the measurements of both source and target satellite of the same serving cell.

Proposal 10: Confirm there is no measurement report initiated based on the measurement of target satellite before satellite switch procedure.

Proposal 11: Clarify that UE doesnot initiate the neighbor measurement during the satellite switch procedure if UE is not at the cell edge.

* ssbTimeOffset / SSB index

[H010] (marked as ToDo)

[O602] (marked as PropReject-Flagged)

[C603] (marked as PropAgree)

[R2-2400500](file:///C:\Data\3GPP\Extracts\R2-2400500%20Open%20Issues%20on%20the%20Satellite%20Switch%20with%20Resynchronization.docx) Open Issues on the Satellite Switch with Resynchronization Google Inc. discussion Rel-18

Proposal 1 Change the ntn-Config IE within the SatSwitchWithReSync IE from mandatory to optional. It is up to the network to ensure the presence of SatSwitchWithReSync in a satellite switch with resynchronization scenario.

Proposal 2 If proposal 1 is agreed, adopt the text proposal (1st and 2nd changes) in Section 3.

Proposal 3 The ssb-TimeOffset within the SatSwitchWithReSync IE indicates the time offset between the SSB from source and target satellite at the gNB (instead of at the UL time synchronization reference point).

- Oppo thinks this could align to other description but there is no real need to change this. QC agrees. CMCC agrees

- HW supports this proposal. CATT/ZTE also support

* We can come back to this in the next meeting

Proposal 4 If proposal 3 is agreed, adopt the text proposal (3rd change) in Section 3.

Proposal 5 RAN2 to discuss the necessity of providing the beam indication (e.g, TCI state or SSB index) prior to switching to the new satellite in a satellite switch with resynchronization procedure.

[R2-2400698](file:///C:\Data\3GPP\Extracts\R2-2400698%20%5bH010%5d%5bO602%5d%5bC603%5d%20Discussion%20on%20ssb-TimeOffset.docx) [H010][O602][C603] Discussion on ssb-TimeOffset Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Use smtc-TargetSat-r18 to replace ssb-TimeOffset-r18.

Proposal 2: Add the following sentence in the field description of t-ServiceStart: The reference point for t-Service is the uplink time synchronization reference point of the cell served by source satellite.

Proposal 3: Adopt the TP in the Annex.

[R2-2401007](file:///C:\Data\3GPP\Extracts\R2-2401007%20SSB%20time%20offset.doc) [O602] Discussion on unchanged PCI OPPO discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1 Dummify ssb-TimeOffset-r18.

[R2-2401393](file:///C:\Data\3GPP\Extracts\R2-2401393_Remaining%20issues%20on%20NR%20NTN%20Enhancements.docx) Remaining issues on NR NTN Enhancements Sequans Communications discussion Rel-18 NR\_NTN\_enh-Core

< Broadcast of new target satellite NTN-config >

Proposal 1: NTN-config in SatSwitchWithReSync should be optional

Proposal 2: Adding/updating/removing NTN-config in SatSwitchWithReSync doesn’t trigger a SI update procedure, it is up to UE to acquire the IE before the satellite switch

< Soft satellite switch with resynchronization procedure >

Proposal 3: Conditional to RAN4 answer, RAN2 should allow RRM from target satellite while still being connected to source satellite

Observation 1: As soon as cell is served by target satellite, all UEs (including IDLE UEs) should be able to sync and access the cell

Proposal 4: As a basic principle, a UE might access a cell as soon as it is served by the NW – this should be not be revisited

Proposal 5: In case of further concern on soft satellite switching operation, consider removing the feature from Rel-18

< ssb-TimeOffset definition >

Observation 2: Current definition is not clear as there are 2 different ULTSRPs in sat switching

Proposal 6: Revert ssb-TimeOffset definition to initial Sequans proposal, see TP in Annex

Proposal 7: If ssb-TimeOffset is ambiguous, use SNF0-boundary-TimeOffset

< Reference point for epoch time (RPepochTime) >

Observation 3: In Rel-17, neighbour/target epoch time is based respectively on serving/target cell frame timing

Observation 4: For new target NTN-config epoch time, both serving/target cell frame timings could be used

Proposal 8: For new target NTN-config epoch time, serving (i.e. before switch) cell frame timing is used

Proposal 9: Adopt epochTime TP in Annex

[R2-2401135](file:///C:\Data\3GPP\Extracts\R2-2401135%20Considerations%20on%20left%20issues%20on%20PCI%20unchanged.docx) Considerations on left issues on PCI unchanged CMCC discussion Rel-18 NR\_NTN\_enh-Core

Proposal1: It is proposed that ntn-Config in SatSwitchWithReSync should be mandatory as it is now in the spec. to avoid abnormal UE behaviour.

Proposal 2: It is proposed to include target SSB index in the SIB19 optionally for both soft and hard satellite switch.

Proposal 3: It is proposed to provide same SSB index for source and target satellite for hard switch and support different SSB index but not mandatory between source and target satellite for soft switch.

Observation 1: It is feasible that a UE supporting soft satellite switch can start synchronizing to the DL of the SpCell served by the target satellite while still being connected to the source satellite (without any simultaneous communication with the source and the target satellites).

Proposal 4: For soft satellite switch, it is feasible to support UE to perform the downlink synchronization with the target satellite and keep the communication with the source satellite of the same serving cell simultaneously.

Proposal 5: It is also fine to wait the feedback from RAN4 and RAN1 about the feasibility.

Proposal 6: Kindly suggest RAN2 to adopt the TP in the annex.

Provision of ntn-Config

[Z333] (marked as ToDo)

[R2-2400536](file:///C:\Data\3GPP\Extracts\R2-2400536%20Inclusion%20of%20NTN-Config%20for%20PCI%20unchanged.doc) Inclusion of NTN-Config for PCI unchanged ZTE Corporation, Sanechips discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: NTN-Config is optionally included in SatSwitchWithReSync.

- Google supports this

- HW thinks this information helps the UE to perform DL synchronization and prefers to leave it as it is

* P1 is not agreed

Proposal 2: When NTN-Config is not included in satelliteSwitchWithResync, UE re-acquire SIB19 at the time indicated by t-service or t-serviceStart, if provided.

Proposal 3: It is proposed that RAN2 discusses and agrees on the TPs provided in the Annex.

[R2-2400248](file:///C:\Data\3GPP\Extracts\R2-2400248%20Discussion%20on%20leftover%20issues%20of%20TS%2038.331.docx) Discussion on leftover open issues of TS 38.331 CATT discussion

Observation 1: The quasi-Earth fixed target cell may disappear suddenly during the on-going CHO being executed, if only CondEventD2 is evaluated for the CHO with combination of EMC and EFC.

Proposal 1: RAN2 to discuss how to take the service time of the EFC into consideration, if RAN2 decides to support condEventD2 for the combination of EMC and EFC.

Proposal 2: The ntn-Config within SatSwitchWithReSync is optionally present.

Proposal 3: The presence or update of ntn-Config within the SatSwitchWithReSync should neither result in system information change notifications nor in a modification of valueTag in SIB1. UE supporting the SatSwitchWithReSync should acquire the ntn-Config within SatSwitchWithReSync before the t-service based on UE implementation.

Proposal 4: Adopt the TP in Annex if Proposal 2 and 3 are agreeable.

[R2-2400481](file:///C:\Data\3GPP\Extracts\R2-2400481.docx) The remaining issues of satellite switch of re-sync TCL discussion

Proposal 1: For satellite switch with re-sync, ntn-Config provided in SIB19 as part of the IE SatSwitchWithReSync can be optionally included.

Proposal 2: The UE can obtain DL synchronization from the target satellite without losing UL synchronization to the source satellite.

Proposal 3: A different SSB index for the target satellite can optionally be provided.

[R2-2400809](file:///C:\Data\3GPP\Extracts\R2-2400809%20Issues%20on%20satellite%20switch%20with%20PCI%20unchanged%20and%20RIL%20S481.docx) Issues on satellite switch with PCI unchanged and RIL S481 Samsung discussion Rel-18 NR\_NTN\_enh-Core

Observation 1: For soft satellite switch, the target satellite can be one of the satellites providing neighbor cells in SIB19 and the ephemeris is already included in one NTN-NeighCellConfig.

Proposal 1: [Z333] ntn-Config is always present in SatSwitchWithReSync, in which ephemeris can be absent.

Proposal 2: Include an index in SatSwitchWithReSync pointing to the ephemeris of the neighbor cell in NTN-NeighCellConfig. Adopt the TP in the Appendix.

Observation 2: The application scenario of satellite switch with resync and unchanged PCI is that the target satellite starts to serve the serving cell’s coverage from the switch start time (t-ServiceStart, or t-Service), it may serve other area before t-ServiceStart. NW controls the PCI unchanged switch purely based on the location/timing, and RRM measurement is not needed.

Proposal 3: [H790, H791] RRM measurement events and SMTC for the serving cell of the target satellite are not considered in satellite switch with resync and unchanged PCI.

Observation 3: The neighbour cell information and t-Service that are not provided in SatSwitchWithReSync may change due to the change of satellite.

Proposal 4: [H062] UE acquires SIB19 after satellite switch with re-sync (at the end of the satellite switch with re-sync procedure, add the step of acquiring SIB19).

Proposal 5: [S481, H009] Add numberOfPUCCHforMsg4HARQACK-RepetitionsList and rsrp-ThresholdPUCCHforMsg4HARQACK for PDCCH repetition of Msg4 HARQ ACK, considering

Option 1: in SIB19 outside ntn-Config, applied for initial access only

Option 2: in SIB19 inside ntn-Config, applied for initial access and handover.

[R2-2401258](file:///C:\Data\3GPP\Extracts\R2-2401258.docx) Open issues on satellite switching with re-sync ITL discussion

Proposal 1: Acquire SIB19 after satellite switching with re-synchronization

Proposal 2: ntn-Config is mandatory included in SatSwitchwithReSync

Proposal 3: Perform DL synchronization to target satellite between t-ServiceStart and t-Service

Applicability to idle/inactive

[K003] (marked as ToDo)

[R2-2400892](file:///C:\Data\3GPP\Extracts\R2-2400892%20%5bK003%5d%20Discussion%20on%20satellite%20switch%20triggering.docx) [K003] Discussion on satellite switch triggering ASUSTeK discussion Rel-18 38.331 NR\_NTN\_enh-Core

Proposal 1: Adopt the TP as provided in K003 for satellite switch with resynchronization (limit to the RRC Connected case)

* It’s up to UE implementation to use the information in broadcast signalling to switch to the new satellite in other states than RRC connected

RACH-based/RACH-less

[H063] (marked as PropReject-Flagged)

[R2-2400195](file:///C:\Data\3GPP\Extracts\R2-2400195%20%5bH063%5d%20RACH-based%20satellite%20switching%20with%20re-sync.DOCX) [H063] RACH-based satellite switching with re-sync Huawei, HiSilicon, CATT, CMCC discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: The NW can inform UE whether it can initiate RACH autonomously during satellite switch with re-sync.

- LG thinks that allowing RACH would cause RACH congestion at t-service

- CATT supports this and thinks we cannot always rely on PDCCH order

- Google supports this

- Nokia also supports

- Samsung does not support this and thinks we already decided not to have it

- Ericsson thinks that RACH-less switch in satellite switch with resync is an integral part of the feature

- Inmarsat and SES think this is not needed

* CB next meeting to check whether to have a NW indication that UEs in RRC Connected mode need to perform RACH during satellite switch with re-sync

Proposal 2: Approve the TP in the Annex.

Proposal 3: RAN2 to discuss whether rachlessHandoverNTN-r18 is reused in the unchanged PCI case to indicate whether UE supports RACH-less, or a new capability is introduced.

* All UEs supporting satellite switch with resync shall be able to perform satellite switch with re-sync without RACH (this does not mean that a UE supporting satellite switch with resync needs to support RACH-less HO)

Proposal 4: If RACH is triggered by the UE or the network during satellite switching with re-sync, RAN2 discusses how to ensure the UE to apply the TA command received in RAR and corresponding handling of TAT.

Proposal 5: When unchanged PCI is configured, RAN2 discusses whether NW needs to indicate the UE that RACH is to be triggered by PDCCH order, and discuss (if needed) potential UE behaviour to ensure proper TAT handling and RAR TA command application.

[R2-2400855](file:///C:\Data\3GPP\Extracts\R2-2400855%20RACH-less%20satellite%20switch.docx) RACH-less satellite switch with resync Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1 No additional capability is required for UE to resume the UL operation without RACH, i.e., using the available UL resources in the new satellite.

SIB19 acquisition

[H062] (marked as PropAgree)

[R2-2400701](file:///C:\Data\3GPP\Extracts\R2-2400701%20%5bH062%5d%20SIB19%20acquisition%20after%20satellite%20switching.docx) [H062] SIB19 acquisition after satellite switching Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: UE acquires SIB19 of the target satellite after satellite switching with re-sync.

Proposal 2: Adopt the TP in the Annex.

T430 handling

[H015] (Marked as PropAgree)

[R2-2400992](file:///C:\Data\3GPP\Extracts\R2-2400992%20%5bH015%5d%20Start%20and%20stop%20condition%20of%20T430.docx) [H015] Start condition of T430 Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: During satellite switching without cell change, stop T430 for the source satellite and start T430 for the target satellite.

Proposal 2: Adopt the TP in the Annex.

* **To be discussed in [Post125][301]**

CHO configuration in satellite switching

[R2-2400703](file:///C:\Data\3GPP\Extracts\R2-2400703%20CHO%20configuration%20in%20satellite%20switch.docx) CHO configuration in satellite switching Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Introduce another NTN-config and the time of satellite switch in CHO configuration.

Proposal 2: Adopt the TP in the Annex.

Agreements:

1. For soft satellite switch, UE shall apply the acquired DL timing and start accessing the target satellite with related operations (e.g. restart T430, reset N\_TA, resume UL operations) not before t-Service
2. For soft satellite switch, UE shall start acquiring the DL synchronization information for the target satellite from t-ServiceStart, while maintaining the connection with source satellite.
3. We don’t introduce the support for configuring and reporting measurements on the target cell (from target satellite) in the soft switch case
4. RAN2 understands that the NW is not expected to configure PDD reporting between serving and target satellites involved in the satellite switch
5. There is no need for the network to activate the use of the satellite switch with re-sync feature. If the UE supports satellite switch with re-sync it can perform it at any time during RRC Connected (up to UE implementation to use the information in broadcast signalling to switch to the new satellite in other states than RRC connected)
6. All UEs supporting satellite switch with resync shall be able to perform satellite switch with re-sync without RACH (this does not mean that a UE supporting satellite switch with resync needs to support RACH-less HO)

Coverage Enhancements

[H009/S481] (Marked as ToDo)

[R2-2400309](file:///C:\Data\3GPP\Extracts\R2-2400309%20%5bH009%5d%20NTN.docx) [H009] NTN coverage enhancement implementation in RRC Huawei, HiSilicon discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: RAN2 to agree to the TP for the introduction of PUCCH repetition for Msg4 HARQ-ACK parameters in RRC from the Annex.

* **TP is endorsed (implying this is not applicable for HO) and considered in the CR review**

[R2-2400537](file:///C:\Data\3GPP\Extracts\R2-2400537%20Inclusion%20of%20Msg4%20ACK%20repetition%20parameters.doc) Inclusion of Msg4 ACK repetition parameters ZTE Corporation, Sanechips discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: SIB19 is used to signalled numberOfPUCCHforMsg4HARQACK-RepetitionsList and rsrp-ThresholdPUCCHforMsg4HARQACK as indicated in R2-2400031.

Proposal 2: Capture in a note in Table 6.2.1-2c of MAC specs that for UE capable of Msg4 HARQ-ACK repetition, it uses LCID codepoints corresponding to PUCCH repetition of Msg4 HARQ-ACK when rsrp-ThresholdPUCCHforMsg4HARQACK is not configured or when measured RSRP is lower than configured rsrp-ThresholdPUCCHforMsg4HARQACK.

Proposal 3: RAN2 discuss and agreed on TPs of P1 and P2 provided in Annexes.

RACH-less HO

[V507] (Marked as PropReject-Flagged)

[R2-2400124](file:///C:\Data\3GPP\Extracts\R2-2400124%20%5bV507%5d%20Clarification%20on%20RACH-less%20CG%20Periodicity.docx) [V507] Clarification on RACH-less CG Periodicity vivo discussion Rel-18 NR\_NTN\_enh-Core

Observation: For Rel-17 CG-SDT, only the CG periodicity of 5, 8, 10, 16, 20, 32, 40, 64, 80, 128, 160, 320, and 640 ms can be configured.

Proposal 1: RAN2 to clarify that the CG periodicity of 5, 8, 10, 16, 20, 32, 40, 64, 80, 128, 160, 320, and 640 ms can be configured for RACH-less case.

Proposal 2: RAN2 to adopt the text proposal in the Annex.

[C604] (Marked as PropReject-Flagged)

[C622] (Marked as PropReject-Flagged)

[R2-2400249](file:///C:\Data\3GPP\Extracts\R2-2400249%20%5bC604%5d%5bC622%5d%20On%20parameter%20applicability%20to%20CG%20RACH-less%20HO%20in%20NR%20NTN.docx) [C604] [C622] On parameter applicability to CG RACH-less HO in NR NTN CATT discussion

Proposal 1: Send LS to RAN1 to check whether the current parameters in CG-NTN-RACH-LessConfiguration-r18 are correctly specified (i.e. ntn-NRofDMRS-Sequences, ntn-DMRS-Port, ntn-SSB-PerCG-PUSCH, ntn-RSRP-ThresholdSSB and ntn-SSB-Subset).

* **Discuss in long [Post125][024] email discussion on remaining issues for RACH-less HO**

Proposal 2: Send LS to RAN1 to check the applicability of below parameters included in rrc-ConfiguredUplinkGrant for CG RACH-less HO in NTN: antennaPort, pathlossReferenceIndex, phy-PriorityIndex, srs-ResourceIndicator and precodingAndNumberOfLayers.

* **Discuss in long [Post125][024] email discussion on remaining issues for RACH-less HO**

Proposal 3: Adopt draft LS in Annex A, if Proposals 1-2 are agreeable.

Proposal 4: It should be clarified in the Spec that the network does not configure cg-RetransmissionTimer, harq-ProcID-Offset and uci-OnPUSCH for CG RACH-less HO in NR NTN.

Proposal 5: The value of ntn-cg-RACH-less-RetransmissionTimer should be (at least) extended as large as configuredGrantTimer in NR NTN.

Proposal 6: Adopt the TP in Annex B for RAN2 specific parameters, if Proposals 4 ~ 5 are agreeable.

[R2-2400869](file:///C:\Data\3GPP\Extracts\R2-2400869_Discussion%20on%20configuration%20of%20ntn-cg-RACH-less-RetransmissionTimer.DOCX) Discussion on configuration of ntn-cg-RACH-less-RetransmissionTimer LG Electronics Inc. discussion NR\_NTN\_enh-Core

Observation 1. If the cg-RACH-less-RetransmissionTimer is larger than the HARQ-RTT-TimerUL-NTN, it would cause the delay of the RACH-less handover completion.

Proposal 1. In RRC specification, capture the restriction on that the cg-RACH-less-RetransmissionTimer is always shorter than the HARQ-RTT-TimerUL-NTN.

NT/NTN mobility

[O600] (Marked as PropReject-Flagged)

[R2-2401005](file:///C:\Data\3GPP\Extracts\R2-2401005%20TN%20broadcasting%20NTN%20info.doc) [O600] Discusssion on TN cell broadcasting NTN info OPPO discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1 The field description of epochTime is corrected as…

* **Come back in the next meeting**

[R2-2400501](file:///C:\Data\3GPP\Extracts\R2-2400501%20Provision%20of%20the%20TN%20PLMN%20ID%20in%20an%20NTN%20Cell.docx) Provision of the TN PLMN ID in an NTN Cell Google Inc. discussion Rel-18

Observation 1 An NTN cell of an NTN-specific PLMN may support the UEs registered to different TN operators, and hence may broadcast the information of the TN frequencies used by different TN operators in SIB4/5.

Observation 2 The UE camping on an NTN cell may scan and measure the TN frequencies used by a TN operator that the UE is not registered to, which results in unnecessary UE power consumption.

Proposal 1 The PLMN ID(s) of a TN frequency can be provided by an NTN cell in SIB4/5.

Proposal 2 If proposal 1 is agreed, adopt the text proposal in Section 3.

### 7.7.4 MAC corrections

PUCCH repetitions

[R2-2400125](file:///C:\Data\3GPP\Extracts\R2-2400125%20Remaining%20Issues%20on%20PUCCH%20Repetition.docx) Remaining Issues on PUCCH Repetition vivo discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: RAN2 agrees to capture procedural text for indicating the capability of PUCCH repetition for Msg4 HARQ-ACK in the MAC spec.

- ZTE thinks this could be covered by a note. Nokia agrees. IDC agrees

* RAN2 agrees to capture some text for indicating the capability of PUCCH repetition for Msg4 HARQ-ACK in the MAC spec. Discuss the details in Post meeting email discussion [Post125][302]

Proposal 2: UE reports the capability of PUCCH repetition for Msg4 HARQ-ACK when the RSRP of the downlink pathloss reference is lower than the corresponding RSRP threshold.

* Discuss the details in [Post125][302]

Proposal 3: UE reports the capability of PUCCH repetition for Msg4 HARQ-ACK when numberOfPUCCHforMsg4HARQACK-RepetitionsList is configured but the corresponding RSRP threshold is not configured.

Proposal 4: RAN2 to adopt the text proposal in the Annex.

RACH-less HO

[R2-2400881](file:///C:\Data\3GPP\Extracts\R2-2400881%20Discussion%20on%20corrections%20for%20RACH-less%20handover%20without%20retransmission%20timer.docx) Discussion on corrections for RACH-less handover without retransmission timer NEC discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Delete the description “3>if there is an on-going RACH-less handover procedure and PDCCH addressed to the MAC entity's C-RNTI has been received; or” in case the cg-RACH-less-RetransmissionTimer is not configured for RACH-less handover.

Proposal 2: For RACH-less handover, specify the UE behavior for initial transmission of first PUSCH in case of cg-RACH-less-RetransmissionTimer is not configured, i.e., add the description “if there is an on-going RACH-less handover procedure and the configured uplink grant is for the initial transmission of RACH-less handover” in section 5.4.1 of TS 38.321.

Proposal 3: RAN2 to agree the TP in annex 4 to capture the proposal 1 and proposal 2 for RACH-less handover without cg-RACH-less-retransmission timer is configured.

- IDC thinks that this section of the spec will be impacted by the discussion to make RACH-less HO a generic feature and we could postpone this to the next meeting

* Postponed to the next meeting

[R2-2400803](file:///C:\Data\3GPP\Extracts\R2-2400803%20(R18%20NR%20NTN%20WI%20AI%207.7.4)%20MAC.docx) MAC corrections for NTN InterDigital discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: RAN2 discuss the following options regarding clarification of when MAC considers the RACH-less handover procedure to be “ongoing”:

Option 1: No change is needed, current specification is clear.

Option 2: Introduce explicit procedural text like the RACH-less LTM Cell Switch procedure.

Option 3: Add a clarifying note.

- LG supports option 2

- vivo thinks option 1 is sufficient

* Discuss in [Post125][302]

Proposal 2: If RAN2 agrees to introduce explicit procedural, the Text Proposal in the Annex is considered as baseline.

[R2-2400871](file:///C:\Data\3GPP\Extracts\R2-2400871_Indication%20for%20HARQ%20feedback%20for%20RACH-less%20handover.DOCX) Indication for HARQ feedback for RACH-less handover LG Electronics Inc. discussion NR\_NTN\_enh-Core

Observation 1. The network determines whether the RACH-less handover is completed or not based on the HARQ feedback of the downlink assignment for the new transmission.

Observation 2. The handover failure may happen if the downlink assignment for new transmission is transmitted using HARQ process with the HARQ feedback disabled for RACH-less handover completion.

Proposal 1. For the RACH-less handover completion, whether to use a HARQ process with HARQ feedback disabled or enabled for the downlink assignment of the new transmission is up to network implementation.

Observation 3. According to the current specification, the UE transmits the HARQ feedback for the HARQ process with HARQ feedback disabled for the first transmission after activation of the configured downlink assignment.

Proposal 2. During RACH-less handover, the UE transmits the HARQ feedback for a downlink assignment of a new transmission using HARQ process with HARQ feedback disabled after transmitting the first uplink transmission.

[R2-2400939](file:///C:\Data\3GPP\Extracts\R2-2400939_Clarification%20on%20UE%20operation%20upon%20TATimer%20expiry%20during%20RACH-less%20HO_v0.doc) Clarification on UE operation upon TATimer expiry during RACH-less HO Apple discussion Rel-17 DUMMY

Observation 1: TATimer expiry is very likely to occur during the NTN RACH-less HO.

Observation 2: In legacy TATimer operation, UE will release UE dedicated SRS and PUCCH configuration upon TATimer expiry.

Observation 3: The UE dedicated SRS and PUCCH configuration are configured but not applied during RACH-less HO.

Observation 4: The UE dedicated SRS and PUCCH configuration are only applied when HO is successful, regardless of RACH-less HO or RACH-based HO.

Observation 5: Releasing the UE dedicated RRC configuration upon TATimer expiry during RACH-less HO will introduce more RRC signaling burden.

Proposal 1: Clarify that UE shall not release UE dedicated RRC configuration (i.e. SR and PUCCH configuration) of target cell upon TATimer expiry during RACH-less HO.

Proposal 2: Capture the proposal 1 in MAC or RRC spec as indicated in the proposed TP.

[R2-2400882](file:///C:\Data\3GPP\Extracts\R2-2400882%20Discussion%20on%20remaining%20issues%20of%20RACH-less%20handover%20for%20NTN.docx) Discussion on remaining issues of RACH-less handover for NTN NEC discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1: Fix the RV to be 0 for both the initial transmission and its retransmission with configured grant for RACH-less handover.

Proposal 2: During the RACH-less handover procedure, if the configured grant is configured, reuse the rsrp-ThresholdSSB-SUL for carrier selection.

Proposal 3: RAN2 to agree the TP to capture the carrier selection procedure for RACH-less handover.

Satellite switch with re-sync

[R2-2400810](file:///C:\Data\3GPP\Extracts\R2-2400810%20MAC%20remaining%20issues.docx) Corrections on NTN MAC issues Samsung discussion Rel-18 NR\_NTN\_enh-Core

Observation 1: For both soft and hard switch procedure, NW does not know when exactly UE has completed the switch, whether the switch is successful, or when to start to schedule UE from the new satellite.

Observation 2: NW should be aware of UE’s intra-cell inter-satellite mobility for NW control in RRC\_CONNECTED.

Proposal 1: UE reports in MAC the completion of satellite switch with resync and unchanged PCI.

Proposal 2: If indication of uplink synchronization is received after indication of uplink synchronization loss due to satellite switch with re-synchronization, TA report is triggered.

Proposal 3: If indication of uplink synchronization is received after indication of uplink synchronization loss due to satellite switch with re-synchronization, and the UE has not reported Timing Advance value after satellite switch with re-synchronization, SR is triggered if there is no UL grant for the triggered TAR.

Proposal 4: If P2 and P3 are agreed, adopt the TP in the Appendix.

* P1~P4 to be discussed in [Post125][302]

Proposal 5: add “consider the RACH-less HO procedure to be ongoing” after PTAG start in clause 5.2. Adopt the TP.

Proposal 6: For CG-based RACH-less HO procedure in clause 5.8.2, replace " when RACH-less handover is triggered and not terminated " by “when there is an on-going RACH-less HO procedure”.

Observation 3: The current procedure, that RACH is triggered whenever one configured uplink grant for RACH-less HO is not valid, is not correct.

Proposal 7: Add the condition for RACH initiation when no CG is valid for RACH-less HO: if no SSB configured for cg-NTN-RACH-Less-Configuration with SS-RSRP above ntn-RSRP-ThresholdSSB is available, initiate RACH.

Proposal 8: Adopt the TP in Appendix for P6 and P7.

[R2-2401281](file:///C:\Data\3GPP\Extracts\R2-2401281%20Discussion%20on%20MAC%20behaviours%20related%20to%20RACH-less%20HO%20and%20unchanged%20PCI.DOCX) Discussion on MAC behaviours related to RACH-less HO and unchanged PCI Huawei, HiSilicon discussion Rel-18 LTE\_NBIOT\_eMTC\_NTN

Proposal 1: If ntn-cg-RACH-less-RetransmissionTimer is configured, retransmission for the initial CG-based RACH-less transmission with the same HARQ process may be performed on any configured grant configuration if the configured grant configurations have the same TBS.

Proposal 2: In the unchanged PCI case, UE doesn’t flush the HARQ buffers.

* P2 to be discussed in [Post125][302]
* [Post125][302][NR-NTN Enh] 38.321 CR (Interdigital)

Scope: draft a MAC CR for other aspects than RACH-less HO, with meeting agreements/based on discussion on aspects marked for post meeting discussion

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401590): short

R2-2401590 Corrections to R18 NR NTN Interdigital CR Rel-18 38.321 18.0.0 XXXX - F NR\_NTN\_enh-Core

### 7.7.5 Corrections to other specs

Corrections to other affected specs, including corrections on UE capabilities

Corrections on issues affecting multiple Stage 3 specs (e.g. RRC and MAC) can also be submitted here

[Q638] (Marked as ToDo)

[R2-2400854](file:///C:\Data\3GPP\Extracts\R2-2400854%20FR2%20in%20NTN.docx) RIL Q638 on FR2 in NTN Qualcomm Incorporated discussion Rel-18 NR\_NTN\_enh-Core

Proposal 1 Remove the “FR1” restriction from the field description of Kmac.

* Agreed

Proposal 2 Remove the “FR1” restriction from the description of Timing Advance field of the Timing Advance MAC CE.

- Samsung thinks the intention was not to restrict to FR1 But to have a specific description for FR1

- ZTE thinks we cannot remove the reference to FR1 without asking RAN1

- Ericsson supports the proposals

* Agreed

[R2-2401000](file:///C:\Data\3GPP\Extracts\R2-2401000%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

Proposal 1 From NTN WI point of view, there is no need to introduce separate UE capability for CCCH/CCCH1 LCID extension. If a UE supports PUCCH repetition for Msg4 HARQ-ACK, it implies the UE supports CCCH/CCCH1 LCID extension as well.

[R2-2400587](file:///C:\Data\3GPP\Extracts\R2-2400587%20Discussion%20on%20the%20measurement%20rules%20for%20cell%20re-selection.docx) Discussion on the measurement rules for cell re-selection ETRI discussion Rel-18 NR\_NTN\_enh-Core

[R2-2401404](file:///C:\Data\3GPP\Extracts\R2-2401404%20-%20Remaining%20issue%20on%20VSAT%20UEs.docx) Remaining issue on VSAT UEs Ericsson discussion Rel-18 NR\_NTN\_enh-Core

[R2-2401409](file:///C:\Data\3GPP\Extracts\R2-2401409%20-%20Remaining%20issue%20on%20switch%20procedure%20for%20satellite%20switch%20with%20re-sync.docx) Remaining issue on switch procedure for satellite switch with re-sync Ericsson discussion Rel-18 NR\_NTN\_enh-Core

# Summary

Agreed CRs

NR-NTN

[R2-2401588](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401588.zip) Minor correction for NTN in 38.304 ZTE Corporation, Sanechips CR Rel-17 38.304 17.7.0 0377 1 F NR\_NTN\_solutions-Core

[R2-2401586](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401586.zip) Correction to 38.331 for NR NTN OPPO, Google, Ericsson CR Rel-17 38.331 17.7.0 4581 1 F NR\_NTN\_solutions-Core

[R2-2401979](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401979.zip) Correction to 38.331 for NR NTN OPPO, Google, Ericsson CR Rel-17 38.331 18.0.0 4582 2 A NR\_NTN\_solutions-Core

[R2-2401922](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401922.zip) Corrections on usage of LEO, GEO, GSO and NGSO MediaTek Inc., Nokia, Nokia Shanghai Bell, Intel (Rapporteur) CR Rel-17 38.306 17.7.0 1042 1 F NR\_NTN\_solutions-Core

[R2-2401923](file:///C:\Data\3GPP\RAN2\Inbox\R2-2401923.zip) Corrections on usage of LEO, GEO, GSO and NGSO MediaTek Inc., Nokia, Nokia Shanghai Bell, Intel (Rapporteur) CR Rel-18 38.306 18.0.0 1043 - A NR\_NTN\_solutions-Core

IoT-NTN

None

NR-NTN Enh

R2-2401599 Stage 2 corrections for NR NTN Thales, … CR Rel-18 38.300 18.0.0 XXXX - F NR\_NTN\_enh-Core

IoT-NTN Enh

None

Approved LSs out

None

[Post125] Email discussions

Short

* [Post125][301][NR-NTN Enh] 38.331 CR (Ericsson)

Scope: update the RRC CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401589): short

* [Post125][302][NR-NTN Enh] 38.321 CR (Interdigital)

Scope: draft a MAC CR for other aspects than RACH-less HO, with meeting agreements/based on discussion on aspects marked for post meeting discussion

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401590): short

* [Post125][303][NR-NTN Enh] 38.304 CR (ZTE)

Scope: update the 38.304 CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401591): short

* [Post125][304][NR-NTN Enh] 37.355 CR (CATT)

Scope: update the 37.355 CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401592): short

* [Post125][305][NR-NTN Enh] UE Caps CRs (Intel)

Scope: draft CRs with meeting agreements

Intended outcome: Endorsed CRs

Deadline for agreed CR (in R2-2401593 and R2-2401594): very short

* [Post125][306][IoT-NTN Enh] 36.331 CR (Huawei)

Scope: update the RRC CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401595): short

* [Post125][307][NR-NTN Enh] 36.321 CR (Mediatek)

Scope: draft a MAC CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401596): short

* [Post125][308][IoT-NTN Enh] 36.304 CR (Nokia)

Scope: update the 36.304 CR based on input papers at RAN#125

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401597): short

* [Post125][309][IoT-NTN Enh] 36.306 CR (Qualcomm)

Scope: Draft a 36.306 CR based on input papers at RAN#125

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401598): short

* [Post125][310][IoT-NTN Enh] Stage 2 CR (Ericsson)

Scope: Update the Stage 2 CR with meeting agreements

Intended outcome: Agreed CR

Deadline for agreed CR (in R2-2401584): short