3GPP TSG-RAN WG2 Meeting #131 R2-2506203

Bangalore, India, Aug 25th – 29th , 2025

**Agenda item: 9.3**

**Source: Session Chair (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:

* [AT131][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** | | | | |
| 09:00 – 10:30 | **[1], [2], [3],**  **[7.0] R18 common (Diana)**  [7.0.1] UE capabilities  **[8.0] NR19 General**  **Break out**  **@NR151617 UP (Diana)**  **[8.19] TEI19 Mobility related papers**  **[7.0.2] Other Rel-18 corrections cont** | Breakout to start after completion of 7.0.1 and ASN.1 discussion  **[7.0.2.20] NR18 SL (Kyeongin)**  **[8.5] NR19 NES(if NR18 SL ends early) (Kyeongin)** | Breakout to start after completion of 7.0.1 and ASN.1 discussion  **NRLTE151617 Pos (Nathan)**  [4.3] LTE positioning  [5.3] NR Rel-16 and earlier  [6.3] NR Rel-17  **[7.0.2.21] NR18 Pos (Nathan)**  **[6.1] NR17 relay documents if any (Nathan) [7.0.2.19] NR18 SL Relay (Nathan)**  **[8.13] NR19 SL Relay (Nathan) (if time allows)** |  |
| 11:00 – 13:00 |
| 14:30 -16:30 | **[7.0.2] Other Rel-18 corrections cont**  **NES**  **[7.0.2.11] NR TEI18**  **[7.8] Other Rel-18 corrections**  **[8.19] TEI19 cont** | **[7.0.2.22] NR18 Mob (Kyeongin)** | **[8.4] NR19 LP-WUS [1] (Erlin)**  **@15:30 [7.0.2.13] NR18 MIMO (Erlin)**  **[8.12] NR19 MIMO [0.75](Erlin)** |
| 17:00– 19:00 | **[8.2] NR19 Ambient IoT [2.5] (Diana)** | **[7.0.2.22] NR18 Mob continued if needed** (**Kyeongin)**  **[8.6] NR19 Mob (if NR18 Mob ends early) (Kyeongin)** | **[8.12] NR19 MIMO (Erlin) con’t**  **@18:00 [8.20] NR Others** |
| **Tuesday** | | | | |
| 08:30 – 10:30 | **[8.6] NR19 Mob [2] (Kyeongin)** | **[8.7] NR19 XR [2] (Dawid)** | **[8.13] NR19 SL Relay (Nathan)** |  |
| 11:00 – 13:00 | **[8.1] NR19 AI/ML PHY [2.5] (Diana)** | **NR18 NTN NR /IoT(Sergio)**  [4.1] R17 IoT NTN corrections  [6.1.1], [6.1.3] R17 NTN corrections  [7.0.2.17] R18 NR NTN corrections  [7.0.2.18] R18 IoT NTN corrections  **[8.9] NR19 IoT NTN [1] Sergio**  [8.9.1] Organizational (only R2-2505026, R2-2505201 and R2-2505555)  [8.9.3] Uplink Capacity Enhancements | **EUTRA&NR151617 (Mattias)**  Except NR17 NTN related Tdoc, which will be handled in Sergio´s session.  [4.1]  [5.1.1], [5.1.3.1], [5.1.3.2], [5.1.3.3]  [6.1.1], [6.1.3], [6.1.3.1], [6.1.3.2], [6.1.3.3] |  |
| 14:30 -16:30 | **[8.2] NR19 Ambient IoT [2] (Diana)** | **[8.8] NR19 NR NTN (Sergio) [2]**  [8.8.1] Organizational  [8.8.2] Downlink coverage enhancements | **[8.18] EUTRA MBS (Dawid) [0.25]**  **[7.0.2.11] NR18 SON/MDT (Mattias)**  **[8.10] NR19 SONMDT [0.5] (Mattias)**  **[8.10.1], [8.10.2], [8.10.3]** |  |
| 17:00– 19:00 | **[8.3] NR19 AI/ML Mobility [2] (Diana)** | **[8.4] NR19 LP-WUS [1] (Erlin)** | **[8.10] NR19 SONMDT [0.5] (Mattias) con’t (if needed)**  **Offline for AI-IoT** |  |
| **Wednesday** | | | | |
| 08:30 – 10:30 | **[8.6] NR19 Mob [2] (Kyeongin)** | **[8.7] NR19 XR [2] (Dawid)** | **Offline slot**  **@9:00 [8.20] NR19 NR Other (Erlin)** |  |
| 11:00 – 13:00 | **[8.3] NR19 AI/ML Mobility [2] (Diana)** | **[8.5] NR19 Network Energy Saving [1] (Kyeongin)** | **[8.11] NR19 SBFD [0.75] (Erlin)** |  |
| 14:30 -16:30 | **[8.1] NR19 AI/ML PHY [2.5] (Diana)** | **[8.9] NR19 IoT NTN [1] Sergio**  [8.9.1] Organizational (cont)  [8.9.3] Uplink Capacity Enhancements (cont)  [8.9.2] Support of S&F | **[6.1][7.0.2.19] NR1718 SL relay CB (Nathan)**  **[8.13] NR19 SL relay (Nathan)** |  |
|  |
| 17:00 – 19:00 | **@17:00-18:30 AI/ML PHY cont**  **[8.18] TEI19 if needed** | **[8.17] R19 IoT NTN TDD mode [0.5]**  **[8.19.1] TEI19 RAN2-led (NTN related aspects)**  - including outcome of [301] | **[8.15] NR19 NavIC**  **[7.0.2.21] NR18 Pos (Nathan) and TEI19 positioning** |  |
|  |
| **Thursday** | | | | |
| **Colourful Polo day** | | | | |
| 08:30 – 10:30 | **@9:00 [8.1] NR19 AI/ML PHY [2.5] (Diana) CB time if need** | **[4.1] R17 IoT NTN corrections**  - issue marked CB Thursday  **[7.0.2.18] R18 IoT NTN**  - issues marked CB Thursday  **[8.9] R19 IoT NTN CB**  [8.9.3] Uplink Capacity Enhancements (cont)  - outcome of [302]  [8.9.2] Support of S&F (cont)  [8.9.4] Support of PWS  **[8.17] R19 IoT NTN TDD mode**  - issues marked CB Thursday | CB Nathan  **[7.0.2.21] NR18 Positioning**  **[7.0.2.19] NR18 SL relay**  **[8.13] NR19 SL relay** |  |
|  |
| 11:00 – 13:00 | **[8.2] NR19 Ambient IoT [2.5] (Diana)** | [**6.1.3.1] R17 NTN corrections**  - issues marked CB Thursday  **[7.0.2.17] NR18 NR NTN**  - issues marked CB Thursday  **[[8.8] NR19 NR NTN [2] (Sergio)**  [8.8.2] Downlink coverage enhancements (cont)  - including outcome of [303] and [304]  [8.8.4] Support of Broadcast service | **CB Mattias**  **CB EUTRA&NR151617 (Mattias)**  **[8.10] CB SON/MDT R19** |  |
| 14:30 -16:30 | **@14:30-15:30 CB AIoT (if needed)**  **@15:30-16:30 CB** **NR19 AI/ML Mobility (if needed)** | **[7.0.2.20] CB NR18 SL** **(Kyeongin)**  **[8.5] CB NR19 NES (Kyeongin)** | CB Erlin  **[8.4] NR19 LP-WUS (Erlin) CBs/Continuation** |  |
|  |
| 17:00 – 19:00 | **CB NR 18 and TEI19 Diana** | **[7.0.2.22] CB NR18 Mob (Kyeongin)**  **[8.6] CB NR19 Mob (Kyeongin)** | CB Dawid:  **[8.7] NR19 XR CB/continuation** |  |
| **Friday** | | | | |
| 08:30 – 10:30 | CB Diana TBD  **@9:30-10:30 CB Ambient IoT** | **CB Sergio (from 9:00)**  [**6.1.3.1] R17 NTN corrections**  - CRs marked CB Friday  **[7.0.2.18] R18 IoT NTN**  - CRs marked CB Friday  **[8.8] NR19 NR NTN**  [8.8.2] Downlink coverage enhancements  - outcome of [304]  - issues marked CB Friday  [8.8.6] LTE to NR NTN mobility  [8.8.3] Uplink Capacity/Throughput Enhancement  [8.8.5] Support of regenerative payload  [8.8.4] Support of Broadcast service  - issue marked CB Friday  **[8.19.1] TEI19 RAN2-led (NTN related aspects)**  - CRs marked CB Friday  **[8.9] NR19 IoT NTN [1] Sergio**  [8.9.4] Support of PWS  [8.9.3] Uplink Capacity Enhancements  - outcome of [302]  - issues marked CB Friday  [8.9.2] Support of S&F  - outcome of [305] | CB Erlin NR19 MIMO  CB NR19 SBFD, NR19 Others |  |
| 11:00 – 13:00 | CB Diana  @11-12 R19 Ambient IoT  Other CBs  Reports from breakout sessions  EoM |  |  |
| 14:30 – 16:00 |  |  |  |
| 16:00 – 17:00 |  |  |  |  |

**Breaks**

Morning coffee: 10:30 to 11:00

Lunch: 13:00 to 14:30

Afternoon coffee: 16:30 to 17:00

List and details of [AT131] offline discussions

NOTE: No offline email discussions will be kicked off before Monday Aug 25th, 09:00 local time

* [AT131][301][TEI19] NTN related TEI19 (Samsung)

Scope: collect views on the NTN related TEI19 proposals (apart from [EUTRAN-to-NBIoTNTN] which is already endorsed), with the intention to prioritize the most important ones / merge / simplify the proposals

Intended outcome: summary of the offline discussion (in R2-2506271)

Offline time: Monday 2025-08-25 afternoon coffee break in room offline 1 (Amaryllis+Petunia)

Deadline for offline discussion summary: Wednesday 2025-08-27 14:00

* [AT131][302][R19 IoT NTN] UL enhancements (Mediatek)

Scope: continue the discussion on the CB-RNTI formula and on the details of the power ramping.

Intended outcome: summary of the offline discussion (in R2-2506278)

Offline time: Wednesday 12:00-12:30 in BO3

Deadline for offline discussion summary: Thursday 2025-08-28 08:00

Scope: continue the discussion on selected proposals for discussion in 8.9.3 that could not be treated online

Intended outcome: summary of the offline discussion (in R2-2506292)

Offline time: Thursday 2025-08-28 15:30:16:00 in BO3

Deadline for offline discussion summary: Friday 2025-08-29 08:00

* [AT131][303][R19 NR NTN] Two SMTC periodicities (Xiaomi)

Scope: continue the discussion on whether to support configuring two different SMTC periodicities (with different offsets) for SMTCs in one frequency, based on the RAN2 assumptions

Intended outcome: summary of the offline discussion (in R2-2506280)

Offline time: Wednesday morning coffee break in BO1

Deadline for offline discussion summary: Wednesday 2025-08-27 14:00

* [AT131][304][R19 NR NTN] UE assisted SMTC selection in connected (Ericsson)

Scope: continue the discussion on Alt1b and Alt2 for UE assisted SMTC selection in connected mode

Intended outcome: summary of the offline discussion (in R2-2506281)

Offline time: Wednesday afternoon coffee break in BO1

Deadline for offline discussion summary: Wednesday 2025-08-27 18:00

Scope: continue the discussion on the remaining FFS: content of the UE assistance information (e.g. index/indices of preferred SMTCs or closest/best reference location(s)) and whether in connected mode the NW can only configure up to 4 STMCs

Intended outcome: summary of the offline discussion (in R2-2506291)

Offline time: Thursday 2025-08-28 15:00:15:30 in BO3

Deadline for offline discussion summary: Friday 2025-08-29 08:00

* [AT131][305][R19 IoT NTN] S&F open issues (Sateliot)

Scope: continue the discussion on remaining proposals from [R2-2506152](file:///C:\Data\3GPP\Extracts\R2-2506152%20-%20On%20Satellite%20ID%20aspects%20for%20S&F.docx) and p1 and [R2-2505437](file:///C:\Data\3GPP\Extracts\R2-2505437%20Further%20consideration%20on%20Store%20and%20Forward.docx). Also draft the LS to CT1, SA2

Intended outcome: summary of the offline discussion (in R2-2506288). Draft LS in R2-2507285

Offline time: Thursday 2025-08-28 16:30:16:30 in BO3

Deadline for offline discussion summary: Friday 2025-08-29 18:00

## 4.1 EUTRA corrections Rel-17 and earlier

(LTE\_NBIOT\_eMTC\_NTN; leading WG: RAN1; REL-17; WID: [RP-211601](file:///C:\Data\3GPP\archive\RAN\RAN%2392\Tdocs\RP-211601.zip))

[R2-2505881](file:///C:\Data\3GPP\Extracts\R2-2505881%2036.331(R17)_Clarification%20on%20UTC%20time%20offset%20in%20IoT%20NTN.docx) Clarification on UTC time offset in IoT NTN ZTE Corporation, Sanechips CR Rel-17 36.331 17.13.0 5145 - F LTE\_NBIOT\_eMTC\_NTN-Core

* Xiaomi thinks this CR is similar to a previous one from Nordic and we could have the same approach
* MTK support the principle but legacy UEs can cannot support the change and then the NW ha sto cope with that. Could accept a R19 correction
* Nokia thinks the issue is valid but not a strong view on how to address this

[R2-2505886](file:///C:\Data\3GPP\Extracts\R2-2505886%2036.331(R18)_Clarification%20on%20UTC%20time%20offset%20in%20IoT%20NTN.docx) Clarification on UTC time offset in IoT NTN ZTE Corporation, Sanechips CR Rel-18 36.331 18.6.0 5146 - A LTE\_NBIOT\_eMTC\_NTN-Core

* Revised in R2-2506282

[R2-2506282](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506282.zip) Clarification on UTC time offset in IoT NTN ZTE Corporation, Sanechips CR Rel-18 36.331 18.6.0 5146 1 F LTE\_NBIOT\_eMTC\_NTN-Core

* Ericsson thinks we could have a Rel-17 CR
* MTK thinks that there are already UEs in the NW and then prefer to have a Rel18 CR with a note on the early implementation
* Revised in R2-2506283 to add a TEI18 in the coversheet

[R2-2506282](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506282.zip) Clarification on UTC time offset in IoT NTN ZTE Corporation, Sanechips CR Rel-18 36.331 18.6.0 5146 1 F LTE\_NBIOT\_eMTC\_NTN-Core, TEI18

* Agreed (unseen)

## 6.1 Common

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

### 6.1.1 Stage 2 and Organisational

Incoming LSs, etc. You should discuss your stage 2 CRs with the specification rapporteurs before submission. Includes impact to 38.300, 37.340, (36.300 if applicable)

[R2-2505037](file:///C:\Data\3GPP\Extracts\R2-2505037_R3-253867.doc) Reply LS on stage 1 requirements to support PWS over satellite NG-RAN in Rel-17 (R3-253867; contact: Ericsson) RAN3 LS in Rel-17 NR\_NTN\_solutions-Core, LTE\_NBIOT\_eMTC\_NTN-Core To:SA1, CT1, RAN2 Cc:SA2, CT4, RAN, SA

* Noted

[R2-2505053](file:///C:\Data\3GPP\Extracts\R2-2505053_RP-251859.docx) Reply LS from RAN on removal of support of PWS over satellite NG-RAN in Rel-17 and 18 (RP-251859; contact: Aalyria) RAN LS in Rel-17 NR\_NTN\_solutions-Core, LTE\_NBIOT\_eMTC\_NTN-Core To:CT1, SA1, CT, SA, RAN3, RAN2 Cc:SA2, CT4

* Noted

[R2-2505826](file:///C:\Data\3GPP\Extracts\R2-2505826%20-%20Support%20for%20PWS%20in%20NTN.docx) Support for PWS in NTN Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1 RAN2 should wait for CT1 decision before taking any further action.

* RAN2 waits for CT1 decision before taking any further action on PWS support over NR NTN in Rel-17 an Rel-18

### 6.1.2 User Plane corrections

User Plane Related aspects will be handled in the User Plane break out session. (exception: TEI new proposals if any).

### 6.1.3 Control Plane corrections

#### 6.1.3.1 NR RRC

Corrections to 38331, and related change to other TS if applicable, except UE caps.

[R2-2505841](C:\\Data\\3GPP\\Extracts\\R2-2505841 discussion on eventD1D2 and condEventD1D2T1.docx" \o "C:\Data\3GPP\Extracts\R2-2505841 discussion on eventD1D2 and condEventD1D2T1.docx) Discussion on eventD1/D2 and condEventD1/D2/T1 Samsung, ASUSTek, CATT, Ericsson, Nokia, Huawei, Apple, Xiaomi, ZTE Corporation, vivo discussion Rel-17 NR\_NTN\_solutions, NR\_NTN\_enh-Core

Proposal 1: RAN2 clarifies for measId configured with only eventD1/D2 for neighbor cells, UE does not need to perform RRM measurement or report result for neighbor cells in the report of the measId.

* RAN2 clarifies for measId configured with only eventD1/D2 for neighbor cells, UE does not need to perform RRM measurement or report result for neighbor cells in the report of the measId.

Proposal 2: For CHO, RAN2 clarifies UE does not need to perform RRM measurements for a measId configured with condEventD1/D2/T1 when evaluating condEventD1/D2/T1. This does not preclude the UE from detecting based on the associated measObject the applicable cell which has a physical cell identity matching the value in reconfigurationWithSync when evaluating condEventD1/D2/T1 for CHO with only condEventD1/D2/T1.

* For CHO, RAN2 clarifies UE does not need to perform RRM measurements for a measId configured with condEventD1/D2/T1 when evaluating condEventD1/D2/T1. This does not preclude the UE from detecting based on the associated measObject the applicable cell which has a physical cell identity matching the value in reconfigurationWithSync when evaluating condEventD1/D2/T1 for CHO with only condEventD1/D2/T1.

Proposal 3: FFS the specification impact of Proposal 1 and 2 (e.g., no change, a NOTE for clarification, or change on procedural text).

[R2-2505842](file:///C:\Data\3GPP\Extracts\R2-2505842%20R17%20CR.docx) Corrections on eventD1 and condEventD1/T1 Samsung CR Rel-17 38.331 17.13.0 5365 1 F NR\_NTN\_solutions R2-2504204

* ZTE thinks the actual change should be about the reporting part, not the measurement
* Ericsson prefers to have a change to the procedural text rather than a Note. Nokia agrees, at least for the first note
* Huawei thinks the spec is already sufficiently clear
* We work on a change to the procedural text
* Revised in R2-2506272

[R2-2506272](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506272.zip) Corrections on eventD1 and condEventD1/T1 Samsung CR Rel-17 38.331 17.13.0 5365 2 F NR\_NTN\_solutions R2-2504204

* Revised in R2-2506286

[R2-2506286](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506286.zip) Corrections on eventD1 and condEventD1/T1 Samsung CR Rel-17 38.331 17.13.0 5365 3 F NR\_NTN\_solutions R2-2504204

* Change *condEventD2 into condEventT1*
* Revised in R2-2506289

R2-2506289 Corrections on eventD1 and condEventD1/T1 Samsung CR Rel-17 38.331 17.13.0 5365 4 F NR\_NTN\_solutions R2-2504204

* CB Friday

[R2-2505843](file:///C:\Data\3GPP\Extracts\R2-2505843%20R18%20CR.docx) Corrections on eventD1/D2 and condEventD1/D2/T1 Samsung CR Rel-18 38.331 18.6.0 5366 1 F NR\_NTN\_solutions, NR\_NTN\_enh-Core R2-2504205

* Xiaomi thinks the change about CHO should refer to the evaluation part
* Revised in R2-2506273

[R2-2506273](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506273.zip) Corrections on eventD1/D2 and condEventD1/D2/T1 Samsung CR Rel-18 38.331 18.6.0 5366 2 F NR\_NTN\_solutions, NR\_NTN\_enh-Core R2-2504205

* Revised in R2-2506287

[R2-2506287](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506287.zip) Corrections on eventD1/D2 and condEventD1/D2/T1 Samsung CR Rel-18 38.331 18.6.0 5366 3 F NR\_NTN\_solutions, NR\_NTN\_enh-Core R2-2504205

* Revised in R2-2506294

R2-2506294 Corrections on eventD1/D2 and condEventD1/D2/T1 Samsung CR Rel-18 38.331 18.6.0 5366 4 F NR\_NTN\_solutions, NR\_NTN\_enh-Core R2-2504205

* CB Friday

[R2-2506155](file:///C:\Data\3GPP\Extracts\R2-2506155%20-%20Correction%20of%20PDD%20reporting%20related%20descriptions.docx) Correction of PDD reporting related descriptions Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1 Confirm that the descriptions for PDD reporting in current specifications incorrectly refer to cells.

* QC thinks this is not critical and if we clarify this here we would also need to make some changes to the UE capability
* Nokia thinks that logically Ericsson is right but this is not crititcal and changes to the specs are not needed. Huawei agrees

Proposal 2 Agree the CRs for TS 38.331 and TS 38.300 provided in the annex of this contribution.

#### 6.1.3.2 UE capabilities

UE cap corrections 38306, 38331.

## 7.0 Common

Rel-18 WIs not covered under an explicit AI in 7.x. Multi-WI Rel-18 items, e.g. cross-WI-issues not handled under another WI. UE capabilities.

### 7.0.2 Rel-18 corrections

*Essential corrections only. For smaller corrections please contact CR editor / Rapporteur directly. Coordinate with rapporteurs and chair if input above limit is required*

*Tdoc limitation: 6*

#### 7.0.2.17 NR NTN enhancements

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

[R2-2505534](file:///C:\Data\3GPP\Extracts\R2-2505534%20Rel-18%2038331%20RP%20for%20hard%20satellite%20switch.docx) Clarification on reference point for hard satellite switch with resynchronization Qualcomm Inc., Huawei, HiSilicon, Xiaomi CR Rel-18 38.331 18.6.0 5372 1 F NR\_NTN\_enh-Core R2-2504339

* QC would like to have a clarification for the description of the ssb-TimeOffset, for which the behaviour is not clarified anywhere
* ZTE thinks we can clarify that “…if this field is provided the cell is operating in soft satellite switch…”
* Ericsson thinks the previous agreement to capture the intention in the meeting notes is sufficient. No need for a spec change. Nokia agrees
* Vivo can accept to have a clarification
* CMCC agrees a clarification is useful, possibly also according the ZTE proposal
* Samsung is fine with the CR (but need to check whether the CR is using the latest version)
* We only introduce a clarification for the ssb-TimeOffset along the lines of the proposal from ZTE
* Revised in R2-2506274

[R2-2506274](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506274.zip) Clarification on reference point for hard satellite switch with resynchronization Qualcomm Inc., Huawei, HiSilicon, Xiaomi CR Rel-18 38.331 18.6.0 5372 2 F NR\_NTN\_enh-Core

* Agreed

[R2-2505577](file:///C:\Data\3GPP\Extracts\R2-2505577%2038331_CR5423(Rel-18)%20reference%20point%20of%20t-ServiceStart.docx) Correction on the reference point of t-ServiceStart MediaTek CR Rel-18 38.331 18.6.0 5423 - F NR\_NTN\_enh-Core

* HW thinks the current text is correct
* Vivo thinks that from the UE point of view there is no issue with the current description
* Ericsson also thinks there is no issue with the current description/modelling. CATT agrees. QC and CMCC also agree.
* Not pursued

[R2-2505715](file:///C:\Data\3GPP\Extracts\R2-2505715%20Final%20Thoughts%20on%20IDC%20issue%20between%20GNSS%20and%20NTN%20UL.docx) Final Thoughts on IDC issue between GNSS and NTN UL Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_NTN\_enh-Core R2-2504133

Proposal 1: Do not consider an extension of autonomousDenialSlots which would increase the number of slots the UE can autonomously deny and bring additional complexity to UL scheduling.

Proposal 2: Do not consider extending the length of the activeDuration in IDC-TDM solution.

* Noted

R2-2505420 Discussion on eventD1/D2 and condEventD1/D2/T1 Samsung discussion Rel-18 NR\_NTN\_solutions, NR\_NTN\_enh-Core

* Withdrawn

#### 7.0.2.18 IoT NTN enhancements

(IoT\_NTN\_enh-Core; leading WG: RAN2; REL-18; WID: [RP-223519](file:///C:\Data\3GPP\archive\RAN\RAN%2398\Tdocs\RP-223519.zip))

[R2-2505914](file:///C:\Data\3GPP\Extracts\R2-2505914%20Various%20corrections%20on%20connected%20mode%20operation%20for%20IoT%20NTN.docx) Various corrections on connected mode RRM for IoT NTN Samsung CR Rel-18 36.331 18.6.0 5121 1 F IoT\_NTN\_enh-Core R2-2504095

1) Clarify that SIB33(-NB) scheduling can be assumed to be unchanged.

- Xiaomi doesn’t agree on this

- Nokia also thinks this is not needed

- ZTE has sympathy for the first change (but we could say that the UE may skip SIB1). HW and CATT agree

- vivo could agree

* First change is agreed

2) Clarify that for NTN, E-UTRAN configures listed cells (cellsToAddModList) and that the UE is only required to measure on the listed cells.

- Xiaomi doesn’t agree on this either

- ZTE/HW disagree

- vivo/CATT think this is not needed

* Second change is not pursued

3) Clarify that Layer 3 filtering is not applicable to event D1/D2/T1.

- ZTE/HW disagree

- CATT thinks this is not needed

* Second change is not pursued
* Revised in R2-2506275

[R2-2506275](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506275.zip) Corrections on IoT NTN SIB33 Samsung CR Rel-18 36.331 18.6.0 5121 2 F IoT\_NTN\_enh-Core R2-2504095

* Agreed

[R2-2506172](file:///C:\Data\3GPP\Extracts\R2-2506172%2036300%20Satellite%20ID%20clarification.docx) Clarification of satellite identifiers THALES, Samsung, Sateliot, Nordic Semiconductor ASA, Novamint, CATT, Ericsson CR Rel-18 36.300 18.5.0 1430 - F IoT\_NTN\_enh-Core

* Ericsson thinks a Stage3 CR is better and sufficient. Toyota agrees
* Thales thinks that also a Stage 2 CR is beneficial.
* ZTE thinks a Stage2 CR is enough.
* ZTE thinks the cover page should be fixed. Changes on changes also need to be removed
* Change is agreed. Actual wording can be further discussed. Coversheet also needs to be revised
* Revised in R2-2506276

R2-2506276 Clarification of satellite identifiers THALES, Samsung, Sateliot, Nordic Semiconductor ASA, Novamint, CATT, Ericsson CR Rel-18 36.300 18.5.0 1430 1 F IoT\_NTN\_enh-Core

* CB Friday

[R2-2506173](file:///C:\Data\3GPP\Extracts\R2-2506173%2036331%20Satellite%20ID%20clarification.docx) Clarification of satellite identifiers THALES, Samsung, Sateliot, Nordic Semiconductor ASA, Ericsson CR Rel-18 36.331 18.6.0 5152 - F IoT\_NTN\_enh-Core

* ZTE wonders about the need and the wording of the CR (what does “correspond to” means?). MTK agrees
* We agree to have a Stage3 change. Actual wording can be further discussed.
* Revised in R2-2506277

R2-2506277 Clarification of satellite identifiers THALES, Samsung, Sateliot, Nordic Semiconductor ASA, Ericsson CR Rel-18 36.331 18.6.0 5152 - F IoT\_NTN\_enh-Core

* CB Friday

## 8.8 NTN for NR Ph3

(NR\_NTN\_Ph3-Core; leading WG: RAN2; REL-19; WID: [RP-243300](file:///C:\Data\3GPP\archive\RAN\RAN%23106\Tdocs\RP-243300.zip))

LTE\_TN\_NR\_NTN\_mob, leading WG: RAN2, Rel-19 WID: [RP-240924](file:///C:\Data\3GPP\archive\RAN\RAN%23104\Tdocs\RP-240924.zip))

Time budget: 2 TU

Tdoc Limitation: 3 tdocs

R2-2505744 Clarify SMTC2-LP offset assumption for NTN (align with SMTC/SMTC4list) Jio Platforms CR Rel-19 38.331 18.6.0 5435 - D NR\_NTN\_Ph3-Core

* Withdrawn

### 8.8.1 Organizational

LS, Rapporteur input, including workplan, running CRs, open issues lists, etc.

Rapporteur inputs do not count towards the tdoc limitation.

Including the outcome of the following email discussion:

[Post130][301][R19 NR NTN] Stage2 CR (Thales)

[Post130][302][R19 NR NTN] RRC CR (Ericsson)

[Post130][303][R19 NR NTN] 38.304 CR (ZTE)

[Post130][304][R19 NR NTN] capability CR (Apple)

For the LTE\_TN\_NR\_NTN\_mob WI, including endorsed draft CRs from the WI spec rapporteurs.

Incoming LSs

[R2-2505023](file:///C:\Data\3GPP\Extracts\R2-2505023_R1-2504934.docx) LS on NR-NTN TP for TS 38.300 (NR\_NTN\_Ph3; contact: Thales) RAN1 LS in Rel-19 NR\_NTN\_Ph3 To:RAN2

* Noted

[R2-2505024](file:///C:\Data\3GPP\Extracts\R2-2505024_R1-2504936.docx) LS on Msg4 PDSCH repetition (R1-2504936; contact: Thales) RAN1 LS in Rel-19 NR\_NTN\_Ph3 To:RAN2

* Noted

[R2-2505050](file:///C:\Data\3GPP\Extracts\R2-2505050_R4-2508433.docx) Reply LS on SMTC enhancements (R4-2508433; contact: Xiaomi) RAN4 LS in Rel-19 NR\_NTN\_Ph3-Core To:RAN2

* We can check offline whether we need to send another LS to RAN4 to explain RAN2 intentions about configuring more than 4 (i.e 6) SMTCs
* Noted

[R2-2505067](file:///C:\Data\3GPP\Extracts\R2-2505067_S4-251099.docx) Reply on Inclusion of NTN intended service area in the Service Announcement (S4-251099; contact: Ericsson) SA4 LS in Rel-19 NR\_NTN\_Ph3-Core To:RAN2 Cc:SA2

* Noted

NR\_NTN\_Ph3-Core

* Stage 2 CR

[R2-2506171](file:///C:\Data\3GPP\Extracts\R2-2506171_was_4761%20Stage%202%20CR%20for%20NTN%20Ph3_clean.docx) Stage 2 Running CR for NR NTN phase 3 THALES (Rapporteur) CR Rel-19 38.300 18.6.0 1023 - B NR\_NTN\_Ph3-Core

- Thales thinks there are some editorials to be fixed

- Ericsson that the current definition of ISA in the Stage 2 CR is different from the one in RAN3 and SA2

* We can inform RAN3 and SA2 that RAN2 already decided that an ISA can span (parts of) multiple NTN cells and ask them to update their definition accordingly
* Draft an LS to RAN3 and SA2 in R2-2506279
* CR is endorsed as a baseline for further discussion

R2-2506279 Draft LS on the definition of Intended Service Area Thales LS out Rel-19 NR\_NTN\_Ph3-Core To:RAN3, SA2

* 38.331 CR

[R2-2505828](file:///C:\Data\3GPP\Extracts\R2-2505828%20-%2038331_(Rel-19)%20-%20Introduction%20of%20NTN%20Phase%203%20enhancements.docx) Introduction of NTN Phase 3 enhancements Ericsson draftCR Rel-19 38.331 18.6.0 B NR\_NTN\_Ph3-Core

* CR is endorsed as a baseline for further discussion

[R2-2505825](file:///C:\Data\3GPP\Extracts\R2-2505825%20-%20Remaining%20RRC%20open%20issues%20for%20NR%20NTN%20Rel-19.docx) Remaining RRC open issues for NR NTN Rel-19 Ericsson discussion Rel-19 NR\_NTN\_Ph3-Core

[Proposals for easy agreement]

SMTC5 list can be configured independently. Delta signalling with SMTC4 list can be supported to avoid unnecessary overhead (5/5)

- Nokia agrees with the proposal. Vivo agrees

The maximum number of 6 configured SMTCs include the SMTC of the serving cell (5/5)

- HW thinks the 6 configured SMTCs should only be for the neighbour cells

- Xiaomi suggests to go for 7. Apple/CMCC/Ericsson agree

* The maximum number configured SMTCs for idle/inactive is 7 and it also includes the SMTC of the serving cell (This updates a previous decision to have a maximum of 6 STMCs).

Existing mechanisms are sufficient to associated the ISA with relevant neighbour frequencies to perform MBS frequency prioritization (3/4).

* We don’t introduce new AS mechanisms to associate the ISA with relevant neighbour frequencies to perform MBS frequency prioritization

[Proposals for further discussion]

FFS Stage 3 impact of the limit of maximum 2 SMTC periodicities per frequency layer and the configuration of 6 SMTC offsets per frequency. Companies are invited to bring concrete text proposals.

FFS whether multiple SMTC periodicities are needed in frequency layers different from the serving cell frequency (e.g., inter-frequency neighbours) and clarify in which inter-frequency scenario(s) this enhancement is beneficial.

SMTC enhancements in connected mode for NTN DL coverage enhancements are pending RAN2 confirmation of the working assumption: “We introduce a mechanism to assist the NW to configure the SMTCs in connected mode”. It is FFS the choice between Alt 1 or Alt2.

FFS to align RAN2 specifications and use the Ellipsoid Point with uncertainty Circle from TS 37.355 to define the circle shape of the ISA in the new SIBXX.

FFS on the terminology misalignment between ‘broadcast service area’ vs. ‘intended service area’ and the potential impact on the MII procedure.

[R2-2505827](file:///C:\Data\3GPP\Extracts\R2-2505827%20-%20Inclusion%20of%20the%20ISA%20in%20the%20Service%20Announcement.docx) Inclusion of the ISA in the Service Announcement Ericsson discussion Rel-19 NR\_NTN\_Ph3-Core

Observation 1 SA4 has confirmed the inclusion of the Intended Service Area defined with circles and polygon shapes in the Service Announcement.

Observation 2 RAN2 and SA4 have chosen different representations of the Intended Service Area in System Information and Service Announcement, respectively.

Proposal 1 It is up to UE implementation how to use the ISA definition in SIB/USD to skip MCCH acquisition when it is outside the ISA of the MBS broadcast service(s) it is interested in. Take the text proposals to TS 38.331 and TS 38.300 as baseline.

-` Samsung indicates that in USD the used term is Target Service Area

* It is up to UE implementation how to use the ISA definition in SIB/USD to skip MCCH acquisition when it is outside the ISA of the MBS broadcast service(s) it is interested in (can further check the wording for the change in 38.300 and 38.331)

Proposal 2 The Intended Service Area in the Service Announcement can be used for frequency prioritization in MBS NTN. Introduce the following NOTE in Stage 2 or TS 38.304.

-` Fujitsu thinks that also for this we need to take into account that in USD the used term is Target Service Area

- Nokia thinks we could also have some normative text

- Thales thinks the Note is not needed

* The Intended Service Area in the Service Announcement can be used for frequency prioritization in MBS NTN. Introduce a corresponding statement in TS 38.304 (FFS on the actual wording and whether it’s normative text or a note)

Proposal 3 Use the Ellipsoid Point with uncertainty Circle from TS 37.355 to define the circle shape of the ISA in the new SIBXX.

- ZTE prefers to keep the existing signalling. HW agrees

- Ericsson thinks that if we don’t align some NW entity will have to perform a mapping

* Can be further discussed in the ASN.1 review

Agreements:

1. The maximum number configured SMTCs for idle/inactive is 7 and it also includes the SMTC of the serving cell (This updates a previous decision to have a maximum of 6 STMCs).

2. We don’t introduce new AS mechanisms to associate the ISA with relevant neighbour frequencies to perform MBS frequency prioritization

3. It is up to UE implementation how to use the ISA definition in SIB/USD to skip MCCH acquisition when it is outside the ISA of the MBS broadcast service(s) it is interested in (can further check the wording for the change in 38.300 and 38.331)

4. The Intended Service Area in the Service Announcement can be used for frequency prioritization in MBS NTN. Introduce a corresponding statement in TS 38.304 (FFS on the actual wording and whether it’s normative text or a note)

* 38.304 CR

[R2-2505281](file:///C:\Data\3GPP\Extracts\R2-2505281%20Stage-3%20running%20304%20CR%20for%20NR%20NTN.docx) Introduction of Rel1-9 NR NTN in 38.304 ZTE Corporation, Sanechips CR Rel-19 38.304 18.4.0 0441 - B NR\_NTN\_Ph3-Core

* CR is endorsed as a baseline for further discussion
* UE capability CRs

[R2-2505489](file:///C:\Data\3GPP\Extracts\R2-2505489_38.331%20UE%20capability%20running%20CR%20on%20NR%20NTN.docx) Draft CR for Rel-19 NR NTN UE capabilities Apple draftCR Rel-19 38.331 18.6.0 B NR\_NTN\_Ph3-Core

* CR is endorsed as a baseline for further discussion

[R2-2505490](file:///C:\Data\3GPP\Extracts\R2-2505490_38.306%20UE%20capability%20running%20CR%20on%20NR%20NTN.docx) Draft CR for Rel-19 NR NTN UE capabilities Apple draftCR Rel-19 38.306 18.6.0 B NR\_NTN\_Ph3-Core

- Apple/QC thinks we should limit the capability to support STMC enhancements to FR1. Ericsson agrees

* We restrict the capabilities to support STMC enhancements to FR1
* CR is endorsed as a baseline for further discussion

Agreements:

1. We restrict the capabilities to support STMC enhancements to FR1

* K-Mac extension

[R2-2506175](file:///C:\Data\3GPP\Extracts\R2-2506175%2038331%20Kmac%20extension.docx) k-Mac extension for NR NTN THALES, Samsung CR Rel-19 38.331 18.6.0 5463 - F NR\_NTN\_Ph3-Core

* CB Friday
* NTN less than 5MHz

[R2-2505282](file:///C:\Data\3GPP\Extracts\R2-2505282%20Introductin%20of%20less%20than%205MHz%20in%20NTN.docx) Introduction of less than 5MHz in NTN ZTE Corporation, Xiaomi, Sanechips CR Rel-19 38.331 18.6.0 5389 1 B NR\_IoT\_NTN\_req\_test\_enh R2-2504779

* Agreed

[R2-2505283](file:///C:\Data\3GPP\Extracts\R2-2505283%20Introduce%20UE%20capability%20siganlling%20for%20NTN%20less%20than%205MHz.docx) Introduce UE capability signalling for NTN less than 5MHz ZTE Corporation, Xiaomi, Sanechips CR Rel-19 38.306 18.6.0 1307 2 B NR\_IoT\_NTN\_req\_test\_enh R2-2504774

* Agreed

LTE\_TN\_NR\_NTN\_mob

* Stage2 CR

[R2-2506137](file:///C:\Data\3GPP\Extracts\R2-2506137%20Introduction%20of%20Stage%202%20for%20LTE%20TN%20to%20NR%20NTN%20idle%20mode%20mobility.docx) Introduction of stage 2 for LTE TN to NR NTN idle mode mobility Samsung CR Rel-19 36.300 18.5.0 1412 6 B LTE\_TN\_NR\_NTN\_mob R2-2504096

* CR is endorsed as a baseline for further discussion
* 36.331 CR

[R2-2506144](file:///C:\Data\3GPP\Extracts\R2-2506144.docx) Introduction of LTE TN to NR NTN IDLE mode mobility CATT CR Rel-19 36.331 18.6.0 5065 6 B LTE\_TN\_NR\_NTN\_mob-Core R2-2504530

- Ericsson thinks that in SIB33 there is a definition of ephemeris applicable for R19 but we also need a definition for R18

- Xiaomi thinks there is an issue with smtc in the CarrierInfoNR-r19

* CR is endorsed as a baseline for further discussion, e.g. to cover the comments above
* 36.306 CR

[R2-2505389](file:///C:\Data\3GPP\Extracts\R2-2505389_CR1918_36306_Rel19_Introduction%20of%20LTE%20TN%20to%20NR%20NTN%20Mobility%20UE%20Capability.docx) Introduction of LTE TN to NR NTN Mobility UE Capability vivo CR Rel-19 36.306 18.5.0 1918 - B LTE\_TN\_NR\_NTN\_mob-Core

* CR is endorsed as a baseline for further discussion

R2-2505147 Introduction of stage 2 for LTE TN to NR NTN idle mode mobility Samsung CR Rel-19 36.300 18.5.0 1412 5 B LTE\_TN\_NR\_NTN\_mob R2-2504096

* Withdrawn

R2-2505233 Introduction of LTE TN to NR NTN IDLE mode mobility CATT CR Rel-19 36.331 18.6.0 5141 - B LTE\_TN\_NR\_NTN\_mob

* Withdrawn

### 8.8.2 Downlink coverage enhancements

Contributions should focus on remaining open issues related to RAN2 aspects of DL coverage enhancements due to extended SIB periodicity (up to 160ms), e.g. possible SMTC impacts (while no contributions are expected on cell level / beam level DTX/DRX mechanism).

* SMTC enhancements
  + Two different SMTC periodicities (with different offsets) for SMTCs
  + Multiple SMTC periodicities for inter-frequency neighbour cells
  + Signalling details

[R2-2506052](file:///C:\Data\3GPP\Extracts\R2-2506052%20Discussion%20on%20DL%20coverage%20enhancements.docx) Discussion on DL coverage enhancements Huawei, HiSilicon discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1: Support configuring two different SMTC periodicities (with different offsets) for SMTCs in one frequency layer for Idle/Inactive and Connected mode UEs.

- QC thinks we should not support this in RAN2 based on the impact on the workload in RAN4. CATT agrees. Samsung also agrees

- Ericsson is not so sure about the extra benefit for the UE if we support multiple SMTC periodicities

- vivo thinks we already discussed the need to support this and should not repeat the discussion. Xiaomi agrees

- Fujitsu thinks that we can confirm our agreement and if RAN4 does not conclude their work on requirement we can finally limit the configuration

* RAN2 assumes that if we support configuring two different SMTC periodicities (with different offsets) for SMTCs in one frequency layer:
  + - This is mainly for connected mode.
    - This will imply a dedicated UE capability
    - If RAN4 will not finish their requirements in R19 we can introduce some statement in the specs in the future to limit the configuration to one periodicity only
* Continue the discussion in offline 303 on whether we support configuring two different SMTC periodicities (with different offsets) for SMTCs in one frequency, based on the RAN2 assumptions

Proposal 2: Multiple SMTC periodicities are needed for both intra-frequency neighbour cells and inter-frequency neighbour cells.

- QC would like to limit this to intra-frequency

* CB Friday

Proposal 5: For SSB and CORESET multiplexing pattern 1, SIB1 repetition transmission period is 160ms if SSB periodicity is 160ms.

- Ericsson indicates that there is no consensus in RAN1 that this is needed

[R2-2505421](file:///C:\Data\3GPP\Extracts\R2-2505421%20DL%20CE.docx) Open issues on Downlink Coverage Enhancement Samsung discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1: Introduce smtc5list, which is a list including up to 5 elements of SSB-MTC5, and each element SSB-MTC5 contains a list of PCI, an offset, and a periodicity (if agreed 2 SMTC periodicities). If a parameter (PCI list, or periodicity or offset) of an element SSB-MTC5 in smtc5list is absent, the corresponding parameter of the element in the same position in smtc4list is applied.

* To be discussed in the CR review.

Proposal 2: If both smtc4list and smtc5list are configured, smtc5list is applied if supported and smtc4list is ignored.

* To be discussed in the CR review.

[R2-2505532](file:///C:\Data\3GPP\Extracts\R2-2505532%20Multiple%20SMTCs.docx) Discussion on beam hopping with multiple SMTC offsets Qualcomm Incorporated discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 6 RAN2 first need to decide whether more than 4 SMTCs configuration is applicable for inter-frequency measurements.

Proposal 7 If P6 is agreed, a new UE capability to support more than 4 SMTCs configuration for inter-frequency measurements is introduced and an LS is sent to RAN4 for any issue/concern.

Proposal 8 Multiple SMTC periodicities are not introduced to be used in combination with more than 4 SMTCs per frequency layer.

* [AT131][303][R19 NR NTN] Two SMTC periodicities (Xiaomi)

Scope: continue the discussion on whether to support configuring two different SMTC periodicities (with different offsets) for SMTCs in one frequency, based on the RAN2 assumptions

Intended outcome: summary of the offline discussion (in R2-2506280)

Offline time: Wednesday morning coffee break in BO1

Deadline for offline discussion summary: Wednesday 2025-08-27 14:00

[R2-2506280](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506280.zip) Report of [AT131][303][R19 NR NTN] Two SMTC periodicity Xiaomi discussion NR\_NTN\_Ph3-Core

Proposal 1: RAN2 supports to configure two different SMTC periodicities (with different offsets) for SMTCs per frequency layer for idle/inactive/connected mode, and UE capability will be introduced for this purpose. If RAN4 cannot finish the corresponding RRM requirement design, we can introduce some statement in the specs in the future to limit the configuration to one periodicity only.

- Ericsson still thinks this is not needed, at least not for idle/inactive. Xiaomi thinks there is no real additional workload in RAN4 if idle/inactive is also supported

* RAN2 supports to configure two different SMTC periodicities (with different offsets) for SMTCs per frequency layer for idle/inactive/connected mode, and UE capability will be introduced for this purpose (FFS if per UE or per band). If RAN4 cannot finish the corresponding RRM requirement design, we can introduce some statement in the specs in the future to limit the configuration to one periodicity only.
* Send an LS to RAN4 on latest RAN2 agreements about SMTC enhancements

Agreements:

1. RAN2 supports to configure two different SMTC periodicities (with different offsets) for SMTCs per frequency layer for idle/inactive/connected mode, and UE capability will be introduced for this purpose (FFS if per UE or per band). If RAN4 cannot finish the corresponding RRM requirement design, we can introduce some statement in the specs in the future to limit the configuration to one periodicity only.

* + Further details of location-based SMTC selection
  + SSB-index based SMTC selection in idle/inactive mode
  + WA on UE assistance for SMTC selection in connected mode

[R2-2506052](file:///C:\Data\3GPP\Extracts\R2-2506052%20Discussion%20on%20DL%20coverage%20enhancements.docx) Discussion on DL coverage enhancements Huawei, HiSilicon discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 3: Support SSB-based SMTC for UEs in Idle/Inactive mode.

Proposal 4: Confirm the working assumption and support Alt1: UE provide the closest N reference locations/neighbour cells to network. Adopt the TP in the Annex.

[R2-2505636](file:///C:\Data\3GPP\Extracts\R2-2505636%20Discussion%20on%20Remaining%20Issues%20of%20DL%20coverage%20enhancement.doc) Discussion on Remaining Issues of DL coverage enhancement Beijing Xiaomi Mobile Software discussion Rel-19

Proposal 4: [RRC-3] RAN2 agrees not to confirm the WA on assisting NW to configure SMTCs in RRC connected mode.

Proposal 5: [RRC-not listed] RAN2 agrees to broadcast a distance threshold together with the reference location of neighbor cells for location based SMTC selection in idle/inactive mode.

Observation 1: If SSBs are transmitted with different satellite beams, serving cell SSB index based SMTC selection can save UE power consumption as it doesn't require location acquisition.

Proposal 6: [RRC-not listed] RAN2 agrees to support serving cell SSB index based SMTC selection.

Proposal 7: [RRC-not listed] For serving cell SSB index based solution, a bitmap of SMTCs per SSB is broadcast in SIB.

[R2-2505532](file:///C:\Data\3GPP\Extracts\R2-2505532%20Multiple%20SMTCs.docx) Discussion on beam hopping with multiple SMTC offsets Qualcomm Incorporated discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1 Location-based SMTC enhancement is also supported in moving cell scenario. The existing movingReferenceLocation is reused for this purpose (i.e., network can update the movingReferenceLocation with epoch time without notifying UE).

Proposal 2 Location-based SMTC is sufficient to solve issue of selecting four SMTCs both in connected mode and idle mode measurements and there is no need to introduce second solution to solve the same issue in Rel-19.

Proposal 3 If there is no scheduling restriction from configuration of more than 4 SMTCs based on UE’s capability, the UE does not report to network which SMTCs are used.

Proposal 4 If there is scheduling restriction from configuration of more than 4 SMTCs based on UE’s capability, extend RRCReconfigurationComplete message to indicate which SMTCs the UE has selected.

Proposal 5 Introduce a UE capability signaling to indicate whether the UE supports configuration of more than 4 SMTCs for intra-frequency measurements.

[R2-2505925](file:///C:\Data\3GPP\Extracts\R2-2505925%20Open%20issues%20on%20downlink%20coverage%20enhancements.docx) Remaining issues on Downlink coverage enhancements Nokia, Nokia Shanghai Bell discussion NR\_NTN\_Ph3-Core

* SMTC selection in RRC connected

Proposal 5: RAN2 to confirm WA to provide SMTC configuration assistance in RRC\_CONNECTED

Proposal 6: RAN2 go for Alt 1 i.e. allowing the gNB to configure the UE to report the x most suitable SMTC configurations. FFS whether it is up to UE implementation how to determine the information.

Proposal 7: the closest N reference locations could be based on the RRC\_IDLE/RRC\_INACTIVE information i.e. by UE reporting the index of the reference location.

Proposal 8: UE assistance information should be the index of the legacy neighbour cell list of the closest N neighbours

[R2-2506153](file:///C:\Data\3GPP\Extracts\R2-2506153%20-%20DL%20coverage%20enhancements.docx) DL coverage enhancements Ericsson discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 2 RAN2 to confirm the WA (to introduce a mechanism that assists the network to configure SMTCs in RRC\_CONNECTED).

Observation 8 Alt. 1 overcomes many of the drawbacks of an approach relying on legacy means to select SMTC(s), except for the requirement for an additional RRC reconfiguration for final configuration of the selected SMTC(s).

Observation 9 The requirement to send two RRC reconfiguration messages for each UE entering RRC\_CONNECTED poses a scalability issue, especially given the large number of UEs and the scarceness of radio resources in NTN cells.

Observation 10 Alt. 1b is a variant of Alt. 1 in which the UE reports the relevant (e.g., N closest) reference location as identified in RRC\_IDLE/INACTIVE during RRC connection establishment/resume.

Observation 11 Alt. 1b effectively eliminates the need for additional signalling messages, minimizes the signalling overhead, and harmonizes the features for RRC\_IDLE/INACTIVE and RRC\_CONNECTED modes.

- Samsung and Toyota think we can also avoid confirming the WA

- Ericsson thinks assistance information from the UE is beneficial. ZTE agrees

- Oppo thinks the SMTC selection could change after this procedure

- vivo is not sure we need this enhancement

* Continue the discussion on Alt1b and Alt 2 in offline 304

Observation 12 Alt. 2 solves the issue of SMTC selection in RRC\_CONNECTED as good as Alt. 1 but with less signalling overhead in terms of number of RRCReconfiguration messages, thus solving the otherwise arising scalability challenge.

Proposal 3 A UE selects the most relevant SMTC(s) based on location information included in the measurement configurations and reports its selection to the network.

Proposal 4 In RRC\_CONNECTED, the network can configure the UE to select a certain number of SMTCs, e.g., K, among the configured SMTCs.

[R2-2506014](file:///C:\Data\3GPP\Extracts\R2-2506014-Discussion%20on%20Downlink%20Coverage%20Enhancements-CSCN.docx) Discussion on Downlink Coverage Enhancements CSCN, ZTE Corporation, Sanechips, Huawei, HiSilicon, CATT discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1: RAN2 should introduce an SSB-based solution that uses the selected beam which UE camps on to map neighbour cell SMTCs for SMTC selection enhancement in RRC\_Idle/Inactive mode.

Proposal 2: RAN2 should introduce a mechanism to assist the NW to configure SMTCs based on UAI in RRC\_CONNECTED mode.

* [AT131][304][R19 NR NTN] UE assisted SMTC selection in connected (Ericsson)

Scope: continue the discussion on Alt1b and Alt2 for UE assisted SMTC selection in connected mode

Intended outcome: summary of the offline discussion (in R2-2506281)

Offline time: Wednesday afternoon coffee break in BO1

Deadline for offline discussion summary: Wednesday 2025-08-27 18:00

Scope: continue the discussion on the remaining FFS: content of the UE assistance information (e.g. index/indices of preferred SMTCs or closest/best reference location(s)) and whether in connected mode the NW can only configure up to 4 STMCs

Intended outcome: summary of the offline discussion (in R2-2506291)

Offline time: Thursday 2025-08-28 15:00:15:30 in BO3

Deadline for offline discussion summary: Friday 2025-08-29 08:00

[R2-2506281](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506281.zip) Report of [AT131][304][R19 NR NTN] UE assisted SMTC selection in connected Ericsson discussion NR\_NTN\_Ph3-Core

Proposal 1 It is beneficial to provide assistance information to configure the most relevant SMTCs for the area where the UE is located.

* RAN2 reconfirms the understanding that if the NW configures more than 4 STMCs the UE in idle/inactive the UE selects up to 4 STMCs (or less, depending on the UE capability) based on location and only considers them for measurements
* FFS if in connected mode the NW will only configure up to 4 STMC.
* UE Assistance Information message will include information to the NW to (re)configure the most relevant SMTCs for the area where the UE is located (FFS on the content of the information, e.g. index/indices of preferred SMTCs or closest/best reference location(s))
* Continue in offline 304

Proposal 2 Based on the selected solution, it is FFS whether there is SA3 (or other working group) impact.

Proposal 3 UE Assistance Information can be used by the UE to provide future updates on closest SMTC based on the previously received information.

- Nokia thinks we could just remove “future” from p3 and then we have a full proposal

- Xiaomi still thinks different options are not clear

- Samsung is not sure there is strong support for this enhancement

- QC can accept either original option 1 or 2, but not 1a

- ZTE supports the enhancements and supports Alt1 but in any case we need to fix the wording of p3

- Samsung can compromise on the solution using UAI to convey the information on the closest references

R2-2506291 Report of [AT131][304][R19 NR NTN] UE assisted SMTC selection in connected – second round Ericsson discussion NR\_NTN\_Ph3-Core

Agreements:

1. RAN2 reconfirms the understanding that if the NW configures more than 4 STMCs the UE in idle/inactive the UE selects up to 4 STMCs (or less, depending on the UE capability) based on location and only considers them for measurements

2 FFS if in connected mode the NW will only configure up to 4 STMC.

3. UE Assistance Information message will include information to the NW to (re)configure the most relevant SMTCs for the area where the UE is located (FFS on the content of the information, e.g. index/indices of preferred SMTCs or closest/best reference location(s))

R2-2506290 LS on additional agreements on SMTC enhancements Xiaomi LS out Rel-19 NR\_NTN\_Ph3-Core To:RAN4

* Msg4 PDSCH repetition

[R2-2505285](file:///C:\Data\3GPP\Extracts\R2-2505285%20Consideration%20on%20Msg4%20PDSCH%20enhancements.doc) Consideration on Msg4 PDSCH repetition ZTE Corporation, Sanechips discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1: LCID in table 6.2.1-2C when LX field is set to 1 is used for UE to report capability/request of Msg4 PDSCH repetition.

* Agreed

Proposal 2: No further conditions are introduced for the UE to report its capability/request for Msg4 PDSCH repetition.

- Apple thinks we can follow the solution for other similar enhancements

* Agreed (we can come back to this if we receive other indications from RAN1)

Proposal 3: RAN2 assumes combination of below features are possible and will define a signalling to support any combination of below features using LCID values in Table 6.2.1-2c:

* + Msg4 PDSCH repetition
  + Msg4 HARQ-ACK PUCCH repetition
  + (e)RedCap

- Ericsson wonders if it’s ok to limit the possibility to introduce other features in the future

* Agreed

The combination of Msg4 PDSCH repetition, Msg4 HARQ-ACK PUCCH repetition and (e)RedCap shall be confirmed by RAN1.

Proposal 4: If P1-P3 is agreed, RAN2 discusses and agrees TP attached in the annex.

[R2-2505492](file:///C:\Data\3GPP\Extracts\R2-2505492_Msg4%20repetition.doc) Msg4 PDSCH repetition in NTN Apple discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1: Network configures one RSRP threshold for Msg4 PDSCH repetition in SIB19.

Proposal 2: As baseline, introduces extra 6 LCID code points when the LX field is set to 1, for CCCH of size 48bits/64bits for Msg4 PDSCH repetition of normal UE(s), RedCap UE(s), and eRedCap UE(s).

Proposal 3: UE indicates its capability and/or request for Msg4 PDSCH repetition by transmitting Msg3 with those extra LCID code points if UE is capable of Msg4 PDSCH repetition and the measured DL reference signal strength is lower than configured RSRP threshold.

Proposal 4: RAN2 to discuss about joint indication to request for both Rel-18 UL coverage enhancement of PUCCH repetition for Msg4 HARQ-ACK and Rel-19 DL coverage enhancement of Msg4 PDSCH repetition.

Agreements:

1. LCID in table 6.2.1-2C when LX field is set to 1 is used for UE to report capability/request of Msg4 PDSCH repetition.

2. No further conditions are introduced for the UE to report its capability/request for Msg4 PDSCH repetition (we can come back to this if we receive other indications from RAN1)

3. RAN2 assumes combination of below features are possible and will define a signalling to support any combination of below features using LCID values in Table 6.2.1-2c:

- Msg4 PDSCH repetition

- Msg4 HARQ-ACK PUCCH repetition

- (e)RedCap

[R2-2505078](file:///C:\Data\3GPP\Extracts\R2-2505078%20Remaining%20Issues%20on%20SMTC%20Enhancements%20for%20NTN.docx) Remaining Issues on SMTC Enhancements for NTN vivo discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505079](file:///C:\Data\3GPP\Extracts\R2-2505079%20Remaining%20Issues%20on%20Repetition%20Enhancements%20for%20NTN.docx) Remaining Issues on Repetition Enhancements for NTN vivo discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505225](file:///C:\Data\3GPP\Extracts\R2-2505225.docx) Discussion on link level enhancement CATT discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505226](file:///C:\Data\3GPP\Extracts\R2-2505226.docx) Discussion on potential SMTC enhancements CATT discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505284](file:///C:\Data\3GPP\Extracts\R2-2505284%20Consideration%20on%20remaining%20issues%20on%20SMTC%20enhancements.doc) Consideration on remaining issues on SMTC enhancements ZTE Corporation, Sanechips discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505285](file:///C:\Data\3GPP\Extracts\R2-2505285%20Consideration%20on%20Msg4%20PDSCH%20enhancements.doc) Consideration on Msg4 PDSCH repetition ZTE Corporation, Sanechips discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505293](file:///C:\Data\3GPP\Extracts\R2-2505293%20Remaining%20consideration%20on%20NR%20NTN%20DL%20Coverage%20Enh.docx) Remaining consideration on NR NTN downlink coverage enhancements DENSO CORPORATION discussion NR\_NTN\_Ph3-Core

[R2-2505351](file:///C:\Data\3GPP\Extracts\R2-2505351%20Discussions%20on%20downlink%20coverage%20enhancement.doc) Discussions on downlink coverage enhancement Fujitsu discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505421](file:///C:\Data\3GPP\Extracts\R2-2505421%20DL%20CE.docx) Open issues on Downlink Coverage Enhancement Samsung discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505491](file:///C:\Data\3GPP\Extracts\R2-2505491_SMTC.doc) SMTC enhancement in NTN Apple discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505492](file:///C:\Data\3GPP\Extracts\R2-2505492_Msg4%20repetition.doc) Msg4 PDSCH repetition in NTN Apple discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505532](file:///C:\Data\3GPP\Extracts\R2-2505532%20Multiple%20SMTCs.docx) Discussion on beam hopping with multiple SMTC offsets Qualcomm Incorporated discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505533](file:///C:\Data\3GPP\Extracts\R2-2505533%20Msg4%20repetition%20UE%20cap.docx) Msg4 PDSCH repetition capability indication Qualcomm Incorporated discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505608](file:///C:\Data\3GPP\Extracts\R2-2505608%20Discussion%20on%20DL%20coverage%20enhancement%20for%20NTN.doc) Discussion on DL coverage enhancement for NTN OPPO discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505635](file:///C:\Data\3GPP\Extracts\R2-2505635%20Msg3%20indication%20on%20support%20of%20Msg4%20PDSCH%20repetition.docx) Msg3 indication on support of Msg4 PDSCH repetition Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505636](file:///C:\Data\3GPP\Extracts\R2-2505636%20Discussion%20on%20Remaining%20Issues%20of%20DL%20coverage%20enhancement.doc) Discussion on Remaining Issues of DL coverage enhancement Beijing Xiaomi Mobile Software discussion Rel-19

[R2-2505642](file:///C:\Data\3GPP\Extracts\R2-2505642_NTN_inter-freq_SMTC.docx) Discussions on supporting multiple SMTC periodicities for inter-frequency neighbour cells ITRI discussion NR\_NTN\_Ph3-Core

[R2-2505688](file:///C:\Data\3GPP\Extracts\R2-2505688%20Some%20remaining%20issues%20for%20DL-CE%20in%20NTN.docx) Some remaining issues for DL-CE in NTN Lenovo discussion Rel-19

[R2-2505707](file:///C:\Data\3GPP\Extracts\R2-2505707.docx) Clarification on downlink coverage enhancement NEC discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505925](file:///C:\Data\3GPP\Extracts\R2-2505925%20Open%20issues%20on%20downlink%20coverage%20enhancements.docx) Remaining issues on Downlink coverage enhancements Nokia, Nokia Shanghai Bell discussion NR\_NTN\_Ph3-Core

[R2-2505953](file:///C:\Data\3GPP\Extracts\R2-2505953-Discussion%20on%20DL%20coverage%20enhancements%20due%20to%20extended%20SSB%20periodicity.docx) Discussion on DL coverage enhancements due to extended SSB periodicity CMCC discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505985](file:///C:\Data\3GPP\Extracts\R2-2505985%20(R19%20NR%20NTN%20WI%20AI%208.8.2)%20DL%20coverage.docx) Downlink coverage enhancement for NTN InterDigital, Inc. discussion Rel-19

[R2-2506013](file:///C:\Data\3GPP\RAN2\Docs\R2-2506013.zip) Open Issues for NR NTN DL Coverage Enhancements in Rel-19 ETRI discussion Rel-19

[R2-2506014](file:///C:\Data\3GPP\Extracts\R2-2506014-Discussion%20on%20Downlink%20Coverage%20Enhancements-CSCN.docx) Discussion on Downlink Coverage Enhancements CSCN, ZTE Corporation, Sanechips, Huawei, HiSilicon, CATT discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2506018](file:///C:\Data\3GPP\Extracts\R2-2506018-Discussion_on_DL_coverage_enhancement.docx) Discussion on Downlink Coverage Enhancements Sharp discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2506052](file:///C:\Data\3GPP\Extracts\R2-2506052%20Discussion%20on%20DL%20coverage%20enhancements.docx) Discussion on DL coverage enhancements Huawei, HiSilicon discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2506150](file:///C:\Data\3GPP\Extracts\R2-2506150%20Details%20on%20DL%20CE%20in%20NR%20NTN.docx) Details on DL CE in NR NTN NERCDTV discussion Rel-19

[R2-2506153](file:///C:\Data\3GPP\Extracts\R2-2506153%20-%20DL%20coverage%20enhancements.docx) DL coverage enhancements Ericsson discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2506154](file:///C:\Data\3GPP\Extracts\R2-2506154%20-%20Discussion%20on%20Reply%20LS%20on%20SMTC%20enhancements.docx) Discussion on Reply LS on SMTC enhancements Ericsson discussion Rel-19 NR\_NTN\_Ph3-Core

### 8.8.3 Uplink Capacity/Throughput Enhancement

Contributions can be submitted on the possible RAN2 aspects of the agreements reached in RAN1.

[R2-2505922](file:///C:\Data\3GPP\Extracts\R2-2505922%20On%20OCC%20applicability%20to%20RACH-less%20handovers.docx) On OCC applicability to RACH-less handovers Samsung discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1: RAN2 to confirm OCC is applicable for RACH-less handovers by suitable network implementation.

Proposal 2: RAN2 to consider documenting OCC being applicable for RACH-less handovers in Stage 2 as seen in Annex A.

[R2-2505436](file:///C:\Data\3GPP\Extracts\R2-2505436%20Discussion%20on%20Uplink%20Capacity%20Enhancements.docx) Discussion on Uplink Capacity Enhancements Huawei, HiSilicon discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505956](file:///C:\Data\3GPP\Extracts\R2-2505956%20Remaining%20issues%20on%20uplink%20capacity%20and%20throughput%20enhancement%20for%20NR%20NTN.docx) Remaining issues on uplink capacity and throughput enhancement for NR NTN CMCC discussion Rel-19 NR\_NTN\_Ph3-Core

### 8.8.4 Support of Broadcast service

Contributions should address the remaining open issues related to the signaling of the intended service area of a broadcast service.

* Known open issues

[R2-2505352](file:///C:\Data\3GPP\Extracts\R2-2505352%20Discussions%20on%20supporting%20broadcast%20service.doc) Discussions on supporting broadcast service Fujitsu, Ericsson discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1: RAN2 to confirm that, with respect to the NTN MBS service, the term ‘broadcast service area’ refers to the ‘intended service area’. Add a note in Stage 2.

- Xiaomi thinks there is no need to cover this in Stage 2. Oppo agrees.

- Thales/Nokia don’t think this clarification is needed

* RAN2 understands that for MII reporting when an ‘intended service area’ is signalled the term ‘broadcast service area’ refers to the ‘intended service area’ (no spec impact)

Proposal 2: A UE may initiate MII upon entering or leaving the ISA. No specification change is required.

* RAN2 understands that a UE may initiate MII upon entering or leaving the ISA (no spec impact)

[R2-2505080](file:///C:\Data\3GPP\Extracts\R2-2505080%20Remaining%20Issues%20on%20MBS%20Broadcast%20Provision%20in%20NTN.docx) Remaining Issues on MBS Broadcast Provision in NTN vivo discussion Rel-19 NR\_NTN\_Ph3-Core

* Target service area in Service Announcement:

Proposal 1: RAN2 confirms that there is no need to align the MBS ISA signaling in SIBxx with that in Service Announcement.

Proposal 2: It is up to UE implementation to use the targeted service area list in the USD to avoid acquiring the MCCH when the UE is outside the MBS service area of the MBS broadcast service.

Proposal 3: From RAN2 perspective, targeted service area list in the USD is not used for other purposes.

* Signalling details:

Proposal 4: If a broadcast session is intended for reception within the entire cell area, the network does not configure the intended area ID(s) associated with that service.

Proposal 5: RAN2 confirms that if no intended area ID is explicitly indicated in MCCH for an MBS broadcast service the UE is interested in, the UE considers the service is allowed for reception within the entire cell area, with legacy behavior applicable.

* RAN2 confirms that if no intended area ID is explicitly indicated in MCCH for an MBS broadcast service the UE is interested in, the UE considers the service is applicable for reception within the entire cell area, with legacy behavior applicable (FFS whether we capture this in the spec)
* MII:

Proposal 6: RRC\_CONNECTED UE may initiate the MBS Interest Indication reporting procedure when UE is entering or leaving the intended service area.

Proposal 7: The existing term “broadcast service area” in sub-clause 5.9.4.2 of TS 38.331 refers to “intended service area” when the cell provides SIBxx. Clarifying this with a NOTE in the RRC specification.

[R2-2505716](file:///C:\Data\3GPP\Extracts\R2-2505716%20Remaining%20Issues%20for%20MBS%20in%20NTN.docx) Remaining Issues for MBS in NTN Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1: RAN2 does not consider including ISA in Service Announcement, irrespective of the SA4 conclusions on targeted service area in Service Announcement.

Proposal 2: There is no need to explicitly define that the broadcast service area from a physics perspective may be different than the intended service area.

Proposal 3: RAN2 does not specify any new behaviour with respect to MBS Interest Indication when Rel-19 NTN capable UE enters or leaves the MBS broadcast service area.

* Other issues / optimizations

[R2-2505822](file:///C:\Data\3GPP\Extracts\R2-2505822%20-%20Support%20for%20broadcast%20services%20in%20NR%20NTN.docx) Support for broadcast services in NR NTN Ericsson discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1 Broadcast future neighbour cells providing the same MBS service(s) as the serving cell.

Proposal 2 In MBS NTN, a UE is informed whether the cell replacing the serving cell provides an MBS service with identical MTCH configuration parameters.

* CB Friday (if time allows)

[R2-2505895](file:///C:\Data\3GPP\Extracts\R2-2505895%20MBS%20broadcast%20over%20NTN.docx) Discussion on MBS broadcast over NTN Huawei, HiSilicon discussion Rel-19 NR\_NTN\_Ph3-Core

* ISA or ISAs

Proposal 1: Clarify whether "ISA" refers to the whole area in which an MBS broadcast service is to be received or to one polygon/circle defined in SIBxx of one cell, and update the TS 38.331 CR accordingly.

* Skip MCCH acquisition

Proposal 4a: SIBx indicates (e.g., 1-bit) whether the cell may broadcast MBS broadcast services relevant in the whole cell coverage.

Proposal 4b: If SIBx does not indicate that the cell may transmit MBS broadcast services relevant in the whole cell coverage, a UE interested in receiving one or more MBS broadcast service but not in any ISA of the cell may skip reading MCCH.

Proposal 5a: The UE that has acquired MCCH and is out of the ISAs of the MBS service of interest shall monitor MCCH change notification and re-acquire MCCH again.

Proposal 5b: Discuss how to reduce unnecessary MCCH re-acquisition for the UE that has acquired MCCH and is out of the ISAs of the MBS services of interest, such as:

alt. 1) upon MCCH change notification, the UE only re-acquire MCCH when the bit indicating "service start" is set ;

alt. 2) upon MCCH change notification, the UE only re-acquires MCCH when a new bit indicating "change of ISAs of ongoing MBS service" is set;

alt. 3) the UE only monitors MCCH change notification every x MCCH modification periods, where x is provided to the UE e.g., in SIBx.

Moved here from 8.8

[R2-2505747](file:///C:\Data\3GPP\Extracts\R2-2505747_Clarify%20UE%20use%20of%20SIBXX%20(ISA)%20to%20gate%20MCCH%20acquisition%20for%20MBS%20broadcast%20in%20NTN.docx) Clarify UE use of SIBXX (ISA) to gate MCCH acquisition for MBS broadcast in NTN Jio Platforms Limited CR Rel-19 38.300 18.6.0 1014 - B NR\_NTN\_Ph3-Core

[R2-2506054](file:///C:\Data\3GPP\Extracts\R2-2506054_ISAaided%20frequency%20deprioritisation%20for%20MBS%20broadcast%20in%20NTN.docx) ISA-aided frequency (de)prioritisation for MBS broadcast in NTN (RRC\_IDLE/INACTIVE) Jio Platforms Limited CR Rel-19 38.304 18.4.0 0445 - B NR\_NTN\_Ph3-Core

Agreements:

1. RAN2 understands that for MII reporting when an ‘intended service area’ is signalled the term ‘broadcast service area’ refers to the ‘intended service area’ (no spec impact)

2. RAN2 understands that a UE may initiate MII upon entering or leaving the ISA (no spec impact)

3. RAN2 confirms that if no intended area ID is explicitly indicated in MCCH for an MBS broadcast service the UE is interested in, the UE considers the service is applicable for reception within the entire cell area, with legacy behavior applicable (FFS whether we capture this in the spec)

[R2-2505080](file:///C:\Data\3GPP\Extracts\R2-2505080%20Remaining%20Issues%20on%20MBS%20Broadcast%20Provision%20in%20NTN.docx) Remaining Issues on MBS Broadcast Provision in NTN vivo discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505149](file:///C:\Data\3GPP\Extracts\R2-2505149_Remaining%20issues%20on%20the%20support%20of%20broadcast%20service%20in%20NTN.docx) Remaining issues on the support of broadcast service in NTN ETRI discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505227](file:///C:\Data\3GPP\Extracts\R2-2505227.docx) Further discussion on support of broadcast service in NR NTN CATT discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505286](file:///C:\Data\3GPP\Extracts\R2-2505286%20Consideration%20on%20remaining%20issues%20on%20broadcast%20enhancements.doc) Consideration on remaining issues on broadcast service enhancements ZTE Corporation, Sanechips discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505352](file:///C:\Data\3GPP\Extracts\R2-2505352%20Discussions%20on%20supporting%20broadcast%20service.doc) Discussions on supporting broadcast service Fujitsu, Ericsson discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505422](file:///C:\Data\3GPP\Extracts\R2-2505422%20BC%20service%20area%20v1.docx) Open issues on Broadcast service area Samsung discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505572](file:///C:\Data\3GPP\Extracts\R2-2505572%20Discussion%20on%20providing%20MBS%20service%20area%20in%20NTN%20network.docx) Discussion on providing MBS service area in NTN network OPPO discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505669](file:///C:\Data\3GPP\Extracts\R2-2505669_The%20remaning%20issue%20of%20MBS%20in%20NTN.doc) The remaning issue of MBS in NTN China Telecommunications discussion

[R2-2505689](file:///C:\Data\3GPP\Extracts\R2-2505689%20Some%20remaining%20issues%20for%20MBS%20and%20ETWS%20broadcast.docx) Some remaining issues for MBS and ETWS broadcast Lenovo discussion Rel-19

[R2-2505716](file:///C:\Data\3GPP\Extracts\R2-2505716%20Remaining%20Issues%20for%20MBS%20in%20NTN.docx) Remaining Issues for MBS in NTN Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505767](file:///C:\Data\3GPP\Extracts\R2-2505767.docx) Remaining open issues for MBS service continuity over NTN Continental Automotive discussion

[R2-2505822](file:///C:\Data\3GPP\Extracts\R2-2505822%20-%20Support%20for%20broadcast%20services%20in%20NR%20NTN.docx) Support for broadcast services in NR NTN Ericsson discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505895](file:///C:\Data\3GPP\Extracts\R2-2505895%20MBS%20broadcast%20over%20NTN.docx) Discussion on MBS broadcast over NTN Huawei, HiSilicon discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505957](file:///C:\Data\3GPP\Extracts\R2-2505957%20Remaining%20issues%20on%20broadcast%20service%20for%20NR%20NTN.docx) Remaining issues on broadcast service for NR NTN CMCC discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505979](file:///C:\Data\3GPP\Extracts\R2-2505979_Discussion%20on%20the%20remaining%20issues%20on%20the%20MBS.doc) Discussion on the remaining issues on the MBS Xiaomi discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2506017](file:///C:\Data\3GPP\Extracts\R2-2506017-Remaining_issues_on_intended_service_area.docx) Remaining issues on intended service area Sharp discussion Rel-19 NR\_NTN\_Ph3-Core

Moved here from 8.8

[R2-2505748](file:///C:\Data\3GPP\Extracts\R2-2505748_ISAaided%20frequency%20deprioritisation%20for%20MBS%20broadcast%20in%20NTN.docx) ISA-aided frequency (de)prioritisation for MBS broadcast in NTN Jio Platforms CR Rel-19 38.304 18.4.0 0443 - B NR\_NTN\_Ph3-Core

* Withdrawn

### 8.8.5 Support of regenerative payload

Contributions, if any, should focus on the needed updates for Stage 2 description and on whether any other existing essential features (not considered so far) would be affected - and potentially need any modifications - in a regenerative payload architecture.

[R2-2505706](file:///C:\Data\3GPP\Extracts\R2-2505706.docx) Stage 2 updates for regenerative payload NEC discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1: clarify UE supports mobility between gNBs operating with transparent and regenerative NTN payloads in section 16.14.3.2

Proposal 2: clarify in section 16.14.3.2.3 that satellite switch with re-synchronization is only for transparent mode

[R2-2505660](file:///C:\Data\3GPP\Extracts\R2-2505660.docx) Satellite switch with re-sync in regenerative payload Sony discussion Rel-19 NR\_NTN\_Ph3-Core

[R2-2505879](file:///C:\Data\3GPP\Extracts\R2-2505879%20Remaining%20issues%20on%20support%20of%20regenerative%20payload.docx) Remaining issues on support of regenerative payload ETRI, Korea University discussion Rel-19 NR\_NTN\_Ph3-Core

### 8.8.6 LTE to NR NTN mobility

Contributions, if any, should focus on any possible missing aspects for the support of idle mode mobility between LTE and NR NTN.

[R2-2505980](file:///C:\Data\3GPP\Extracts\R2-2505980_Discussion%20on%20the%20smtc%20in%20the%20CarrierInforNR-r19.doc) Discussion on the smtc in the CarrierInfoNR-r19 Xiaomi discussion Rel-19 NR\_NTN\_Ph3-Core

* The smtc-r19 is absent in the CarrierInfoNR-r19

Proposal 1: The following options can be considered for UE to determine SMTC when the smtc-r19 is not present in the CarrierInfoNR-r19.

* + Option 1: UE uses the SMTC configured in the SIB24 when the smtc-r19 is not present in the CarrierInfoNR-r19.
  + Option 2: Add the sentence ‘In this release, the smtc is mandatory present in the CarrierInfoNR-r19’ in the field description.
* UE adjusts the SMTC according to the actual propagation delay

Proposal 2: For the smtc-r19 in the CarrierInfoNR-r19, the UE should adjust the offset according to the actual propagation delay.

[R2-2505609](file:///C:\Data\3GPP\Extracts\R2-2505609%20Discussion%20on%20dedicated%20priority%20via%20RRCConnectionRelease.doc) Discussion on dedicated priority via RRCConnectionRelease OPPO discussion Rel-19 NR\_NTN\_Ph3-Core

Proposal 1 Similar to redirection, include the satellite ID information in the FreqPriorityNR IE in RRCConnectedRelease message when E-UTRA provide the dedicated priority for NR NTN frequency.

[R2-2505986](file:///C:\Data\3GPP\Extracts\R2-2505986%20(R19%20NR%20NTN%20WI%20AI%208.8.6)%20LTE%20to%20NR%20NTN%20mobility.docx) Discussion on LTE to NR NTN mobility InterDigital, Inc. discussion Rel-19

Proposal 1: The satellite ID list is present for each entry of FreqPriorityListNR-r15

## 8.9 IoT NTN Ph3

(IoT\_NTN\_Ph3-Core; leading WG: RAN2; REL-19; WID: [RP-243278](file:///C:\Data\3GPP\archive\RAN\RAN%23106\Tdocs\RP-243278.zip))

Time budget: 1 TU

Tdoc Limitation: 3 tdocs

### 8.9.1 Organizational

LS, Rapporteur input, including workplan, running CRs, open issues lists, etc.

Rapporteur inputs do not count towards the tdoc limitation.

Including the outcome of the following email discussion:

[Post130][305][R19 IoT NTN] Stage2 CR (Ericsson)

[Post130][306][R19 IoT NTN] RRC CR (Huawei)

[Post130][307][R19 IoT NTN] MAC CR (Mediatek)

[Post130][308][R19 IoT NTN] 36.304 CR (Nokia)

[Post130][309][R19 IoT NTN] capability CR (Qualcomm)

Incoming LSs

[R2-2505004](file:///C:\Data\3GPP\Extracts\R2-2505004_C1-254119.docx) Reply LS on S&F mode indications to NAS (C1-254119; contact: CICT Mobile) CT1 LS in Rel-19 5GSAT\_Ph3\_ARCH, IoT\_NTN\_Ph3-Core To:RAN2 Cc:SA2

* Noted

[R2-2505021](file:///C:\Data\3GPP\Extracts\R2-2505021_R1-2504905.docx) Reply LS on CB Msg3 EDT for IoT NTN Ph3 (R1-2504905; contact: MediaTek) RAN1 LS in Rel-19 IoT\_NTN\_Ph3 To:RAN2

* Noted

[R2-2505026](file:///C:\Data\3GPP\Extracts\R2-2505026_R1-2504959.docx) Reply LS on CB Msg3 EDT for IoT NTN Ph3 (R1-2504959; contact: MediaTek) RAN1 LS in Rel-19 IoT\_NTN\_Ph3 To:RAN2

* Noted

[R2-2505056](file:///C:\Data\3GPP\Extracts\R2-2505056_S2-2505538.doc) Reply LS on stage 1 requirements for the support for PWS over satellite NGRAN in Rel-17 (S2-2505538; contact: Samsung) SA2 LS in Rel-19 IoT\_NTN\_Ph3-Core To:RAN2, CT1 Cc:SA3, RAN3, SA1

- QC highlights that SA2 agreement is that support is applicable only for NB-IoT RAT over NTN.

* Noted

Stage 2 CR

[R2-2505145](file:///C:\Data\3GPP\Extracts\R2-2505145%20-%2036300_CR1425_(Rel-19)%20-%20Introduction%20of%20IoT%20NTN%20phase%203.docx) Introduction of IoT NTN phase 3 Ericsson CR Rel-19 36.300 18.5.0 1425 - B IoT\_NTN\_Ph3-Core

* Endorsed as a baseline for further discussion

[R2-2506185](file:///C:\Data\3GPP\Extracts\R2-2506185%20-%20IoT%20NTN%20phase%203%20open%20issues%20in%20Stage%202.docx) IoT NTN phase 3 open issues in Stage 2 Ericsson discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 1 If the CB-Msg4 is successfully decoded and it contains a HARQ ACK resource allocation for a UE, the UE shall always send HARQ ACK.

Proposal 2 If the CB-Msg4 is successfully decoded and it contains a matching UE contention resolution identity and a C-RNTI, if UE is later scheduled it follows the configured HARQ feedback enabled/disabled.

Proposal 3 RAN2 to confirm the current modelling in stage 2 where CB-Msg3-EDT is a variant of existing EDT procedures.

- QC thinks we could have separate figures for CB-msg3-EDT

* We confirm the current modelling in stage 2 where CB-Msg3-EDT is a variant of existing EDT procedures, but add separate figures for CB-Msg3-EDT

Proposal 4 RAN2 to discuss whether there is a need for further description of PWS in stage 2.

- vivo thinks we could add examples about the cases where PWS may not be supported

* Can further discuss this in the final CR review

36.331 CR

[R2-2505246](file:///C:\Data\3GPP\Extracts\R2-2505246%20Introduction%20of%20IoT%20NTN%20Ph3.docx) Introduction of IoT NTN Ph3 Huawei, HiSilicon CR Rel-19 36.331 18.6.0 5137 - B IoT\_NTN\_Ph3-Core

* Endorsed as a baseline for further discussion

[R2-2505247](file:///C:\Data\3GPP\Extracts\R2-2505247%20RRC%20open%20issue%20list%20for%20IoT%20NTN.docx) RRC open issue list for IoT NTN Huawei, HiSilicon discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 0: The value ranges for all the RRC parameters can be further checked during the next CR review.

* Agreed

Proposal 1: (RRC-2) RAN2 to discuss whether to allow the UE to skip reading SIB1-NB to shorten the latency of PWS acquisition.

Proposal 2: (RRC-3) RAN2 to discuss whether to allow UE to receive and assemble PWS segments from different cells during mobility based on proponent’s TP.

Proposal 3: (RRC-4) RAN2 to discuss whether the information of current working mode should be forwarded to upper layers after SI acquisition.

Agreements:

1. The value ranges for all the RRC parameters can be further checked during the next CR review.

36.321 CR

[R2-2505201](file:///C:\Data\3GPP\Extracts\R2-2505201%20MAC%20CR1591%20for%20R19%20IoT%20NTN.docx) Introduction of IoT NTN enhancements phase 3 MediaTek Inc. CR Rel-19 36.321 18.4.0 1591 - B IoT\_NTN\_Ph3-Core R2-2504525

* Endorsed as a baseline for further discussion

[R2-2505555](file:///C:\Data\3GPP\Extracts\R2-2505555%20IoT%20NTN%20MAC%20Open%20issues.docx) Remaining MAC open issues in IoT NTN MediaTek Inc. discussion Rel-19 IoT\_NTN\_Ph3-Core R2-2504526

* Potentially easy agreements

Proposal 5: When the CB-Msg3ResponseTimer expires and the maximum number of re-attempts has been reached, the MAC indicates failure of CB-Msg3 transmission to the upper layer (i.e. RRC) [11/11].

* Agreed

Proposal 8: CB-Msg3 response window is modeled as a timer in MAC [12/12].

* Agreed

Proposal 9: If the PDCCH is successfully decoded before CB-Msg3ResponseTimer expires, but the corresponding PDSCH is successfully decoded after the timer has expired, the MAC PDU is treated the same as the one successfully decoded before the timer expires. [11/11]

* Agreed
* Need mode discussion

Proposal 1: RAN2 to confirm the working assumption on CB-RNTI formula [10/11].

Proposal 2: For the agreed CB-RNTI formula from P1, RAN2 to discuss

• Whether to define Msg3\_W\_index to floor(start SFN\_id of Tx window / minimum Tx window length or periodicity].

• Whether to define Y = 16.

• Whether starting value X is optionally configurable.

Proposal 3: Power ramping in CB-Msg3-EDT is NOT supported [9/11].

Proposal 4: RAN2 to choose between 3ms or 0ms processing time when determine the Msg4 monitoring starts.

Proposal 6: RAN2 to discuss the RRC behavior when receiving the CB-Msg3 EDT failure indication from MAC.

Proposal 7: RAN2 to further discuss whether to support multiple TBS.

• Option 1 [4/11] – Support multiple TBS per CE level

• Option 2 [7/11] – One TBS per CE level is enough

o Note that 3 companies think R1 input is needed

Proposal 12: RAN2 to discuss whether to support CQI reporting in anchor carrier and/or non-anchor in CB-Msg3-EDT procedure. If yes, RAN2 to discuss how does the UE prepare DL channel quality measurement result in CB-Msg3 without Msg1/Msg2.

Agreements:

1. When the CB-Msg3ResponseTimer expires and the maximum number of re-attempts has been reached, the MAC indicates failure of CB-Msg3 transmission to the upper layer (i.e. RRC).

2. CB-Msg3 response window is modeled as a timer in MAC.

3. If the PDCCH is successfully decoded before CB-Msg3ResponseTimer expires, but the corresponding PDSCH is successfully decoded after the timer has expired, the MAC PDU is treated the same as the one successfully decoded before the timer expires.

36.404 CR

[R2-2505249](file:///C:\Data\3GPP\Extracts\R2-2505249-IoT-NTN-Running-CR-TS36304_v05_Final.docx) Running CR for IoT-NTN Rel-19 Idle mode procedures Nokia Solutions & Networks (I) CR Rel-19 36.304 18.4.0 0882 - B IoT\_NTN\_Ph3-Core

* Endorsed as a baseline for further discussion

[R2-2505872](file:///C:\Data\3GPP\Extracts\R2-2505872-36.304-Open-Issue-Summary-Final.docx) Rapporteur Summary TS36.304 Open Issues Nokia , Nokia Shanghai Bells discussion

Proposal 1: Introduce acceptable cell support for NB-IoT in Rel-19.

Proposal 1A: Following are the specification changes needed to reflect the support for acceptable cell feature for NB-IoT capable of PWS.

• Figure in 5.2.2-2 to be updated.

• Changes to 5.2.8a to clarify the PWS support of NB-IoT for acceptable cell.

Proposal 1B :

The Text proposal in Annexure A is considered as basis for introducing changes for acceptable cell support for NB-IoT

Proposal 2 : Majority of the responses indicated that working assumption can be confirmed. However no convergence on whether to have specification changes for idle mode operation based on this parameter. RAN2 to discuss the expected UE behavior corresponding to the working assumption on introducing SF mode for neighbour cell.

Proposal 3: RAN2 confirms that it is up to up to UE implementation on how to handle the S&F Monitoring list as specified in TS23.401. No RAN2 SPEC change expected.

Proposal 4: Paging monitoring relaxation for cell operating in SF mode without any stored DL data can be considered for Rel-19 based on assessment of required spec changes. Required spec changes are evaluated based on text proposal from interested companies on the above issue.

UE capability CRs

[R2-2505540](file:///C:\Data\3GPP\Extracts\R2-2505540%20Rel-19%2036306%20Running%20CR.docx) UE capability Running CR for Rel-19 IoT NTN Qualcomm Inc. CR Rel-19 36.306 18.5.0 1912 1 B IoT\_NTN\_Ph3-Core R2-2504321

* Endorsed as a baseline for further discussion

[R2-2505541](file:///C:\Data\3GPP\Extracts\R2-2505541%20Rel-19%2036331%20UE%20cap%20draft%20CR.docx) UE capability draft RRC CR for Rel-19 IoT NTN Qualcomm Incorporated draftCR Rel-19 36.331 18.6.0 IoT\_NTN\_Ph3-Core

* Endorsed as a baseline for further discussion

[R2-2505542](file:///C:\Data\3GPP\Extracts\R2-2505542%20open%20issues%20Rel-19%2036306.docx) Open issues on Rel-19 IoT NTN UE capabilities Qualcomm Incorporated discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 1 nextHopChainingCount-r15 in RRC Release message is reused for CB-Msg3 EDT using UP solution [8/8].

* Agreed (with likely no spec impact)

Proposal 2 RAN2 decide whether to introduce a new optional UE capability without signaling for the support of MT CB-Msg3 EDT for UEs supporting MO CB-Msg3 EDT [5/8].

Proposal 3 From RAN2 perspective, PWS can be supported in NB-IoT Terrestrial Network. Inform SA1 that requirements for PWS support in NB-IoT terrestrial networks should be added.

* From RAN2 perspective, PWS can be supported in NB-IoT Terrestrial Network. Inform SA1 (cc SA2) to consider whether requirements for PWS support in NB-IoT terrestrial networks should be added (FFS about support for acceptable cells)

Proposal 4 No UE radio capability signaling is introduced to indicate whether UE supports S&F mode operation [5/8].

Agreements:

1. nextHopChainingCount-r15 in RRC Release message is reused for CB-Msg3 EDT using UP solution (likely no spec impact)

2. From RAN2 perspective, PWS can be supported in NB-IoT Terrestrial Network. Inform SA1 (cc SA2) to consider whether requirements for PWS support in NB-IoT terrestrial networks should be added (FFS about support for acceptable cells)

R2-2506293 Draft LS PWS support in NB-IoT terrestrial networks Samsung LS out Rel-19 NR\_NTN\_Ph3-Core To:SA1 Cc:SA2

k-Mac extension

[R2-2506174](file:///C:\Data\3GPP\Extracts\R2-2506174%2036331%20Kmac%20extension.docx) k-Mac extension for IoT NTN THALES, Samsung CR Rel-19 36.331 18.6.0 5153 - F IoT\_NTN\_Ph3-Core

* CB Friday

### 8.9.2 Support of Store & Forward

Contributions should focus on remaining open issues related to possible impacts to the radio interface.

[R2-2505370](file:///C:\Data\3GPP\Extracts\R2-2505370%20Leftover%20issues%20on%20the%20satellite%20S&F%20opeartion.docx) Leftover issues on the satellite S&F operation Google discussion Rel-19 IoT\_NTN\_Ph3-Core

* (RRC-4) Whether to forward mode information to the upper layer

Observation 1 (RRC-4) The UE NAS needs to know from the RRC layer the current operation mode of the serving satellite, in order to decide whether to indicate the S&F capability in an Attach or in a TAU procedure.

Proposal 1 (RRC-4) UE forwards the S&F mode indication (i.e., sf-OperationMode) to upper layers upon acquiring it from SIB1(-NB). RAN2 to capture this UE behavior in 3GPP TS 36.331, sub-clause 5.2.2.7.

- ZTE is fine with the intention but thinks we can add another information (i.e. transition time)

- Sateliot thinks this is required for NAS.

* The UE forwards the S&F mode indication (e.g. sf-OperationMode) to upper layers upon acquiring it from SIB1(-NB). RAN2 to capture this UE behavior in 3GPP TS 36.331, sub-clause 5.2.2.7.

regarding the indication to NAS of the transition time:

- HW would like to keep the previous RAN2 agreement, also because this might be used at the application layer even if not needed at NAS layer. Vivo agrees HW.

- Ericsson thinks we should revert the agreement based on the LS received by CT1. Xiaomi/Oppo agree with Ericsson.

- QC thinks no indication to NAS is needed

- Nokia doesn’t see the need to send the transition time to NS but they are ok to keep this

- Toyota thinks we should not revert the agreement.

- Also Apple would like to keep the agreement. ZTE agrees

* We can further discuss this if companies really see the need to revert the previous RAN2 agreement
* The impact of t-ModeSwitching on the UE AS

Observation 2 As the S&F mode indication (i.e., sf-OperationMode) and the legacy barring indications can only change at the boundaries of SI modification periods, the S&F mode transition time (i.e., t-ModeSwitching) signaled in SIB31 allows UEs to know more precisely when the serving cell changes its operational mode.

Proposal 2 Non-S&F-capable UE can utilize the transition time from the normal mode to the S&F mode to determine whether to establish/reestablish/resume an RRC connection (no spec impact).

Proposal 3 Non-S&F-capable UE can utilize the transition time from the normal mode to the S&F mode to determine when to trigger the measurement for cell reselection.

Proposal 4 If P3 is agreed, RAN2 to adopt the TP in Annex into the current 36.304 running CR.

* S&F mode indications for neighbour cells

Proposal 5 The S&F mode indication (i.e., sf-OperationMode) and the S&F mode transition time (i.e., t-ModeSwitching) of the neighbor satellite are signaled in SIB33 per neighbor satellite.

- Sateliot would like to confirm the WA and supports the proposal

- QC supports this but thinks transition time could be optional (and thinks UE behaviour could left to UE implementation)

- Panasonic thinks this should be per satellite ID

- vivo thinks it’s not clear how this would be used by the UE. MTK agrees

- Ericsson supports this and thinks we should clarify the UE behaviour in terms of cell reselection. IDC agrees

- ZTE supports this

- Nokia thinks the information would be useful at the application layer

* The S&F mode indication (i.e., sf-OperationMode) and the S&F mode transition time (i.e., t-ModeSwitching) of the neighbor satellite are signaled in SIB33 per neighbor satellite.

- Sateliot thinks the same indication should be included in SIB32

Proposal 6 Non-S&F-capable UE deprioritizes the neighbor cells operating in the S&F mode by decreasing the cell rankings of these neighbor cells by a common delta value.

* A Rel-19 UE may deprioritize the neighbor cells operating in the S&F mode (FFS on the detailed specification impact, i.e. whether a note is sufficient or some normative text. To be considered in the post meeting CR review)

- IDC thinks we could also allow the NW to signal some offset instead

[R2-2505228](file:///C:\Data\3GPP\Extracts\R2-2505228.docx) Discussion on cell reselection enhancement based on the S&F monitoring list CATT, Samsung, Google, Huawei, Thales, Sateliot discussion Rel-19 IoT\_NTN\_Ph3-Core

Observation 1: SA2 agreed that the S&F Monitoring list is used by the UE assist with saving power and determining which satellites to receive MT data/signalling.

Observation 2: As specified in the latest TS 23.401, SA2 intends to leave some room for the UE to decide which S&F satellite to access, with the consequence also specified that if the UE access a satellite that is not belonging to the S&F Monitoring List there is increased probability that it will not be able to complete the NAS procedure.

Observation 3: Following the current cell (re)selection procedure, the UE shall (re)select to/camp on a cell that meets related RSRP/RSRQ conditions and the NW configured priority. This leaves no room for UE implementation to further consider the S&F Monitoring list as specified in SA2 Spec, resulting in increasing UE access failure as highlighted by SA2 (in case of an access attempt to a satellite not in the S&F Monitoring list).

Proposal 1: RAN2 agrees that the UE may not consider the cell operating in S&F mode as a suitable cell for reselection, if it is not a cell provided by the satellites included in the S&F Monitoring list.

- Xiaomi thinks it could be risky to prevent reselection to a normal cell

- Ericsson does not agree with this. Nokia agrees and thinks this information is about pending NAS procedures and it should not affect cell reselection. ZTE also agrees.

- HW thinks we can discuss AS impacts for this and sees some benefit to consider this information

- CATT thinks we should clarify some AS impacts due to this. IDC agrees

- Sateliot thinks we should at least pass the Satellite ID information to the NAS level. ZTE could agrees. IDC thinks this could work but it would be less efficient. Nokia is ok with this, but cell reselection should not be prevented

- QC thinks we should not send information to NAS but indicate in AS that the use of this information is up to UE implementation

- Ericsson has some sympathy for sending the information but thinks this should be requested by CT1

* We send an LS to CT1 asking whether the Satellite ID information broadcast in SIB should be sent to NAS
* Draft an LS in R2-2508285 (Sateliot)

Proposal 1a: RAN2 adopts the TP provided in the Annex A as the baseline, if Proposal 1 is agreeable.

Proposal 2: RAN2 discusses whether any new assistance information needs to be introduced into system information for the S&F operation (e.g. mapping between satellite ID(s) and {frequency(ies), PCI(s)}), if Proposal 1 is agreeable.

[R2-2505229](file:///C:\Data\3GPP\Extracts\R2-2505229.docx) Discussion on relaxation of IDLE mode task based on the S&F monitoring list CATT, Samsung, Google, Thales discussion Rel-19 IoT\_NTN\_Ph3-Core

Observation 1: SA2 agreed that the S&F monitoring list is used by the UE assist with saving power and determining which satellites to receive MT data/signalling.

Proposal 1: When a S&F monitoring list is configured by upper layers, the UE may stop the IDLE mode tasks (e.g. cell (re)selection, paging monitoring, etc.) if the UE determines that it is out of coverage of all target satellite(s) indicated by the list. Endorse the TP in Annex.

Proposal 2: Clarify that the satellite IDs within the S&F monitoring list refers to the satelliteId with long-term valid ephemeris in SIB32.

[R2-2506152](file:///C:\Data\3GPP\Extracts\R2-2506152%20-%20On%20Satellite%20ID%20aspects%20for%20S&F.docx) On Satellite ID aspects for S&F Satellite operation Sateliot, Thales, Novamint, CATT, Samsung, Ericsson, Nordic discussion Rel-19 R2-2504617

* Alignment of Satellite IDs:

Observation 1: AS-based and NAS-based satellite IDs are of the same type.

Observation 2: A UE that has been provided with a “S&F Monitoring List”, which includes a list of satelliteIDs, is expected to determine the satelliteID value of NTN cells operating in S&F from the satelliteID information broadcast in the SIBs.

Proposal 1: RAN2 is respectively requested to add a stage-2 description in Rel-18 specs to clarify that the satellite identifier value used in different SIB messages to identify the satellite assistance information of one certain satellite should be the same.

Proposal 2: RAN2 is respectfully requested to add a stage-2 description in Rel-19 specs to state that the satellite identifier values used at the AS-level (e.g., satellite identifiers included in SIB messages) and the NAS-level (e.g. satellite identifiers included in the S&F Monitoring list) are sent consistently, i.e. with the same value, when they refer to the same satellite (related TP provided in the Annex)

- ZTE thinks we should not discuss NAS aspects in AS specs

- Xiaomi supports the proposal, we should indicate that this should be ensured by NW implementation and inform other relevant groups

* We clarify the stage-2 description in 36.300 to state that the satellite identifier values used at the AS-level (e.g., satellite identifiers included in SIB messages) and the NAS-level (e.g. satellite identifiers included in the S&F Monitoring list) are set consistently, i.e. with the same value, when they refer to the same satellite (FFS on the actual wording)
* Inform CT1 and SA2 about this in the LS out
* Scope and uniqueness of Satellite IDs:

Proposal 3: RAN2 is respectfully requested to continue discussion on the scope and uniqueness of satellite IDs, considering options such as:

1) A satellite identifier value should uniquely identify a satellite to the UE within a PLMN

2) Quasi(?)-Global uniqueness based on an identifier such as PLMN

3) Cell-specific uniqueness

4) Up to network/UE implementation (e.g. the satellite Id does not have to be unique for the whole life of the network, but maybe only for a sufficiently long period of time ensuring that an assistance information got from SIB by the UE has expired and so, not be used)

Proposal 4: RAN2 is respectfully requested to capture outcome of P3 in Stage 2.

Proposal 5: If uniqueness is established to be quasi(?)-global and the value range of existing defined satellite IDs (satelliteId-r17/r18) is not enough, then introduce new satelliteId-r19.

Proposal 6: RAN2 discuss informing other WGs for alignment.

* Continue the discussion offline 305

[R2-2505105](file:///C:\Data\3GPP\Extracts\R2-2505105_S&F.doc) Discussion on Store and Forward operation Xiaomi discussion Rel-19 IoT\_NTN\_Ph3-Core

* Architecture option broadcasting

Proposal 3: RAN2 to consider indicating S&F architecture option (Split MME or Full CN) in SIB.

Proposal 4: UE does not initiate user plane establishment and user plane data transfer in the cell indicating split MME architecture.

[R2-2505437](file:///C:\Data\3GPP\Extracts\R2-2505437%20Further%20consideration%20on%20Store%20and%20Forward.docx) Further consideration on Store and Forward Huawei, HiSilicon, China Telecom discussion Rel-19 IoT\_NTN\_Ph3-Core

Paging in S&F satellite operation

Proposal 1:An indication is introduced in the System information to indicate that the UE could skip monitoring paging and initiating RRC connection for MT data reception.

* Continue the discussion offline 305
* [AT131][305][R19 IoT NTN] S&F open issues (Sateliot)

Scope: continue the discussion on remaining proposals from [R2-2506152](file:///C:\Data\3GPP\Extracts\R2-2506152%20-%20On%20Satellite%20ID%20aspects%20for%20S&F.docx) and p1 and [R2-2505437](file:///C:\Data\3GPP\Extracts\R2-2505437%20Further%20consideration%20on%20Store%20and%20Forward.docx). Also draft the LS to CT1, SA2

Intended outcome: summary of the offline discussion (in R2-2506288). Draft LS in R2-2506285

Offline time: FFS

Deadline for offline discussion summary: Friday 2025-08-29 18:00

R2-2506288 Report of [AT131][305][R19 IoT NTN] S&F open issues Sateliot discussion IoT\_NTN\_Ph3-Core

Agreements:

1. The UE forwards the S&F mode indication (e.g. sf-OperationMode) to upper layers upon acquiring it from SIB1(-NB). RAN2 to capture this UE behavior in 3GPP TS 36.331, sub-clause 5.2.2.7.

2. The S&F mode indication (i.e., sf-OperationMode) and the S&F mode transition time (i.e., t-ModeSwitching) of the neighbor satellite are signaled in SIB33 per neighbor satellite.

3. A Rel-19 UE may deprioritize the neighbor cells operating in the S&F mode (FFS on the detailed specification impact, i.e. whether a note is sufficient or some normative text. To be considered in the post meeting CR review)

4. We clarify the stage-2 description in 36.300 to state that the satellite identifier values used at the AS-level (e.g., satellite identifiers included in SIB messages) and the NAS-level (e.g. satellite identifiers included in the S&F Monitoring list) are set consistently, i.e. with the same value, when they refer to the same satellite (FFS on the actual wording)

R2-2506285 Draft LS on Satellite ID for S&F Sateliot LS out Rel-19 IoT\_NTN\_Ph3-Core To:CT1 Cc:SA2

[R2-2505081](file:///C:\Data\3GPP\Extracts\R2-2505081%20Remaining%20Issues%20on%20S&F%20Operation.docx) Remaining Issues on S&F Operation vivo discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505146](file:///C:\Data\3GPP\Extracts\R2-2505146_892_Panasonic_IoT-NTN_SnF_Remaining_Neighbour_Cell_Issues.docx) Store & Forward: Remaining Neighbour Cell Issues PANASONIC discussion

[R2-2505178](file:///C:\Data\3GPP\Extracts\R2-2505178%20Discussion%20on%20support%20of%20Store&Forward.docx) Discussion on support of Store&Forward Transsion Holdings discussion Rel-19

[R2-2505230](file:///C:\Data\3GPP\Extracts\R2-2505230.docx) Discussion on leftover issues of S&F operation CATT discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505257](file:///C:\Data\3GPP\Extracts\R2-2505257%20Remaining%20issues%20for%20S&F%20operation.docx) Remaining issues for S&F operation ZTE Corporation, Sanechips discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505294](file:///C:\Data\3GPP\Extracts\R2-2505294%20Remaining%20consideration%20on%20Store%20and%20Forward.docx) Remaining consideration on Store & Forward operation DENSO CORPORATION discussion IoT\_NTN\_Ph3-Core

[R2-2505437](file:///C:\Data\3GPP\Extracts\R2-2505437%20Further%20consideration%20on%20Store%20and%20Forward.docx) Further consideration on Store and Forward Huawei, HiSilicon, China Telecom discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505494](file:///C:\Data\3GPP\Extracts\R2-2505494_Store%20and%20Forward.doc) Remaining issues in S&F operation Apple discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505550](file:///C:\Data\3GPP\Extracts\R2-2505550%20-%20Discussion%20on%20Store%20&%20Forward%20satellite%20operation.docx) Discussion on Store & Forward satellite operation OPPO discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505567](file:///C:\Data\3GPP\Extracts\R2-2505567%20RAN2%20impact%20on%20SF%20mode.docx) RAN2 impact on S&F mode MediaTek Inc. discussion IoT\_NTN\_Ph3-Core R2-2504527

[R2-2505690](file:///C:\Data\3GPP\Extracts\R2-2505690%20Some%20remaining%20issues%20for%20S&F%20operation%20mode%20and%20transition%20time.docx) Some remaining issues for S&F operation mode and transition time Lenovo discussion Rel-19

[R2-2505798](file:///C:\Data\3GPP\Extracts\R2-2505798.docx) Discussion on Paging and Mode Switching Toyota ITC discussion Rel-19 IoT\_NTN\_Ph3-Core R2-2504097

[R2-2505823](file:///C:\Data\3GPP\Extracts\R2-2505823%20-%20Support%20for%20store%20and%20forward%20in%20IoT%20NTN.docx) Support for store and forward in IoT NTN Ericsson discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505871](file:///C:\Data\3GPP\Extracts\R2-2505871-Store-Forward-RAN-Aspects-V1.docx) Open issues for SF operation Nokia , Nokia Shanghai Bells discussion

[R2-2505878](file:///C:\Data\3GPP\Extracts\R2-2505878%20Remaining%20issues%20on%20Store%20and%20Forward.docx) Remaining issues on Store and Forward satellite operation ETRI, Korea University discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505916](file:///C:\Data\3GPP\Extracts\R2-2505916%20Open%20issues%20on%20Store%20and%20Forward%20operation.docx) Open issues on Store and Forward operation Samsung discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505928](file:///C:\Data\3GPP\Extracts\R2-2505928.doc) Remaining issues for Store & Forward satellite operation SHARP Corporation discussion

[R2-2505962](file:///C:\Data\3GPP\Extracts\R2-2505962%20Discussion%20on%20Store%20and%20Forward%20remaining%20issues.docx) Discussion on Store and Forward remaining issues CMCC discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2506033](file:///C:\Data\3GPP\Extracts\R2-2506033%20Discussion%20on%20usage%20of%20time%20information%20for%20S&F.docx) Discussion on usage of time information for S&F ASUSTeK discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2506070](file:///C:\Data\3GPP\Extracts\R2-2506070%20Discussion%20on%20the%20Store%20and%20Forward%20satellite%20operation.docx) Discussion on the Store and Forward satellite operation HONOR discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2506151](file:///C:\Data\3GPP\Extracts\R2-2506151%20-%20Cell%20reselection%20and%20idle%20mode%20tasks%20for%20S&F.docx) On cell (re)selection and idle mode task relaxation for S&F Satellite operation Sateliot, Thales, Novamint discussion Rel-19 R2-2504617

[R2-2506156](file:///C:\Data\3GPP\Extracts\R2-2506156%20(R19%20IoT-NTN%20AI%208.9.2)%20-%20Support%20of%20S+F.docx) Store and Forward open issues Interdigital, Inc. discussion Rel-19 IoT\_NTN\_Ph3-Core

### 8.9.3 Uplink Capacity Enhancement

Contributions should focus on remaining open issues related to the enhancements to reduce the necessary uplink and downlink signaling to complete an EDT transaction (Msg3 transmission without msg1/RAR; efficient delivery of msg4 / RRCEarlyDataComplete).

* Working Assumption confirmation on CB-RNTI formula

including

* + Whether to define Msg3\_W\_index to floor(start SFN\_id of Tx window / minimum Tx window length or periodicity].
  + Whether to define Y = 16.
  + Whether starting value X is optionally configurable.

(RAN2#130 Working Assumption:

The formula for RNTI for mMsg4 monitoring is:

RNTI=X + Msg3\_W\_index modulo (Y) + Y\*CE\_level + 3\*Y\*carrier\_id.

• X is the starting RNTI for Msg4 reception, which can be defined by RAN2 e.g. X=2401 for eMTC or 4097 for NB-IoT,

• Msg3\_W\_index is the index of Msg3 transmission window within a periodicity of 1024 SFNs and index 0 corresponds to the Msg3 transmission window starts at the SFN defined by IE startSFN-r19,

• Y is ceil (Msg4\_WS/Msg3\_WP),

• CE\_level is the CE level, 0 <= CE\_level < 3

• carrier\_id is the index of the UL carrier of the CB-Msg3 resources, anchor carrier has index 0,

0 <= carrier\_id < 16

Can come back to check if the NW can also simply configure RNTI = X)

[R2-2506416](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506416.zip) Discussion on CB-RNTI Mediatek discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal: The CB-RNTI is calculated as below:

• For eMTC

o 2401 + floor (start SFN\_id of Tx window/2)

• For NB-IoT

o 4097 + floor (start SFN\_id of Tx window/4) + 256\*carrier\_id

o carrier\_id is the index of the UL carrier associated with the selected UL grants (0 <= carrier\_id < 16). The carrier\_id of the anchor carrier is 0.

- QC thinks we should confirm the WA and fix what is needed (Y with a fixed value). We should also keep the CE level

- Ericsson is generally ok with this proposal but not sure about the carried ID

* Continue in offline 302

[R2-2505082](file:///C:\Data\3GPP\Extracts\R2-2505082%20Remaining%20Issues%20on%20CB-Msg3%20EDT%20Mechanism.docx) Remaining Issues on CB-Msg3 EDT Mechanism vivo discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 5 (MAC-2): RAN2 confirms that the network configuration of RNTI = X is not supported.

Proposal 6 (MAC-2): For CB-RNTI, define Msg3\_W\_index to floor(start SFN\_id of Tx window / minimum Tx window length or periodicity).

Proposal 7 (MAC-2): For CB-RNTI, RAN2 confirms that there is no need to define Y=16. The configurable value of Msg3\_WP is designed taking the valid range of CB-RNTI into account.

Proposal 8 (MAC-2): For CB-RNTI, RAN2 confirms that X is a hard-coded value.

[R2-2505551](file:///C:\Data\3GPP\Extracts\R2-2505551-%20Discussion%20on%20CB-msg3%20EDT%20and%20msg4%20enhancement-V1.docx) Discussion on CB-Msg3 EDT and Msg4 enhancement OPPO discussion Rel-19

Proposal 1 The WA on CB-RNTI calculation formula can be confirmed.

Proposal 2 Define Msg3\_W\_index to floor (start SFN\_id of Tx window / Tx window periodicity) where the Tx window periodicity configured for the selected CE level and carrier is used.

[R2-2505231](file:///C:\Data\3GPP\Extracts\R2-2505231.docx) Discussion on open issues for CB-Msg3 EDT CATT discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 2 (MAC-2): For the agreed CB-RNTI formula:

- Replace the Msg3\_W\_index with floor(SFN\_id / [minimum Tx window periodicity]), where SFN\_id is the index of the first radio frame of the selected CB-Msg3 transmission window.

- Replace Y (i.e., ceil(Msg4\_WS/Msg3\_WP)) as a fixed value; the exact value can be determined when the candidate lengths of CB-Msg3 response timer length and CB-Msg3 transmission window periodicity are finalized.

- Stick to fixed X value in the CB-RNTI formula, i.e., 2401 for eMTC or 4097 for NB-IoT.

[R2-2505258](file:///C:\Data\3GPP\Extracts\R2-2505258%20Remaining%20issues%20for%20CB-msg3-EDT.docx) Remaining issues for CB-msg3-EDT ZTE Corporation, Sanechips discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 1c: It’s no need to introduce any factor (e.g., modulo (Y)) to adjust the result of [floor (start SFN\_id of Tx window/minimum Tx window periodicity)]. So the final formula can be like:

RNTI=X + [floor (start SFN\_id of Tx window/minimum Tx window periodicity)] + Y\*CE\_level + 3\*Y\*carrier\_id

[R2-2506184](file:///C:\Data\3GPP\Extracts\R2-2506184%20-%20UL%20capacity%20enhancements%20for%20IoT%20NTN.docx) UL capacity enhancements for IoT NTN Ericsson discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 6 A first CB-Msg3 window (M = 0), starting in startH-SFN and startSFN, is associated with a CB-RNTI equal to startCB-RNTI.

Proposal 7 For the Mth CB Msg3 window before or after the first CB-Msg3 window, the associated CB-RNTI is equal to:

CB-RNTI = startCB-RNTI + (M modulo (nrofCB-RNTI))

* Whether to support OCC

[R2-2505536](file:///C:\Data\3GPP\Extracts\R2-2505536%20OCC.docx) Support of OCC Qualcomm Incorporated, European Space Agency, German Aerospace Center discussion Rel-19 IoT\_NTN\_Ph3-Core

Observation 1. The procedure for Msg3 transmission and Msg4 reception defined for non-OCC based CB-Msg3 EDT is applicable for OCC-based CB-Msg3 EDT. Only additional work is to define signalling support for OCC configuration.

Observation 2. Even a power imbalance of 10 dB results in only a performance degradation that is minimal i.e., 0.25 dB for NPUSCH with OCC.

Proposal 1 Confirm that OCC-based CB-Msg3 EDT is supported.

- Toyota agrees OCC should support OCC in Rel-19

[R2-2505571](file:///C:\Data\3GPP\Extracts\R2-2505571%20Discussion%20on%20CB-Msg3-EDT.docx) Discussion on CB-Msg3 procedure MediaTek Inc. discussion IoT\_NTN\_Ph3-Core R2-2504528

“There is still a significant amount of unfinished normative work, such as the OCC resource design, details on the RSRP threshold for transmitting CB-Msg3 using OCC, how the UE chooses OCC-based and OCC-free CB-Msg3 resource, how the UE selects the OCC code, how the UE transmits replicas using OCC, whether an extension of the CB-Msg4 monitoring window is needed, UE capability, etc. It is unlikely that all of these can be completed in a single RAN2 meeting. Therefore, we suggest that the OCC for CB-Msg3 is not supported in Release 19.”

Proposal 1: OCC for CB-Msg3 is NOT supported in Release 19.

- Ericsson agrees we should not support OCC in this release and RAN1 might still have to work on this. Oppo agrees. Nokia also agrees

- Session chair thinks that rather than the possible performance degradation and the need for further RAN1 work, a possible implication of supporting OCC for CB-Mg3-EDT is the need for further resource partitioning

- QC and ZTE thinks that if we don’t take an agreement to introduce OCC now we can continue the work and then come back to add OCC support later, e.g. via TEi19

* We don’t further work on the inclusion of OCC support for CB-Msg3-EDT as part of IoT\_NTN\_Ph3-Core in Rel19.

- Session chair thinks that supporting companies might come back and suggest to introduce OCC support for CB-Msg3-EDT at a later point in time

* Power ramping

[R2-2505632](file:///C:\Data\3GPP\Extracts\R2-2505632%20Remaining%20issues%20on%20UL%20capacity%20enhancement%20for%20IoT%20NTN.docx) Remaining issues on UL capacity enhancement for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-19 IoT\_NTN\_Ph3-Core

Observation 2: The CB-Msg3 UL transmission power calculation is not clearly defined in TS36.213 (i.e., which j should be followed for CB-Msg3 UL transmission power calculation).

Observation 3: In legacy Msg3 transmission, UE can not only perform Msg3 power ramping but also increase its CE level to improve the Msg3 transmission successful rate.

Observation 4: The UE has no means to improve its CB-Msg3 transmission reliablity if both the CB-Msg3 power ramping and the CE level increase are not supported.

Observation 5: There is no clear conclusion in RAN1 whether the CB-Msg3 power ramping should be supported because they have no time for performance evaluation. RAN2 can make the final decision considering the CB-Msg3 CE level increase is forbidden.

Proposal 3: Power ramping between CB-Msg3 windows is supported.

Propo

sal 4: The same principle as for legacy Msg3 power ramping (j=2) should be followed to limit the specification impact.

- vivo thinks that without RAN1 work we cannot decide on power ramping

- ESA thinks that if we can use existing procedures for power ramping we should do it

- Samsung thinks we have agreed to avoid increasing the CE level assuming that there would be power ramping.

- IDC is not sure we should introduce power ramping without RAN1

- HW thinks power ramping is not essential

- ZTE is ok to discuss a possible simple power ramping scheme

* We try to define a simple power ramping scheme reusing existing mechanisms and then we inform RAN1 inviting them to respond if they find a problem
* Continue in offline 302

From [R2-2505231](file:///C:\Data\3GPP\Extracts\R2-2505231.docx), [R2-2505736](file:///C:\Data\3GPP\Extracts\R2-2505736%20Further%20consideration%20on%20UL%20capacity%20enhancement.docx), [R2-2505551](file:///C:\Data\3GPP\Extracts\R2-2505551-%20Discussion%20on%20CB-msg3%20EDT%20and%20msg4%20enhancement-V1.docx), [R2-2505958](file:///C:\Data\3GPP\Extracts\R2-2505958%20Discussion%20on%20remaining%20issues%20of%20uplink%20capacity%20enhancement%20for%20IoT-NTN.docx):

Proposal: Power ramping is not supported for CB‑msg3‑EDT in Rel‑19

- QC agrees that power ramping might not be needed

* processing time

[R2-2506184](file:///C:\Data\3GPP\Extracts\R2-2506184%20-%20UL%20capacity%20enhancements%20for%20IoT%20NTN.docx) UL capacity enhancements for IoT NTN Ericsson discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 8 The NW processing time shall be considered for the start of Msg4 monitoring.

Observation 4 In legacy eMTC and NB-IoT, there is always 3 ms processing time for the eNB between a (N)PUSCH transmission and (N)PDCCH monitoring.

Proposal 9 The UE shall start PDCCH monitoring for CB-Msg4 earliest UE-eNB RTT + 3 ms after the end of the CB-Msg3 window.

[R2-2505632](file:///C:\Data\3GPP\Extracts\R2-2505632%20Remaining%20issues%20on%20UL%20capacity%20enhancement%20for%20IoT%20NTN.docx) Remaining issues on UL capacity enhancement for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-19 IoT\_NTN\_Ph3-Core

“In TS36.321, the start time of the Msg3 response window were defined in both the legacy RACH and PUR, in which 4 ms were considered in PUR while it is not added in RACH contention resolution.

For CB-Msg3, we tend to keep the specification simple and align the UE behaviour with the contention resolution timer as defined in legacy RACH procedure. Furthermore, the processing time may not be needed in order to start the transmission of CB-Msg4 earlier since the network can process the Msg3 transmission and prepare for Msg4 transmission well in advance for those UEs who transmit the Msg3 at the early part of CB-Msg3 transmission window.”

Proposal 5: When the Msg4 monitoring window starts at the end of CB-Msg3-EDT transmission window plus UE-eNB RTT, there is no need to consider additional delays for NW/UE processing time.

- Xiaomi and MTK would like to keep things simple and support the proposal

- Ericsson can also accept this

* Agreed
* RRC behavior when receiving the CB-Msg3 EDT failure indication from MAC.

[R2-2505493](file:///C:\Data\3GPP\Extracts\R2-2505493_Contention%20based%20MSG3.doc) Remaining issues in CB-Msg3 Apple discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 3: In Section 5.3.3.1b of RRC spec, add a note that when both CB-Msg3-EDT and legacy EDT conditions are met, which one to select is up to UE.

* We leave to UE implementation to decide in which order the conditions to trigger the different procedures are met.

Proposal 4: RAN2 to down select between Option 1 and Option 2, to support fallback from CB-Msg3-EDT to RACH based EDT.

• Option 1: RRC procedure is not re-initiated. Same Msg3 is transmitted for RACH based EDT.

• Option 2: RRC procedure is re-initiated (T300 is re-started), and how to avoid data loss is up to UE implementation.

* When the RRC layer receives a CB-Msg3 EDT failure indication from the MAC layer the RRC procedure is re-initiated (how to avoid data loss is up to UE implementation). Which procedure (e.g. EDT, 4-step RACH, CB-Msg3-EDT) is initiated is up to UE implementation

Proposal 4a: If Option 1 is taken, the following procedures could be considered.

0) MAC notifies CB-Msg3-EDT failure to upper layer;

1) RRC layer continues with RACH based EDT condition checking and if RACH based EDT condition is met:

- RRC message is not re-generated;

- T300 keeps running (not re-started);

2) RRC layer informs MAC layer for EDT based RACH together with an indication “not flush Msg3”

3) MAC layer initiates EDT based RACH, with the same Msg3.

- Ericsson thinks for EDT we did not specify how this is done and we could leave this to UE implementation. CATT and Oppo agree

- MTK thinks option 1 is too complex and we could leave this to UE implementation.

- Samsung wonders what happens to T300 and maybe one solution is to specify option 2

- HW thinks that option 2 is simpler

- Xiaomi can accept option 2

Proposal 5: Add one more condition for CB-Msg3-EDT condition checking that “CB-Msg3-EDT fallback indication has not been received from lower layers for this establishment or resumption procedure”.

[R2-2505632](file:///C:\Data\3GPP\Extracts\R2-2505632%20Remaining%20issues%20on%20UL%20capacity%20enhancement%20for%20IoT%20NTN.docx) Remaining issues on UL capacity enhancement for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 6: When the RRC layer receives a CB-Msg3 EDT failure indication from the MAC layer, it may let the UE fall back to legacy 4-step RACH or EDT. The UE shall follow the legacy mechanism to determine whether to trigger EDT.

Proposal 7: The Msg3 buffer shall not be flushed when the UE falls back from the CB-Msg3 EDT procedure to the legacy 4-step RACH or EDT.

Proposal 8: The RRC layer shall provide a CB-Msg3 fallback indication to the MAC layer.

* Whether to support multiple TBS.(multiple vs one TBS per CE level)

[R2-2505632](file:///C:\Data\3GPP\Extracts\R2-2505632%20Remaining%20issues%20on%20UL%20capacity%20enhancement%20for%20IoT%20NTN.docx) Remaining issues on UL capacity enhancement for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 9: Multiple TBSs and TBS selection are supported for CB-Msg3 EDT.

- vivo thinks in any case we cannot decide this in RAN2 without RAN1. Xiaomi agrees

- Samsung thinks this is not a critical enhancement

* We don’t support multiple TBSs per CE level for CB-Msg3 EDT

Proposal 10: RAN2 to downselect below two options:

• Option1: NW can configure multiple CB-Msg3 TBSs for a CE level (to avoid RAN1 impact)

• Option2: UE is allowed to select TBS smaller than the configured CB-Msg3 TBS for the corresponding CE level.

[R2-2505537](file:///C:\Data\3GPP\Extracts\R2-2505537%20EDT%20enh.docx) CB-Msg3-EDT and Msg4 multicast Qualcomm Incorporated discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 5 Support multiple-TBSs option same as that of Rel-15 EDT.

Proposal 6 Support smaller TBS size of 144 bits for CB-Msg3 EDT.

* We introduce one or a few more additional values smaller than the smallest possible TBS size at the moment (328bits), e.g. 144bits (Come back by the end of the week with the exact new value, or list of new values).
* CB Friday
* whether to support CQI reporting in anchor carrier and/or non-anchor in CB-Msg3-EDT procedure. If yes, RAN2 to discuss how does the UE prepare DL channel quality measurement result in CB-Msg3 without Msg1/Msg2.

[R2-2505917](file:///C:\Data\3GPP\Extracts\R2-2505917%20On%20open%20issues%20for%20CB-Msg3-EDT.docx) On open issues for CB-Msg3-EDT Samsung discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 5: RAN2 to confirm CQI reporting (in RRCEarlyData and DCQR and AS RAI MAC CE) in CB-Msg3 for CB-Msg3-EDT (for CP/UP eMTC and NB-IoT) is supported for anchor carrier.

- MTK thinks this CQI reporting is not very useful in this procedure and we can avoid supporting this. Nokia agrees

- QC thinks this could be supported at least for anchor carrier

- Xiaomi wonders if also for the anchor carrier we need to check with RAN1

- vivo thinks we need to also ask RAN4

- HW is reluctant to introduce this if it impacts other WGs

- Samsung thinks that in any case we need to spec changes to say that CQI reporting is not include in this case

* We clarify that CQI reporting is not included in CB-Msg3 for CB-Msg3-EDT for non-anchor carrier
* CB Friday to decide on the anchor carrier case
* Further details on resource configuration

[R2-2505082](file:///C:\Data\3GPP\Extracts\R2-2505082%20Remaining%20Issues%20on%20CB-Msg3%20EDT%20Mechanism.docx) Remaining Issues on CB-Msg3 EDT Mechanism vivo discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 1: RAN2 confirms that both multi-PRB allocation and sub-PRB allocation are supported for CB-Msg3.

Proposal 2: RAN2 confirms that both single-tone and multi-tone are supported for CB-Msg3, and intends to reuse the parameter npusch-MCS-r16 for CB-Msg3.

Proposal 3: RAN2 confirms only one narrowband is configured for MPDCCH monitoring, as the running CR implementation.

Proposal 4: RAN2 sends an LS to RAN1 to inform them of Proposal 1 and Proposal 2.

Proposal 9 (RRC-1.4): CB-Msg3 transmission window length and periodicity are configured in multiples of the CB-Msg3 PUSCH periodicity (e.g., value ranging from 1..32).

[R2-2505632](file:///C:\Data\3GPP\Extracts\R2-2505632%20Remaining%20issues%20on%20UL%20capacity%20enhancement%20for%20IoT%20NTN.docx) Remaining issues on UL capacity enhancement for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 14: To support capacity enhancement in line with the objective of the WI, the MPDCCH narrowband configuration for CB-Msg4 monitoring shall be defined as a set, following the legacy RACH procedure.

[R2-2505258](file:///C:\Data\3GPP\Extracts\R2-2505258%20Remaining%20issues%20for%20CB-msg3-EDT.docx) Remaining issues for CB-msg3-EDT ZTE Corporation, Sanechips discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 3: It’s suggested to use value 3 as the number of frequency-domain resources set for both eMTC and NB-IoT.

Proposal 4a: It’s suggested to define the length of CB-msg3 transmission window in units of (N)PUSCH resources periodicity.

Proposal 4b: It’s suggested to introduce a multiplication factor for parameter of replicas, e.g., K as the configurable parameter for the length of CB-msg3 transmission window. The final value of the length of CB-msg3 transmission window is the result of [(the number of replicas) multiplied by the factor of K], that is:

Length of CB-msg3 transmission window = [(the number of replicas) \* K] \* (N)PUSCH resources periodicity

Proposal 4c: The number of K can be configured by the NW with the maximum value of 4.

Proposal 4d: It’s suggested to also define the periodicity of CB-msg3 transmission window as a value in units of (N)PUSCH resources periodicity.

[R2-2506184](file:///C:\Data\3GPP\Extracts\R2-2506184%20-%20UL%20capacity%20enhancements%20for%20IoT%20NTN.docx) UL capacity enhancements for IoT NTN Ericsson discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 5 The periodicity of (N)PUSCH resources for CB-Msg3 is not larger than H-SFN duration.

* On CB-Msg3-EDT completion

[R2-2505369](file:///C:\Data\3GPP\Extracts\R2-2505369%20Leftover%20issues%20on%20CB-Msg3-EDT.docx) Leftover issues on CB-Msg3-EDT Google discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 1 Upon receiving a matching Contention Resolution Identity and a C-RNTI in a CB-Msg4, the UE does not consider the CB-Msg3-EDT procedure has ended and continues monitoring PDCCH for receiving an RRC message responding to the RRCEarlyDataRequest.

- Ericsson thinks this is how it is currently described in the running CR

* Upon receiving a matching Contention Resolution Identity and a C-RNTI in a CB-Msg4 without an RRC message, the UE considers UL transmission as successful but the UE does not consider the CB-Msg3-EDT procedure has ended and continues monitoring PDCCH.

Proposal 2 Upon receiving a CB-Msg4 including a matching Contention Resolution Identity without including an RRC message or a C-RNTI, the UE terminates the CB-Msg3-EDT procedure and keeps in RRC\_IDLE.

* Upon receiving a CB-Msg4 including a matching Contention Resolution Identity without including both an RRC message and a C-RNTI, the UE behaves as if it received an empty EarlyDataComplete message, terminates the CB-Msg3-EDT procedure and keeps in RRC\_IDLE.

Proposal 3 The UE indicates to the network, whether it is able to terminate a CB-Msg3-EDT procedure upon receiving a CB-Msg4 containing no RRC message, as one of its capabilities.

Proposal 4 The UE can indicate in CB-Msg3, whether DL data following the UL data in CB-Msg3 is expected or not.

- ZTE wonders if this is needed

- IDC highlights that we specified the same behavior in PUR

- QC thinks there are NAS mechanisms for this

* Based on NW indication, it shall be possible for the UE to indicate during CB-Msg3-EDT procedure whether DL data following the UL data in CB-Msg3 is expected or not. FFS whether existing fields can be reused or new ones introduced
* CB Friday

[R2-2505917](file:///C:\Data\3GPP\Extracts\R2-2505917%20On%20open%20issues%20for%20CB-Msg3-EDT.docx) On open issues for CB-Msg3-EDT Samsung discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 3: RRC procedures need to capture CRID as complete response for the CB-Msg3 EDT in CP solution.

Proposal 4: For introducing enhancements from CB-Msg3 EDT to 4-step EDT, the only viable feature would be receiving CRID as complete response.

[R2-2506157](file:///C:\Data\3GPP\Extracts\R2-2506157%20(R19%20IoT-NTN%20AI%208.9.3)%20-%20EDT%20enhancements.docx) Efficient delivery (reduced overhead) of msg4 / RRCEarlyDataComplete Interdigital, Inc. discussion Rel-19 IoT\_NTN\_Ph3-Core

Observation 1: PUR feature can terminate the EDT procedure without using RRC, by using Layer 1 ACK or Timing advance MAC CE, if eNB is aware that there is no pending downlink data or signalling.

Proposal 1: RAN2 to discuss how eNB knows that there is no pending downlink data from the application layer.

Observation 2: With the PUR feature it is possible for the UE to indicate in PURConfigurationRequest whether it expects a downlink response by RRC.

Proposal 2: Introduce “rrc-ACK”, to RRCEarlyDataRequest to indicate whether an RRC Response Message is preferred by the UE for CB-Msg3, similar to PURConfigurationRequest

Proposal 3: Contention Resolution MAC CE includes a new flag indicating whether to terminate only the uplink transmissions, or to terminate the entire procedure and return to RRC\_IDLE.

* Whether to support NW-indicated fallback

[R2-2505632](file:///C:\Data\3GPP\Extracts\R2-2505632%20Remaining%20issues%20on%20UL%20capacity%20enhancement%20for%20IoT%20NTN.docx) Remaining issues on UL capacity enhancement for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-19 IoT\_NTN\_Ph3-Core

Observation 7: When the CB-Msg3 resource is overloaded, repeated CB-Msg3 transmission attempts may result in continuous failures. It would be beneficial for the network to fall back UEs to the 4-step RACH procedure to balance the load.

Proposal 12: RAN2 to discuss whether to support the network-indicated fallback to legacy RACH or EDT.

- Ericsson wonders how the NW knows when to send this message so this might not be very useful

- vivo also thinks the NW could rather change the resource configuration

- HW thinks the NW could also set the BI for this. IDC is not sure this would solve the problem

- Xiaomi thinks we could have separate access control for CB-msg3 EDT. Nokia thinks this would also be possible

- Ericsson thinks there are already ways to control the load

* We don’t introduce support for network-indicated fallback to legacy RACH or EDT.

Proposal 13: The reserved value for MAC subheader type indication can be used for NW-indicated fallback.

[R2-2505537](file:///C:\Data\3GPP\Extracts\R2-2505537%20EDT%20enh.docx) CB-Msg3-EDT and Msg4 multicast Qualcomm Incorporated discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 8: If MAC subheader field T = 11 and there is indication that no UL grant is present, then no control element is present and the UE exits the CB-Msg3 EDT to fallback to either 4 step RACH or Rel-15 EDT.

Proposal 9: If MAC subheader field T = 11 and there is indication that UL grant is present, then control element includes the UL grant field, the location (time and frequency indicator) of transmitted Msg3 as in RAPID, timing advance and a temporary C-RNTI. Based on UL grant TBS, the UE decides whether the Msg3 includes UL data or not (i.e., update Msg3 or not).

* Some other proposals

[R2-2505917](file:///C:\Data\3GPP\Extracts\R2-2505917%20On%20open%20issues%20for%20CB-Msg3-EDT.docx) On open issues for CB-Msg3-EDT Samsung discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 2: RAN2 to discuss options on TA report for CB-Msg3 EDT.

1. TA report is not included for CB-Msg3-EDT – RAN2 clarifies the RRC procedures.

2. TA report is included in the CB-Msg3-EDT according to the RRC procedures – RAN2 clarifies the ta-Report field description

3. New configuration to configure TA report for CB-Msg3-EDT

[R2-2506184](file:///C:\Data\3GPP\Extracts\R2-2506184%20-%20UL%20capacity%20enhancements%20for%20IoT%20NTN.docx) UL capacity enhancements for IoT NTN Ericsson discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 2 The UE shall use the cell specific Koffset for the CB-Msg3-EDT procedure, regardless of if it has a UE specific Koffset or not.

Proposal 3 The MAC entity shall discard any Differential Koffset at the start of a CB-Msg3-EDT procedure.

[R2-2505106](file:///C:\Data\3GPP\Extracts\R2-2505106_UL%20capacity%20IoT%20NTN.doc) Discussion on uplink capacity enhancements for IoT NTN Xiaomi discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 5: RAN2 to discuss whether to have separate access control for CB-msg3 EDT.

* [AT131][302][R19 IoT NTN] UL enhancements (Mediatek)

Scope: continue the discussion on the CB-RNTI formula and on the details of the power ramping.

Intended outcome: summary of the offline discussion (in R2-2506278)

Offline time: Wednesday 12:00-12:30 in BO3

Deadline for offline discussion summary: Thursday 2025-08-28 08:00

Scope: continue the discussion on selected proposals for discussion in 8.9.3 that could not be treated online

Intended outcome: summary of the offline discussion (in R2-2506292)

Offline time: Thursday 2025-08-28 15:30:16:00 in BO3

Deadline for offline discussion summary: Friday 2025-08-29 08:00

[R2-2506278](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506278.zip) Report of [AT131][302][R19 IoT NTN] UL enhancements Mediatek discussion IoT\_NTN\_Ph3-Core

CB-RNTI

Proposal 1: RAN2 to select one of below options to calculate CB-RNTI

• Option 1

o For eMTC

 floor (start SFN\_id of Tx window/2) + 2401

o For NB-IoT

 floor (start SFN\_id of Tx window/4) + 256\*carrier\_id + 4097

 carrier\_id is the index of the UL carrier associated with the selected UL grants (0 <= carrier\_id < 16). The carrier\_id of the anchor carrier is 0.

o Note: To ensure 20ms (for eMTC) and 40ms (for NB-IoT) is the minimum value in transmission window periodicity configuration.

• Option 5

o For eMTC

 floor (start SFN\_id of Tx window/WP) modulo (32) + 32\*CE\_level + 2401

 the CE\_level is the selected enhanced coverage level (0 <= CE\_level < 2)

o For NB-IoT

 floor (start SFN\_id of Tx window/WP) modulo (32) + 32\*CE\_level + 96\*carrier\_id + 4097

 the CE\_level is the selected enhanced coverage level (0 <= CE\_level < 3)

 the carrier\_id is the index of the UL carrier associated with the selected UL grants (0 <= carrier\_id < 16). The carrier\_id of the anchor carrier is 0.

o WP is the configured CB-MSG3 transmission window periodicity in unit of 10ms.

- Ericsson wonders whether we can remove CE\_level or make it configurable

- QC thinks CE level is needed

- vivo thinks that CE level is not needed

* We go for option 5

Power Ramping

Proposal 2: RAN2 to define two new RRC parameters for CB-Msg3 power ramping (i.e., powerRampingStep and cb-Msg3-InitialReceivedTargetPower), with the same value ranges as those defined for legacy Msg3 power ramping.

* Agreed

Proposal 3: The UE applies power ramping when the CB-Msg3ResponseTimer has expired and the UE proceeds to the next CB-msg3 transmission, by reusing the CB\_MSG3\_TRANSMISSION\_COUNTER\_CE as defined in the MAC running CR.

* Agreed

Proposal 4: The CB-Msg3 received target power can be calculated as below:

• the CB-MSG3\_RECEIVED\_TARGET\_POWER is set to cb-Msg3-InitialReceivedTargetPower + (CB\_MSG3\_TRANSMISSION\_COUNTER\_CE – 1) \* powerRampingStep;

* Agreed
* We inform RAN1 that RAN2 agreed to support power ramping for both NB-IoT and eMTC copying RAN2 agreements asking RAN1 to check the specification impact for RAN1 specs
* Draft an LS to RAN1 in R2-2506284

R2-2506292 Report of [AT131][302][R19 IoT NTN] UL enhancements – second round Mediatek discussion IoT\_NTN\_Ph3-Core

Agreements:

1. We don’t further work on the inclusion of OCC support for CB-Msg3-EDT as part of IoT\_NTN\_Ph3-Core in Rel19.

2. We try to define a simple power ramping scheme reusing existing mechanisms and then we inform RAN1 inviting them to respond if they find a problem

3. When the Msg4 monitoring window starts at the end of CB-Msg3-EDT transmission window plus UE-eNB RTT, there is no need to consider additional delays for NW/UE processing time.

4. We leave to UE implementation to decide in which order the conditions to trigger the different procedures are met.

5. When the RRC layer receives a CB-Msg3 EDT failure indication from the MAC layer the RRC procedure is re-initiated (how to avoid data loss is up to UE implementation). Which procedure (e.g. EDT, 4-step RACH, CB-Msg3-EDT) is initiated is up to UE implementation

6. We don’t support multiple TBSs per CE level for CB-Msg3 EDT

7. We introduce one or a few more additional values smaller than the smallest possible TBS size at the moment (328bits), e.g. 144bits (Come back by the end of the week with the exact new value, or list of new values).

8. We clarify that CQI reporting is not included in CB-Msg3 for CB-Msg3-EDT for non-anchor carrier

9. Upon receiving a matching Contention Resolution Identity and a C-RNTI in a CB-Msg4 without an RRC message, the UE considers UL transmission as successful but the UE does not consider the CB-Msg3-EDT procedure has ended and continues monitoring PDCCH.

10. Upon receiving a CB-Msg4 including a matching Contention Resolution Identity without including both an RRC message and a C-RNTI, the UE behaves as if it received an empty EarlyDataComplete message, terminates the CB-Msg3-EDT procedure and keeps in RRC\_IDLE.

11. Based on NW indication, it shall be possible for the UE to indicate during CB-Msg3-EDT procedure whether DL data following the UL data in CB-Msg3 is expected or not. FFS whether existing fields can be reused or new ones introduced

12. We don’t introduce support for network-indicated fallback to legacy RACH or EDT

13. CB-RNTI formula:

For eMTC

- floor (start SFN\_id of Tx window/WP) modulo (32) + 32\*CE\_level + 2401

- the CE\_level is the selected enhanced coverage level (0 <= CE\_level < 2)

For NB-IoT

- floor (start SFN\_id of Tx window/WP) modulo (32) + 32\*CE\_level + 96\*carrier\_id + 4097

- the CE\_level is the selected enhanced coverage level (0 <= CE\_level < 3)

- the carrier\_id is the index of the UL carrier associated with the selected UL grants (0 <= carrier\_id < 16). The carrier\_id of the anchor carrier is 0.

WP is the configured CB-MSG3 transmission window periodicity in unit of 10ms.

14. RAN2 to define two new RRC parameters for CB-Msg3 power ramping (i.e., powerRampingStep and cb-Msg3-InitialReceivedTargetPower), with the same value ranges as those defined for legacy Msg3 power ramping.

15. The UE applies power ramping when the CB-Msg3ResponseTimer has expired and the UE proceeds to the next CB-msg3 transmission, by reusing the CB\_MSG3\_TRANSMISSION\_COUNTER\_CE as defined in the MAC running CR.

16. The CB-Msg3 received target power can be calculated as below:

the CB-MSG3\_RECEIVED\_TARGET\_POWER is set to cb-Msg3-InitialReceivedTargetPower + (CB\_MSG3\_TRANSMISSION\_COUNTER\_CE – 1) \* powerRampingStep;

R2-2506284 Draft LS on additional agreements for CB-Msg3-EDT Nokia LS out Rel-19 IoT\_NTN\_Ph3-Core To:RAN1

[R2-2505082](file:///C:\Data\3GPP\Extracts\R2-2505082%20Remaining%20Issues%20on%20CB-Msg3%20EDT%20Mechanism.docx) Remaining Issues on CB-Msg3 EDT Mechanism vivo discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505106](file:///C:\Data\3GPP\Extracts\R2-2505106_UL%20capacity%20IoT%20NTN.doc) Discussion on uplink capacity enhancements for IoT NTN Xiaomi discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505179](file:///C:\Data\3GPP\Extracts\R2-2505179%20Discussion%20on%20uplink%20capacity%20enhancement.docx) Discussion on uplink capacity enhancement Transsion Holdings discussion Rel-19

[R2-2505231](file:///C:\Data\3GPP\Extracts\R2-2505231.docx) Discussion on open issues for CB-Msg3 EDT CATT discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505258](file:///C:\Data\3GPP\Extracts\R2-2505258%20Remaining%20issues%20for%20CB-msg3-EDT.docx) Remaining issues for CB-msg3-EDT ZTE Corporation, Sanechips discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505369](file:///C:\Data\3GPP\Extracts\R2-2505369%20Leftover%20issues%20on%20CB-Msg3-EDT.docx) Leftover issues on CB-Msg3-EDT Google discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505493](file:///C:\Data\3GPP\Extracts\R2-2505493_Contention%20based%20MSG3.doc) Remaining issues in CB-Msg3 Apple discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505536](file:///C:\Data\3GPP\Extracts\R2-2505536%20OCC.docx) Support of OCC Qualcomm Incorporated, European Space Agency, German Aerospace Center discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505537](file:///C:\Data\3GPP\Extracts\R2-2505537%20EDT%20enh.docx) CB-Msg3-EDT and Msg4 multicast Qualcomm Incorporated discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505551](file:///C:\Data\3GPP\Extracts\R2-2505551-%20Discussion%20on%20CB-msg3%20EDT%20and%20msg4%20enhancement-V1.docx) Discussion on CB-Msg3 EDT and Msg4 enhancement OPPO discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505571](file:///C:\Data\3GPP\Extracts\R2-2505571%20Discussion%20on%20CB-Msg3-EDT.docx) Discussion on CB-Msg3 procedure MediaTek Inc. discussion IoT\_NTN\_Ph3-Core R2-2504528

[R2-2505632](file:///C:\Data\3GPP\Extracts\R2-2505632%20Remaining%20issues%20on%20UL%20capacity%20enhancement%20for%20IoT%20NTN.docx) Remaining issues on UL capacity enhancement for IoT NTN Nokia, Nokia Shanghai Bell discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505691](file:///C:\Data\3GPP\Extracts\R2-2505691%20EDT%20for%20uplink%20capacity%20enhancement%20in%20NTN%20(Revision%20of%20R2-2503909).docx) EDT for uplink capacity enhancement in NTN Lenovo discussion Rel-19

[R2-2505736](file:///C:\Data\3GPP\Extracts\R2-2505736%20Further%20consideration%20on%20UL%20capacity%20enhancement.docx) Further consideration on UL capacity enhancement Huawei, HiSilicon discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505917](file:///C:\Data\3GPP\Extracts\R2-2505917%20On%20open%20issues%20for%20CB-Msg3-EDT.docx) On open issues for CB-Msg3-EDT Samsung discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505958](file:///C:\Data\3GPP\Extracts\R2-2505958%20Discussion%20on%20remaining%20issues%20of%20uplink%20capacity%20enhancement%20for%20IoT-NTN.docx) Discussion on remaining issues of uplink capacity enhancement for IoT-NTN CMCC discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2506157](file:///C:\Data\3GPP\Extracts\R2-2506157%20(R19%20IoT-NTN%20AI%208.9.3)%20-%20EDT%20enhancements.docx) Efficient delivery (reduced overhead) of msg4 / RRCEarlyDataComplete Interdigital, Inc. discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2506184](file:///C:\Data\3GPP\Extracts\R2-2506184%20-%20UL%20capacity%20enhancements%20for%20IoT%20NTN.docx) UL capacity enhancements for IoT NTN Ericsson discussion Rel-19 IoT\_NTN\_Ph3-Core

R2-2506168 Support of OCC with CB UL in IoT NTN Aalyria, Qualcomm Incorporated discussion Rel-19

* Withdrawn

### 8.9.4 Support of PWS

Contributions should focus on remaining open issues related to the introduction of support for broadcast of PWS messages for NB-IoT, re-using the LTE mechanisms.

[R2-2505563](file:///C:\Data\3GPP\Extracts\R2-2505563%20Support%20of%20PWS%20for%20NB-IoT.docx) Remaining issues on PWS support for NB-IoT Huawei, HiSilicon, China Telecom discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 1: (RRC-3) A NB-IoT NTN UE is allowed to assemble PWS segments from different cells within an eNB based on a NW indication.

Proposal 2: An eMTC NTN UE is allowed to assemble PWS segments from different cells within an eNB based on a NW indication.

Proposal 3: (RRC-2) The NW can choose to send the scheduling information of PWS SIBs in advance and indicate whether the PWS SIBs are being broadcast or not similar to NR on-demand SI si-BroadcastStatus indication.

[R2-2505633](file:///C:\Data\3GPP\Extracts\R2-2505633%20%20On%20support%20of%20inter-cell%20PWS%20reception%20for%20NB-IoT%20NTN.docx) On support of inter-cell PWS reception for NB-IoT NTN Nokia, Nokia Shanghai Bell, Google, Huawei discussion Rel-19 IoT\_NTN\_Ph3-Core

Proposal 1: RAN2 to confirm support for continued reception of PWS message segments from different cells provided by the same eNB (inter-cell, intra-eNB case).

Proposal 2: Introduce a new indication in SIB for inter-cell PWS segmentation reception.

Observation 3: The UE must be able to determine the eNB identity of the current cell to facilitate inter-cell intra-eNB PWS segmentation reception.

Observation 4: The TS 38.331 specification includes gNB-ID-Length that defines which bits in CellIdentity provide the gNB ID.

Proposal 3: Specify eNB-ID-Length in SIB31-NB to indicate the number of bits used for providing the eNB ID in the CellIdentity.

Proposal 4: RAN2 to discuss the TP to support continued reception of PWS message segments in inter-cell intra-eNB scenario.

[R2-2505552](file:///C:\Data\3GPP\Extracts\R2-2505552%20-%20Discussion%20on%20PWS%20for%20NB-IoT.docx) Discussion on PWS for NB-IoT OPPO discussion Rel-19 IoT\_NTN\_Ph3-Core

• Option 1: Introduce an acceptable cell category for NB-IoT

• Option 2: Only simply specify that “a PWS capable NB-IoT UE may camp on an NB-IoT cell for PWS reception, without requiring the cell to be a part of UEs PLMNs”

Proposal 1 Introduce an acceptable cell category for NB-IoT (at least for NTN).

[R2-2505083](file:///C:\Data\3GPP\Extracts\R2-2505083%20Remaining%20Issues%20on%20PWS%20Support%20for%20NB-IoT.docx) Remaining Issues on PWS Support for NB-IoT vivo discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505107](file:///C:\Data\3GPP\Extracts\R2-2505107_PWS%20for%20NB-IoT.doc) PWS support for NB-IoT over NTN Xiaomi discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505259](file:///C:\Data\3GPP\Extracts\R2-2505259%20Remaining%20issues%20for%20PWS%20support.docx) Remaining issues for PWS support ZTE Corporation, Sanechips discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505538](file:///C:\Data\3GPP\Extracts\R2-2505538%20PWS%20NB-IoT.docx) Discussion on PWS in NB-IoT NTN Qualcomm Incorporated discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505568](file:///C:\Data\3GPP\Extracts\R2-2505568%20PWS%20support%20for%20NB-IoT.docx) Remaining open issues of PWS for NB-IoT MediaTek Inc. discussion IoT\_NTN\_Ph3-Core

[R2-2505692](file:///C:\Data\3GPP\Extracts\R2-2505692%20Further%20considerations%20on%20PWS%20broadcast%20support%20in%20IoT%20NTN%20(Revision%20of%20R2-2503910).docx) Further considerations on PWS broadcast support in IoT NTN Lenovo discussion Rel-19

[R2-2505824](file:///C:\Data\3GPP\Extracts\R2-2505824%20-%20Enhancements%20to%20support%20PWS%20in%20NB-IoT%20NTN.docx) Enhancements to support PWS in NB-IoT NTN Ericsson discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505918](file:///C:\Data\3GPP\Extracts\R2-2505918%20Open%20issues%20on%20PWS%20for%20NB-IoT%20NTN.docx) Open issues on PWS for NB-IoT NTN Samsung discussion Rel-19 IoT\_NTN\_Ph3-Core

[R2-2505959](file:///C:\Data\3GPP\Extracts\R2-2505959%20Remaining%20issues%20on%20support%20of%20PWS.docx) Remaining issues on support of PWS CMCC discussion Rel-19 IoT\_NTN\_Ph3-Core

## 8.17 IoT-NTN TDD mode

(IoT\_NTN\_TDD; leading WG: RAN1; REL-19; WID [RP-243293](file:///C:\Data\3GPP\archive\RAN\RAN%23106\Tdocs\RP-243293.zip))

Time budget: 0.5 TU

Tdoc Limitation: 1 tdoc

Including the outcome of the following email discussion:

[Post130][310][IoT NTN TDD] Stage2 CR (Iridium)

[Post130][311][IoT NTN TDD] RRC CR (Huawei)

[Post130][312][IoT NTN TDD] MAC CR (Toyota)

[Post130][313][IoT NTN TDD] 36.304 CR (Xiaomi)

[Post130][314][IoT NTN TDD] capability CR (Samsung)

Incoming LS

[R2-2505018](file:///C:\Data\3GPP\Extracts\R2-2505018_R1-2504883.docx) LS on TP for 36.300 for IOT NTN TDD mode (R1-2504883; contact: Qualcomm) RAN1 LS in Rel-19 IoT\_NTN\_TDD-Core To:RAN2

* Noted

Stage 2 CR

[R2-2505256](file:///C:\Data\3GPP\Extracts\R2-2505256.docx) Stage 2 CR for Introduction of IoT NTN TDD mode Iridium Satellite LLC CR Rel-19 36.300 18.5.0 1426 - B IoT\_NTN\_TDD-Core

- Iridium indicates that RAN1 agreed some changes to the TP and they are sending a follow-up LS

* Endorsed as a baseline for further discussion (including the discussion on the updated TP from RAN1)

36.331 CR

[R2-2505248](file:///C:\Data\3GPP\Extracts\R2-2505248%20Introduction%20of%20IoT%20NTN%20TDD%20mode.docx) Introduction of IoT NTN TDD mode Huawei, HiSilicon CR Rel-19 36.331 18.6.0 5138 - B IoT\_NTN\_TDD-Core

* Endorsed as a baseline for further discussion

36.321 CR

[R2-2505250](file:///C:\Data\3GPP\RAN2\Docs\R2-2505250.zip) Introduction of IoT NTN TDD mode TOYOTA Info Technology Center CR Rel-19 36.321 18.4.0 1592 - B IoT\_NTN\_TDD-Core

* Endorsed as a baseline for further discussion

36.304 CR

[R2-2505111](file:///C:\Data\3GPP\Extracts\R2-2505111_36.304%20CR%20for%20IoT-NTN%20TDD%20mode.docx) Introduction of IoT NTN TDD mode Xiaomi CR Rel-19 36.304 18.4.0 0883 - B IoT\_NTN\_TDD-Core

* Endorsed as a baseline for further discussion

36.306 CR

[R2-2505385](file:///C:\Data\3GPP\Extracts\R2-2505385%20Report%20of%20%5bPost130%5d%5b314%5d%5bIoT%20NTN%20TDD%5d%20capability%20CR.docx) Report of [Post130][314][IoT NTN TDD] capability CR Samsung discussion

Proposal 1: (CAP-1) On the general IoT NTN TDD mode capability, RAN2 to decide on type of capability:

- Conditionally mandatory (as in draft CR)

- Optional capability without signalling

* IoT NTN TDD mode capability is conditionally mandatory (as in the draft CR) if the UE supports the relevant TDD band

[R2-2505148](file:///C:\Data\3GPP\Extracts\R2-2505148%20Introduction%20of%20capabilities%20for%20IoT%20NTN%20TDD.docx) Introduction of capabilities for IoT NTN TDD Samsung CR Rel-19 36.306 18.5.0 1914 - B IoT\_NTN\_TDD-Core

* Endorsed as a baseline for further discussion
* list of neighbour cells operating in TDD mode

[R2-2505539](file:///C:\Data\3GPP\Extracts\R2-2505539%20NB-IoT%20TDD.docx) Discussion on new NB-IoT NTN TDD mode Qualcomm Incorporated discussion Rel-19 IoT\_NTN\_TDD

Observation 1. As NB-IoT does not support frequency priority, the UE may select TDD mode cell over FDD cell.

Proposal 4 Introduce a new list of neighbor cells operating in TDD mode for measurements and cell reselection.

- Xiaomi wonders if we need such new specific list. ZTE agrees

- Nokia thinks that something is needed

- Iridium thinks this is not needed, and not even a time offset

- HW thinks that at least the time offset might be needed

[R2-2506176](file:///C:\Data\3GPP\Extracts\R2-2506176%20Discussion%20on%20IoT%20NTN%20TDD_v4.docx) Remaining issues for IoT-NTN TDD mode THALES discussion Rel-19 IoT\_NTN\_TDD

Proposal 1: No need to introduce a new list of neighbour cells operating in TDD mode in Rel-19

* No need to introduce a new list of neighbour cells operating in TDD mode in Rel-19
* Neighbor cell synchronization and measurement

[R2-2505109](file:///C:\Data\3GPP\Extracts\R2-2505109_Discussion%20on%20the%20IoT%20NTN%20TDD%20mode.doc) Discussion on support of IoT-NTN TDD mode Xiaomi discussion Rel-19 IoT\_NTN\_TDD

Neighbor cell measurement

Proposal 1: RAN2 assume that for IoT NTN TDD mode, serving cell and neighbor cells are not always synchronized.

* RAN2 assume that for IoT NTN TDD mode, serving cell and neighbor cells are not always synchronized.

Proposal 2: TDD radio frame offset between serving cell and neighbor cell(s) is provided to the UE for neighbor cell measurement.

- Iridium thinks this is not needed

- Thales thinks this is an optimization not necessary for the system to work

- vivo thinks this was also discussed in RAN1 and there is no agreement this is needed

- Xiaomi thinks that power consumption is a big concern in this case and then it’s critical to support this. Nokia agrees

- HW thinks this can be an optional IE

- QC thinks the UE should not be required to read MIB of neighbour cells just to measure cells

* TDD radio frame offset between serving cell and neighbor cell(s) can be provided via SIB33 to the UE for neighbor cell measurement.

- Xiaomi thinks we should inform other groups of this decision. Nokia, Iridium and Toyota think this is not needed

Proposal 3: If proposal 1 and 2 are agreeable, RAN2 can send LS to RAN1 for confirmation.

[R2-2505539](file:///C:\Data\3GPP\Extracts\R2-2505539%20NB-IoT%20TDD.docx) Discussion on new NB-IoT NTN TDD mode Qualcomm Incorporated discussion Rel-19 IoT\_NTN\_TDD

Proposal 5 Discuss how to provide the UEs with timing information of neighbor cell that is operating in NB-IoT TDD mode for measurements.

[R2-2505634](file:///C:\Data\3GPP\Extracts\R2-2505634%20Remaining%20issues%20on%20support%20of%20TDD%20mode%20for%20IoT-NTN.docx) Remaining issues on support of TDD mode for IoT-NTN Nokia, Nokia Shanghai Bell discussion Rel-19 IoT\_NTN\_TDD

Proposal 2: Severing cell to provide assistance information on the active periods of the neighbour cells configured for measurements. RAN2 to discuss the TS 36.331 TP.

[R2-2505919](file:///C:\Data\3GPP\Extracts\R2-2505919%20On%20open%20issues%20on%20IoT%20NTN%20TDD.docx) On open issues for IoT NTN TDD Samsung discussion Rel-19 IoT\_NTN\_TDD

Proposal 3: RAN2 to wait for LS from RAN4 on providing UE with active periods of neighbouring cells.

[R2-2505738](file:///C:\Data\3GPP\Extracts\R2-2505738%20Remaining%20issues%20of%20IoT-NTN%20TDD.docx) Remaining issues of IoT NTN TDD Huawei, HiSilicon discussion Rel-19 IoT\_NTN\_TDD

Impact on Measurement

Proposal 1: RAN2 to confirm that inter-frequency neighboring cell measurement can be performed during the GAP configured outside the serving cell's available UL and DL subframes to avoid interfering the normal data transmission during the serving cell’s available UL and DL subframes.

* Misc open issues

[R2-2505144](file:///C:\Data\3GPP\Extracts\R2-2505144.docx) Final aspects on loT NTN TDD mode Iridium Satellite LLC discussion Rel-19 IoT\_NTN\_TDD

Observation 1: There is no performance benefit in distributing the start paging subframes within D=8 subframes.

Proposal 1: There is no benefit in introducing a new idle mode DRX cycle length for IoT NTN TDD mode.

* Agreed

Proposal 2: There is no specification impact for RAN2 (36.304) related to paging scheduling.

- QC thinks we should at least say that paging might be postponed to the next available subframe. Xiaomi thinks this is already clear in RAN1 spec

* Agreed

Proposal 3: There is no specification change required in the existing SIB1 scheduling mechanism.

* Agreed

Proposal 4: No specification changes are required for providing neighbor cell information for cell reselection.

Proposal 5: SIB33-NB should be updated to provide extended k-mac value up to 1023ms for the neighbor cells

- HW clarifies this is already captured in RRC

[R2-2506176](file:///C:\Data\3GPP\Extracts\R2-2506176%20Discussion%20on%20IoT%20NTN%20TDD_v4.docx) Remaining issues for IoT-NTN TDD mode THALES discussion Rel-19 IoT\_NTN\_TDD

Proposal 3: Preamble format 0 and 1 and NPRACH repetitions < 64 and >= 64 are supported for IoT NTN TDD mode, based on FDD procedures. Consider the table 5.1.4-1 modifications for TS 36.321 below:

Table 5.1.4-1: Subframes between preamble transmission and RA Response Window in NB-IoT

|  |  |  |  |
| --- | --- | --- | --- |
| TDD/FDD/IoT NTN TDD mode | Preamble format | Number of NPRACH repetitions | X |
| FDD/IoT NTN TDD | 0 or 1 | >= 64 | 41 |
| FDD/IoT NTN TDD | 0 or 1 | < 64 | 4 |
| FDD | 2 | >= 16 | 41 |
| FDD | 2 | < 16 | 4 |
| TDD | Any | Any | 4 |

- Toyota confirms this is already captured in the MAC CR

[R2-2505919](file:///C:\Data\3GPP\Extracts\R2-2505919%20On%20open%20issues%20on%20IoT%20NTN%20TDD.docx) On open issues for IoT NTN TDD Samsung discussion Rel-19 IoT\_NTN\_TDD

Proposal 1: Change the value range of k-Mac-r19 to 513...1024.

* Not agreed

Proposal 2: RAN2 does not specify any enhancements related to GNSS measurement gaps for IoT NTN TDD.

[R2-2505287](file:///C:\Data\3GPP\Extracts\R2-2505287%20Consideration%20on%20IoT-NTN%20TDD%20mode.docx) Remaining issues for IoT NTN TDD ZTE Corporation, Sanechips discussion Rel-19 IoT\_NTN\_TDD

Proposal 2: The repetitions of SC-PTM message transmission falling on the non-D subframes are postponed to the next valid D subframe within the transmission Period.

* Can come back if we see a need to clarify the situation for SC-PTM

[R2-2505539](file:///C:\Data\3GPP\Extracts\R2-2505539%20NB-IoT%20TDD.docx) Discussion on new NB-IoT NTN TDD mode Qualcomm Incorporated discussion Rel-19 IoT\_NTN\_TDD

Proposal 1 Clarify that the explicit epoch time is associated with the SFN where SIB1 was originally scheduled to be transmitted.

- Nokia thinks the NW can ensure there is no problem. Iridium agrees

- Xiaomi doesn’t think a clarification is needed

* RAN2 assumes the network will take into account the invalid subframes when setting the explicit EpochTime

Proposal 2 To avoid paging delay due to collision of postponed paging transmission with the scheduled DL transmission, UE is configured whether to monitor paging in next valid DL frames of next SFN X and SFN X+1 (if no paging in SFN X).

Proposal 3 For SPS interval, the values of semiPersistSchedIntervalUL-r15 are interpreted as new values that are multiple of 90ms.

[R2-2505634](file:///C:\Data\3GPP\Extracts\R2-2505634%20Remaining%20issues%20on%20support%20of%20TDD%20mode%20for%20IoT-NTN.docx) Remaining issues on support of TDD mode for IoT-NTN Nokia, Nokia Shanghai Bell discussion Rel-19 IoT\_NTN\_TDD

Proposal 1: The start of the RAR window and Contention Resolution timer shall be aligned with the start of the DL occasions, when the UE-eNB RTT is shorter than the UL-DL gap. RAN2 to discuss the TP implementation.

Proposal 3: RAN2 to discuss reusing the AS operation from GNSS measurement gap for RRC Connected UE working in NB-IoT TDD NTN, except the neighbor cell measurement which is possible outside the serving cell’s UL-DL pair. The TP for TS 36.300 can be a starting point.

Proposal 4: RAN2 to discuss handling of the PUR & SPS postponement including postponement to another valid UL subframe to avoid UL collision between different UEs.

* Rel-19 features applicable to IoT NTN TDD

[R2-2506176](file:///C:\Data\3GPP\Extracts\R2-2506176%20Discussion%20on%20IoT%20NTN%20TDD_v4.docx) Remaining issues for IoT-NTN TDD mode THALES discussion Rel-19 IoT\_NTN\_TDD

Proposal 4: OCC defined for IoT NTN Rel-19 can be supported for IoT NTN TDD mode (No spec impact)

* RAN2 assumes that OCC defined for IoT NTN Rel-19 can be supported for IoT NTN TDD mode but ask RAN1 for confirmation

Proposal 5: Support the CB-Msg3 and CB-Msg4 for IoT NTN TDD mode, with one of the adaptations below:

Option a) Add configurations that are aligned with the 90 ms periodicity for npusch-Periodicity and windowPeriodicity-NB

Option b) Support postponement of CB-Msg3-EDT occasions to the next valid D frame within the transmission window when the number of replicas > 1

- QC thinks we could consider option A

* We aim at introducing the needed changes (if any) to support CB-Msg3 and CB-Msg4 for IoT NTN TDD mode during the ASN.1 review, including at least
  + - Adding configurations that are aligned with the 90 ms periodicity for npusch-Periodicity and windowPeriodicity-NB

(FFS other needed enhancements based on the progress of the CB-Msg3-EDT discussion this week)

Proposal 6: IoT NTN PWS Rel-19 can be supported in IoT NTN TDD (no spec impact)

* Agreed
* Open issue CAP-1

[R2-2505232](file:///C:\Data\3GPP\Extracts\R2-2505232.docx) Discussion on support of NB-IoT NTN TDD CATT discussion Rel-19 IoT\_NTN\_TDD

Proposal 2: (CAP-1) IoT NTN TDD mode capability can be optional capability without signaling, and a statement can be included in capability specification to declare that UE supporting band n249 must support IoT NTN TDD feature group.

[R2-2505287](file:///C:\Data\3GPP\Extracts\R2-2505287%20Consideration%20on%20IoT-NTN%20TDD%20mode.docx) Remaining issues for IoT NTN TDD ZTE Corporation, Sanechips discussion Rel-19 IoT\_NTN\_TDD

Proposal 1: Define the type of UE capability as conditionally mandatory method (i.e. as in the TS36.306 running CR).

* On early implementation of the IoT-NTN TDD mode

[R2-2505701](file:///C:\Data\3GPP\Extracts\R2-2505701-iot-ntn-tdd.docx) On early implementation of the IoT-NTN TDD mode Nordic Semiconductor, Iridium, Thales discussion Rel-19 IoT\_NTN\_TDD

Observation-1: The UE capability of the IoT-NTN TDD mode is implicitly associated with the used TDD band.

Observation-2: The network capability of the IoT-NTN TDD mode is implicitly associated with the used TDD band.

Observation-3: There is no UE IoT-NTN TDD mode capability or band support ambiguity from the network point of view, since supporting UEs are only being served on specific IoT-NTN TDD mode bands.

Observation-4: The Rel-19 IoT-NTN TDD mode can be implemented on top of Rel-17.

Proposal-1: Document in 3GPP TS36.331 Annex G that Rel-19 IoT-NTN TDD mode is early implementable feature starting from Rel-17 for a UE supporting a IoT-NTN TDD mode band.

- Iridium thinks that this feature is tied to a band and then it should be possible to have this early implementable from Rel-17

- QC thinks that early implementation for a single CR is one thing, but for a whole feature/WI is not so common so has some doubts about this.

- Samsung reminds we also agreed to support Cb-Msg3-EDT for IoT NTN TDD, and this is definitely not a Rel-17 feature

- vivo thinks RAN2 cannot decide alone on this

Agreements:

1. IoT NTN TDD mode capability is conditionally mandatory (as in the draft CR) if the UE supports the relevant TDD band

2. No need to introduce a new list of neighbour cells operating in TDD mode in Rel-19

3. RAN2 assume that for IoT NTN TDD mode, serving cell and neighbor cells are not always synchronized.

4. There is no benefit in introducing a new idle mode DRX cycle length for IoT NTN TDD mode.

5. There is no specification impact for RAN2 (36.304) related to paging scheduling.

6. There is no specification change required in the existing SIB1 scheduling mechanism.

7. RAN2 assumes the network will take into account the invalid subframes when setting the explicit EpochTime

8. RAN2 assumes that OCC defined for IoT NTN Rel-19 can be supported for IoT NTN TDD mode but ask RAN1 for confirmation

9. We aim at introducing the needed changes (if any) to support CB-Msg3 and CB-Msg4 for IoT NTN TDD mode during the ASN.1 review, including at least

Adding configurations that are aligned with the 90 ms periodicity for npusch-Periodicity and windowPeriodicity-NB

(FFS other needed enhancements based on the progress of the CB-Msg3-EDT discussion this week)

10. IoT NTN PWS Rel-19 can be supported in IoT NTN TDD (no spec impact)

11. TDD radio frame offset between serving cell and neighbor cell(s) can be provided via SIB33 to the UE for neighbor cell measurement.

* RAN2 considers the IoT\_NTN\_TDD WI as completed.

[R2-2505109](file:///C:\Data\3GPP\Extracts\R2-2505109_Discussion%20on%20the%20IoT%20NTN%20TDD%20mode.doc) Discussion on support of IoT-NTN TDD mode Xiaomi discussion Rel-19 IoT\_NTN\_TDD

[R2-2505144](file:///C:\Data\3GPP\Extracts\R2-2505144.docx) Final aspects on loT NTN TDD mode Iridium Satellite LLC discussion Rel-19 IoT\_NTN\_TDD

[R2-2505232](file:///C:\Data\3GPP\Extracts\R2-2505232.docx) Discussion on support of NB-IoT NTN TDD CATT discussion Rel-19 IoT\_NTN\_TDD

[R2-2505287](file:///C:\Data\3GPP\Extracts\R2-2505287%20Consideration%20on%20IoT-NTN%20TDD%20mode.docx) Remaining issues for IoT NTN TDD ZTE Corporation, Sanechips discussion Rel-19 IoT\_NTN\_TDD

[R2-2505539](file:///C:\Data\3GPP\Extracts\R2-2505539%20NB-IoT%20TDD.docx) Discussion on new NB-IoT NTN TDD mode Qualcomm Incorporated discussion Rel-19 IoT\_NTN\_TDD

[R2-2505553](file:///C:\Data\3GPP\Extracts\R2-2505553%20-%20Discussion%20on%20IoT%20NTN%20TDD%20mode.docx) Discussion on IoT NTN TDD mode OPPO discussion Rel-19 IoT\_NTN\_TDD

[R2-2505634](file:///C:\Data\3GPP\Extracts\R2-2505634%20Remaining%20issues%20on%20support%20of%20TDD%20mode%20for%20IoT-NTN.docx) Remaining issues on support of TDD mode for IoT-NTN Nokia, Nokia Shanghai Bell discussion Rel-19 IoT\_NTN\_TDD

[R2-2505701](file:///C:\Data\3GPP\Extracts\R2-2505701-iot-ntn-tdd.docx) On early implementation of the IoT-NTN TDD mode Nordic Semiconductor, Iridium, Thales discussion Rel-19 IoT\_NTN\_TDD

[R2-2505738](file:///C:\Data\3GPP\Extracts\R2-2505738%20Remaining%20issues%20of%20IoT-NTN%20TDD.docx) Remaining issues of IoT NTN TDD Huawei, HiSilicon discussion Rel-19 IoT\_NTN\_TDD

[R2-2505919](file:///C:\Data\3GPP\Extracts\R2-2505919%20On%20open%20issues%20on%20IoT%20NTN%20TDD.docx) On open issues for IoT NTN TDD Samsung discussion Rel-19 IoT\_NTN\_TDD

[R2-2505960](file:///C:\Data\3GPP\Extracts\R2-2505960%20Remaining%20issues%20on%20support%20of%20IoT-NTN%20TDD%20mode.docx) Remaining issues on support of IoT-NTN TDD mode CMCC discussion Rel-19 IoT\_NTN\_TDD

[R2-2506176](file:///C:\Data\3GPP\Extracts\R2-2506176%20Discussion%20on%20IoT%20NTN%20TDD_v4.docx) Remaining issues for IoT-NTN TDD mode THALES discussion Rel-19 IoT\_NTN\_TDD

R2-2505143 DraftCR 36300 IoT NTN TDD Iridium Satellite LLC draftCR Rel-19 36.300 18.5.0 B IoT\_NTN\_TDD-Core

* Withdrawn

## 8.19 TEI19

Time budget: 1 TU

Tdoc Limitation: 1 tdoc for new proposals and 1 tdoc for old proposals for RAN2-led.

1 additional tdoc for primary co-sourcing company on top of the limit is allowed for co-sourced contribution with 4 or more companies.

Companies are encouraged to submit co-sourced contributions, which will have priority for discussion in RAN2#130

### 8.19.1 RAN2-led

* EUTRAN to NB-IoT NTN mobility

[R2-2505084](file:///C:\Data\3GPP\Extracts\R2-2505084_CR1917_36306_Rel19_Introduction%20of%20E-UTRAN%20to%20NB-IoT%20NTN%20Mobility%20UE%20Capability.docx) Introduction of E-UTRAN to NB-IoT NTN Mobility UE Capability [EUTRAN-to-NBIoTNTN] vivo, Samsung, Google, THALES, MediaTek Inc., Aalyria CR Rel-19 36.306 18.5.0 1917 - B TEI19

* Agreed

[R2-2505367](file:///C:\Data\3GPP\Extracts\R2-2505367%20Introduction%20of%20NB-IoT%20satellite%20information%20in%20E-UTRAN%20%5bEUTRAN-to-NBIoTNTN%5d.docx) Introduction of NB-IoT satellite information in E-UTRAN [EUTRAN-to-NBIoTNTN] Google, Samsung, vivo, THALES, MediaTek Inc., Aalyria CR Rel-19 36.331 18.6.0 5140 - B TEI19

* Agreed

[R2-2505368](file:///C:\Data\3GPP\Extracts\R2-2505368%20Introduction%20of%20NB-IoT%20satellite%20information%20in%20E-UTRAN%20%5bEUTRAN-to-NBIoTNTN%5d.docx) Introduction of NB-IoT satellite information in E-UTRAN [EUTRAN-to-NBIoTNTN] Google, Samsung, vivo, THALES, MediaTek Inc., Aalyria CR Rel-19 36.300 18.5.0 1427 - B TEI19

* Agreed
* Redirection from NR TN to NR NTN (and from IoT TN to IoT NTN)

[R2-2505920](file:///C:\Data\3GPP\Extracts\R2-2505920%20Draft%20CR%20Introduction%20of%20Redirection%20from%20NR%20TN%20to%20NR%20NTN%20to%2038.331.docx) Draft CR Introduction of redirection from NR TN to NR NTN to 38.331 Samsung draftCR Rel-19 38.331 18.6.0 B TEI19

[R2-2505921](file:///C:\Data\3GPP\Extracts\R2-2505921%20Draft%20CR%20Introduction%20of%20Redirection%20from%20NR%20TN%20to%20NR%20NTN%20to%2038.306.docx) Draft CR Introduction of redirection from NR TN to NR NTN to 38.306 Samsung draftCR Rel-19 38.306 18.6.0 B TEI19

[R2-2505954](file:///C:\Data\3GPP\Extracts\R2-2505954-Discussion%20on%20Redirection%20from%20TN%20to%20IoT%20NTN%20and%20NR%20NTN.docx) Discussion on redirection from TN to IoT NTN and NR NTN CMCC discussion Rel-19 TEI19.

* All contributions to be discussed first in offline 301
* Proposals are endorsed. Actual CRs to be drafted in R2-2506426, R2-2506426 and R2-2506428, R2-2506429

[R2-2506426](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506426.zip) Introduction of redirection from NR TN to NR NTN to 38.331 [NR-TN-NTN-redir] Samsung CR Rel-19 38.331 18.6.0 5429 - B TEI19

* Revised in R2-2506433

[R2-2506433](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506433.zip) Introduction of redirection from NR TN to NR NTN to 38.331 [NR-TN-NTN-redir] Samsung CR Rel-19 38.331 18.6.0 5429 1 B TEI19

* CB Friday

[R2-2506427](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506427.zip) Introduction of redirection from NR TN to NR NTN to 38.306 [NR-TN-NTN-redir] Samsung CR       Rel-19 38.306 18.6.0 1348 - B TEI19

* CB Friday

[R2-2506428](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506428.zip) Introduction of TN to NTN redirection for IoT to 36.331 [IoT-TN-NTN-redir] Samsung, Ericsson, Google CR Rel-19 36.331 18.6.0  5156 - B TEI19

* CB Friday

[R2-2506429](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506429.zip) Introduction of TN to NTN redirection for IoT to 36.306 [IoT-TN-NTN-redir] Samsung, Ericsson, Google CR Rel-19 36.306 18.5.0 1925 - B TEI19

* CB Friday
* NB-IoT NTN to NR NTN Cell Selection

[R2-2506098](file:///C:\Data\3GPP\Extracts\R2-2506098%20CR%20TS%2036.331%20Cell%20selection%20NTN%20NB-IoT%20-%20NTN-NR.docx) NB-IoT NTN to NR NTN Cell Selection EchoStar, Qualcomm, Aalyria, Terrestar, Skylo, Sateliot CR Rel-19 36.331 18.6.0 5151 - B IoT\_NTN\_enh-Core

[R2-2506099](file:///C:\Data\3GPP\Extracts\R2-2506099%20CR%20TS%2036.306%20inter-RAT%20cell-selection%20IoT-NTN%20to%20NR-NTN.docx) Asisstance for inter-RAT cell-selection from NB-IoT NTN to NR-NTN EchoStar, Qualcomm, Aalyria, Terrestar, Skylo, Sateliot CR Rel-19 36.306 18.5.0 1923 - B IoT\_NTN\_enh-Core

[R2-2506100](file:///C:\Data\3GPP\Extracts\R2-2506100%20CR%2038.331%20Cell%20selection%20NTN-NR%20to%20NTN%20NB-IoT.docx) NR-NTN to NB-IoT NTN Cell Selection EchoStar, Qualcomm, Aalyria, Terrestar, Skylo CR Rel-19 38.331 18.6.0 5455 - B NR\_NTN\_enh-Core

[R2-2506101](file:///C:\Data\3GPP\Extracts\R2-2506101%20TS%2038.306%20inter-RAT%20cell%20selection%20from%20NTN-NR%20to%20NTN-IoT.docx) Asisstance for inter-RAT cell-selection from NR NTN to NB-IoT NTN EchoStar, Qualcomm, Aalyria, Terrestar, Skylo, Sateliot CR Rel-19 38.306 18.6.0 1340 - B NR\_NTN\_enh-Core

* All contributions to be discussed first in offline 301

- Samsung thinks the concerns with this are related to the use cases (even if they think it could make sense). But the CRs need to be fixed in any case

- Echostar thinks there is a use case and standardization support is needed to convince the ecosystem to work on this. Aalyria agrees (and this applies also to the proposal on redirection)

- QC also thinks this would be beneficial and supports the proposal

- Viasat also supports this as this is a very valid use case

- Xiaomi thinks it’s too early to support this and we can reconsider this after the takeoff of NR NTN products. Proponents could come back with a TEI20 proposal

- Ericsson thinks that this could be already supported by UE implementation based on existing specs (saying that the UE could use stored information for cell selection)

- Skylo also thinks this is a valid use case. Skylo is also not sure about the possibility to use stored information, e.g. in case of moving satellites

- Ericsson thinks there is also a problem to exchange the needed information between eNbs and gNBs for this

* Can come back with this proposal
* Redirection for NB-IoT NTN to NR-NTN

[R2-2506178](file:///C:\Data\3GPP\Extracts\R2-2506178%20-%20Introduction%20of%20RRC%20Release%20with%20Redirection%20for%20NB-IoT%20NTN%20to%20NR-NTN.docx) Introduction of RRC Release with Redirection for NB-IoT NTN to NR-NTN Aalyria discussion Rel-19 IoT\_NTN\_Ph3, IoT\_NTN\_Ph3-Core

[R2-2506179](file:///C:\Data\3GPP\Extracts\R2-2506179%20-%20CR%20to%20TS%2036.331%20-%20Introduction%20of%20RRC%20Release%20with%20Redirection%20for%20NB-IoT%20NTN%20to%20NR-NTN.docx) CR to TS 36.331 - Introduction of RRC Release with Redirection for NB-IoT NTN to NR-NTN Aalyria CR Rel-19 36.331 18.6.0 5154 - B IoT\_NTN\_enh-Core, TEI19

* All contributions to be discussed first in offline 301

- ZTE thinks we should avoid at least this proposal for now as really not urgent

* Can come back with this proposal
* Satellite Switch with Resynchronization support for IoT NTN

[R2-2505933](file:///C:\Data\3GPP\Extracts\R2-2505933%20Discussion%20on%20support%20of%20SatSwitchwithResync%20for%20NB%20IoT%20NTN%20v5.docx) TEI19] Introduction of Satellite Switch with Resynchronization support for IoT NTN Skylo Technologies, Lockheed Martin, EchoStar, Sateliot discussion Rel-19

[R2-2505934](file:///C:\Data\3GPP\Extracts\R2-2505934%20CR%20%20TS%2036.300%20on%20SatSwitchwithResync%20%5bTEI19%20IoT%20LEO%20NTN%5d%20v3.docx) SatSwitchwithReSync support for NB-IoT NTN Skylo Technologies, Lockheed Martin, EchoStar, Sateliot CR Rel-19 36.300 18.5.0 1429 - B IoT\_NTN\_Ph3-Core

[R2-2505938](file:///C:\Data\3GPP\Extracts\R2-2505938%20CR%20%20TS%2036.321%20on%20SatSwitchwithResync%20%5bTEI19%20IoT%20LEO%20NTN%5d%20v3.docx) SatSwitchwithReSync support for IoT NTN Skylo Technologies, Lockheed Martin, EchoStar, Sateliot CR Rel-19 36.321 18.4.0 1594 - B IoT\_NTN\_Ph3-Core

[R2-2505939](file:///C:\Data\3GPP\Extracts\R2-2505939%20CR%20%20TS%2036.331%20on%20SatSwitchwithResync%20%5bTEI19%20IoT%20LEO%20NTN%5d%20v3.docx) SatSwitchwithReSync support for IoT NTN Skylo Technologies, Lockheed Martin, EchoStar, Sateliot CR Rel-19 36.331 18.6.0 5149 - B IoT\_NTN\_Ph3-Core

* All contributions to be discussed first in offline 301

- Viasat, Echostar, ESA, Aalyria also support this proposal

- HW also see some benefits to support this

- Xiaomi thinks that also for hard switch there is RAN4 impact

- Aalyria thinks hard switch can also be supported without RAN4 work

- MTK thinks this is the last meeting for Rel-19 and it’s the first time we see this proposal. We could consider it for the next release

- Ericsson thinks NB-IoT does not support connected mode mobility and they would like this to stay like that. Also this would be needed for connections that last for a long time and this is not the case for typical IoT scenarios

- Session chair thinks this could also be considered as an update for the R20 IoT NTN WID

* RAN2 thinks this could be further considered in Rel-20
* other

[R2-2506015](file:///C:\Data\3GPP\Extracts\R2-2506015-Discussion%20on%20measurement%20events%20for%20inter-frequency%20scenarios%20with%20overlapping%20coverage%20in%20NR%20NTN-CSCN.docx) Discussion on measurement events for inter-frequency scenarios with overlapping coverage in NR NTN CSCN, ZTE Corporation, Sanechips, Huawei, HiSilicon, CATT discussion Rel-19 TEI19

* We don’t pursue this enhancement in TEI19
* [AT131][301][TEI19] NTN related TEI19 (Samsung)

Scope: collect views on the NTN related TEI19 proposals (apart from [EUTRAN-to-NBIoTNTN] which is already endorsed), with the intention to prioritize the most important ones / merge / simplify the proposals

Intended outcome: summary of the offline discussion (in R2-2506271)

Offline time: Monday 2025-08-25 afternoon coffee break in room offline 1 (Amaryllis+Petunia)

Deadline for offline discussion summary: Wednesday 2025-08-27 14:00

[R2-2506271](file:///C:\Data\3GPP\RAN2\Inbox\R2-2506271.zip) Report of [AT131][301][TEI19] NTN related TEI19 Samsung discussion TEI19

[Easy agreements]

Proposal 1: For NR TN to NR NTN: Optional explicit ephemeris in redirection message is introduced if SIB19 is not broadcast. If explicit ephemeris is not present, the UE uses the neighbour cell ephemeris in SIB19 for which the carrier frequency matches.

* Agreed

Proposal 2: Agree the CRs in R2-2506426/R2-2506427.

Proposal 3: On minor open issues:

- Regarding the SMTC in RRCRelease, we can follow solution as will be discussed for LTE TN to NR NTN.

- Any discussion on redirection behaviour in 38.304 can be discussed in maintenance.

* CB Friday

Proposal 4: For IoT TN to IoT NTN redirection agree CRs in R2-2506428/R2-2506429.

[More discussion]

Proposal 5: (3 support/5 negative) Discuss downprioritizing enhancements for new measurement event (single referencelocation and threshold) for TEI19.

Proposal 6: (4 support/7 negative) Discuss downprioritizing enhancements for support for NB-IoT NTN<->NR NTN cell selection in TEI19.

Proposal 7: (4 support/4 negative) Discuss downprioritizing enhancements for satellite switch with resync for TEI19.

Proposal 8: Downprioritize enhancements for redirection from NB-IoT NTN to NR NTN for TEI19.

[R2-2505452](file:///C:\Data\3GPP\Extracts\R2-2505452-TEI19-LTE-satellite.docx) Indication to the UE on the LTE operation via satellite Apple discussion Rel-19 TEI19

Proposal 1: Introduce an optional IE in LTE SIB1 to indicate to the UE about the LTE NTN operation by the NW.

Proposal 2: Introduce the IE from Rel-19 but make it release independent.

Proposal 3: RAN2 to agree that the access stratum simply forwards the SIB1 indication to the upper layers when the UE reads this from LTE SIB1.

- TIM comments (via email): our understanding is that the problem highlighted in the paper is one of the reasons why NTN supporters of 3GPP NTN solutions triggered this kind of work in 3GPP RAN groups to have fully 3GPP based and compliant solutions. This [proposal] is harming 3GPP NTN ecosystem in general, aiming to pre NTN proprietary solutions. As already commented in RAN2 and in plenary, 3GPP is going to die soon if we continue to put 3GPP stamp on proprietary solutions

- Aalyria thinks the correct approach to solve this is via PLMN selection and also wonders why not relying on NR NTN if in any case we need to change something in LTE

- Thales is a bit surprised by this attempt to address this issue in RAN2/RAN4 while this should be addressed via a WI proposal in RAN plenary.

- CMCC thinks this could be solved by CT1 via a NAS solution

- Xiaomi thinks that a specific PLMN could solve this problem

- Viasat thinks this is going to further fragment the market and it’s not the right way to go

- Samsung agrees with TIM comment about putting a 3GPP stamp on proprietary solutions and in any case the decision for this should not be made here. ESA also agrees on this

[R2-2505390](file:///C:\Data\3GPP\Extracts\R2-2505390%20CR%2038.331%20Cell%20selection%20NTN-NR%20to%20NTN%20NB-IoT.docx) NTN-NR to NB-IoT Cell Selection EchoStar, Qualcomm, Aalyria, Terrestar, Skylo, Sateliot CR Rel-19 38.331 18.6.0 5415 - B NR\_NTN\_enh-Core

* Withdrawn

[R2-2505391](file:///C:\Data\3GPP\Extracts\R2-2505391%20TS%2038.306%20inter-RAT%20cell%20selection%20from%20NTN-NR%20to%20NTN-IoT.docx) Asisstance for inter-RAT cell-selection from NR NTN to NB-IoT NTN EchoStar, Qualcomm, Aalyria, Terrestar, Skylo, Sateliot CR Rel-19 38.306 18.6.0 1326 - B NR\_NTN\_enh-Core

* Withdrawn

[R2-2505409](file:///C:\Data\3GPP\Extracts\R2-2505409%20CR%20TS%2036.331%20Cell%20selection%20NTN%20NB-IoT%20-%20NTN-NR.docx) NB-IoT NTN to NR NTN Cell Selection EchoStar, Qualcomm, Aalyria, Terrestar, Skylo, Sateliot CR Rel-19 36.331 18.6.0 5142 - B IoT\_NTN\_enh-Core

* Withdrawn

[R2-2505410](file:///C:\Data\3GPP\Extracts\R2-2505410%20CR%20TS%2036.306%20inter-RAT%20cell-selection%20IoT-NTN%20to%20NR-NTN.docx) Asisstance for inter-RAT cell-selection from NB-IoT NTN to NR-NTN EchoStar, Qualcomm, Aalyria, Terrestar, Skylo, Sateliot CR Rel-19 36.306 18.5.0 1919 - B IoT\_NTN\_enh-Core

* Withdrawn

# Summary

Agreed CRs

R17 IoT NTN (LTE\_NBIOT\_eMTC\_NTN)

R17 NR NTN (NR\_NTN\_solutions-Core)

R18 IoT NTN (IoT\_NTN\_enh-Core)

R18 NR NTN (NR\_NTN\_enh-Core)

Approved LSs out

[Post131] Email discussions

Short

Long