**3GPP TSG RAN meeting #106 RP-242462**

**Madrid, Spain, December 9-13th , 2024** *rev of RP-242333*

## Status Report to TSG

**Title: Status report for WID: Non-Terrestrial Networks (NTN) for NR Phase 3; rapporteur: Thales, CATT**

**Agenda item:** 9.3.2.2

|  |  |
| --- | --- |
| **WI / SI Name** | Rel-19 Non-Terrestrial Networks (NTN) for NR Phase 3 |
| included in this status report | Study Item: No | Core part: Yes | Performance part:Yes | Testing part:No |
| **Acronym** | NR\_NTN\_Ph3 |
| **Unique ID** | 1020097 |
| **TSG Tdoc of latest approved WI/SI description (if any)** | RP-240775 |
| **Target Completion Date****(indicate if changed)** | Study Item: N/A | Core part: 09/2025 | Performance part: 03/2026 | Testing part:  |
| **Overall Completion level** | Study Item: N/A  | Core part: Overall: 55%RAN1: 50%RAN2: 60%RAN3: 70%RAN4: 60% | Performance Part: Overall: 0%RAN4: 0% | Testing part:  |

Note: Overall completion level percentage numbers should use one of the colors below:

* xx%: Normal progress, no RAN plenary action needed
* xx%: Progress behind schedule, may need RAN plenary intervention. If so, SR should clearly define requested action
* xx%: Progress critically behind, RAN plenary shall intervene. SR should define requested action

**Source:**

|  |  |
| --- | --- |
| **Leading WG** | RAN2 |
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## 1 Work plan related evaluation

|  |  |
| --- | --- |
| **Do you want to modify the time budget for this WI/SI compared to what was endorsed at the last RAN meeting?** | No |

*If you answered No: Then please remove the Excel file from the zip file of this status report.*

*If you answered Yes: Then please fill out the attached Excel template to request a modification of the time budgets for your WI /SI. The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI. The basis are the endorsed time budgets of the last RAN meeting. Please highlight all changes of the values.
 One time unit (TU) corresponds to ~ 2 hours in the meeting.
 If this status report covers a WI with Core and Performance part, then please have one line for each in the attached Excel table.
 Note: If no Excel table is attached, then this means no time budget change.*

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## 2. Detailed progress in RAN WGs since last TSG meeting (for all involved WGs)

 NOTE: Agreements and Open issues impacted cross-TSG aspects shall be explicitly highlighted

## 2.1 RAN1

#### 2.1.1 Agreements

#### 2.1.1.1 Decisions during RAN1#118bis:

**2.1.1.1.1 General**

Agreement

Response to RAN2 LS: A majority of companies in RAN1 think that it would not be a problem, depending on gNB implementation in a regenerative payload scenario, to stick to 0 as minimum possible value for TA common without introducing the negative value for ta-Common.

Agreement

The draft response LS to RAN2 is endorsed in R1-2409257, also cc to RAN4. Final LS in R1-2409258.

**2.1.1.1.1 NR-NTN downlink coverage enhancement**

Agreement

For NR NTN, support extended periodicity of the half frames with SS/PBCH blocks assumed by UE during initial access.

* The maximum of the additional default value (apart from the existing 20ms value) is at least 160 ms.
	+ FFS: whether 320ms can be supported as the maximum of the additional default value instead of or in addition to 160ms

**Agreement**

Support PDCCH CSS Link level enhancement in Rel-19 for all CSS types except type 3.

* The following techniques are for further study:
	+ PDCCH repetition, including:
		- Option 1: Intra-slot PDCCH repetition
		- Option 2: Inter-slot PDCCH repetition
	+ CORESET length (i.e. number of OFDM symbols) extension
	+ DCI format optimization (e.g. size reduction, etc)
* Note: the same technique is intended to apply to all search space types targeted for link level enhancements
* For the above techniques, at least the following aspects should be discussed for the relevant candidate techniques:
	+ Configuration
	+ Backward compatibility and UE behaviour of legacy UE
	+ Linked Search Space
	+ Blocking probability
	+ DCI format size budget
	+ Resource overhead
	+ Impact on CORESET0
* Focus on coverage enhancement for set 1-3 with a target CNR of -8 dB for NR NTN DL coverage enhancements at link level.
* FFS: whether to apply the selected solution to PDCCH CSS type3 and PDCCH USS

Agreement

For PDSCH with Msg4 Link level enhancement:

* Continue studying PDSCH repetition
	+ Further discuss the specification impact for at least the following:
		- Procedure and signaling
		- Repetition factor
	+ Focus on coverage enhancement for set 1-3 with a target CNR of -8 dB for NR NTN DL coverage enhancements at link level.

**2.1.1.1.2 Support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands**

**Conclusion**

The different use cases (e.g. the collision happening in different channel types or different scheduling cases) from RAN1#118 agreement for collision case 3 (Semi-statically configured DL reception collides with semi-statically configured UL transmission) consist of pairs of one semi-statically configured DL reception and one semi-statically configured UL transmission, among:

* Semi-statically configured DL reception includes Type-0/0A/0B/1/2-PDCCH CSS and dedicated semi-statically configured PDCCH USS/PDSCH SPS/CSI-RS/PRS/[Type 3 PDCCH CSS]
* Semi-statically configured UL transmission includes semi-statically configured PUSCH/PUCCH/SRS

**2.1.1.1.3 NR-NTN uplink capacity/throughput enhancement**

Working assumption

For the normative phase,

* Support OCC length 2 with inter-slot OCC to multiplex up to 2 UEs.
* Support OCC length 4 with one of the following OCC techniques
	+ Option 1: Inter-slot with OCC length 4 to multiplex up to 4 UEs.
	+ Option 2: Intra-symbol pre-DFT OCC with OCC length 4 to multiplex up to 4 UEs.
	+ Option 3: Combination of Inter-slot OCC with OCC length 2 and intra-symbol pre-DFT OCC with OCC length 2 to multiplex up to 4 UEs.
	+ Note 1:
		- At least consider 8 slots, 16 slots, and 20 slots for VoIP with BLER 2% target, with 1 RB, 2 RBs when comparing Option 1, Option 2, and Option 3. Companies can additionally report on 4 slots at least for 2 RBs.
		- Option 2 assumes TBoMS, FFS Option 3 assumes TBoMS

Note 2: as part of the working assumption, it is assumed that there would be separate UE capabilities for OCC length 2 and OCC length 4, where UE capability for OCC length 2 is a prerequisite for UE capability for OCC length 4.

**Conclusion**

For TBS calculation and rate matching for OCC with PUSCH, for inter-slot OCC in the working assumption of RAN1#118bis:

* for inter-slot OCC for OCC length 2 and for inter-slot OCC for OCC length 4 in option 1 in the working assumption of RAN1#118bis
	+ No change in determination of TBS
	+ No change for rate matching

Agreement

For RV cycling for OCC with PUSCH

* For inter-slot OCC for OCC length 2 and for inter-slot OCC for OCC length 4 in option 1 in the working assumption of RAN1#118bis
	+ Same RV value is used in one OCC group (i.e., OCC length applied to N slots).
	+ FFS: RV cycling can be additionally used across OCC groups

Agreement

For OCC sequence for OCC with PUSCH:

* For OCC length 2, re-use orthogonal sequence [1 1; 1 -1]

#### 2.1.1.2 Decisions during RAN1#119

Agreement

The following response is sent in reply to RAN2 LS R1-2409343:

Response to RAN2: The OCC solution that RAN1 is working on may be applied to CB-Msg3 NPUSCH format 1 single tone at least for OCC length 2, for the subcarrier spacing(s) for which CB-Msg3 is supported, when the power imbalance is small. The design details for the OCC solution are ongoing.

Action to RAN2: RAN1 respectfully asks RAN2 to take the above information into account.

Agreement

The draft LS reply to RAN2 is endorsed in R1-2410894. Final LS in R1-2410895.

**2.1.1.2.1 NR-NTN downlink coverage enhancement**

Agreement

For PDSCH with Msg4 Link level enhancement:

* Support PDSCH repetition
	+ FFS: signalling design including number of repetitions
	+ FFS: impact on UE capability
* Note: the target coverage enhancement to bridge the gap with respect to single Msg4 transmission is 2.8 dB
* Focus on coverage enhancement for set 1-3 with a target CNR of -8 dB for NR NTN DL coverage enhancements at link level.

**Observation**

Backward compatibility for legacy UEs (i.e. Rel-17 and Rel-18 UEs) assuming a default SSB periodicity of 20ms is not guaranteed when SS/PBCH blocks periodicity is larger than 20ms within the cell used for initial frequency scan.

Legacy UEs (i.e. Rel-17 and Rel-18 UEs) are not expected to be able to camp on a cell with SS/PBCH blocks periodicity larger than 160 ms.

Agreement

For link level enhancement of PDSCH with SIB1:

* Support PDSCH repetitions within 20 ms duration
	+ The number of repetitions is fixed to 2 repetitions
	+ Further discuss the specification impact for at least the following:
		- Procedure and signaling (enabling repetitions, associated time resource determination, etc.)
* Note 1: without the above PDSCH repetitions, the coverage gap is 2.2 dB to 4.6 dB depending on SIB1 size.
* Note 2: Focus on coverage enhancement for set 1-3 with a target CNR of -8 dB for NR NTN DL coverage enhancements at link level.
* Note 3: the above is not related to multiple SIB1 transmissions across 20 ms periodicities of SSB, which may not be available when the SSB periodicity is 160 ms or larger (if supported) depending on the SSB and CORESET multiplexing pattern.

Agreement

For PDCCH CSS (except Type-3) link level enhancements, support only PDCCH repetition for NTN.

* FFS: intra-slot and/or inter-slot

**2.1.1.2.2 Support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands**

Agreement

For Rel-19 HD-FDD (e)Redcap UE in RRC connected mode, for collision case 3,

* Handling of collision with Type-0/0A/1/2-PDCCH CSS in RRC-Connected mode is left to UE implementation whether to prioritize UL or prioritize DL with the constraint in the following note.
* For other use cases, default priority rule for collision case 3 in RRC-Connected mode is that DL is prioritized.
	+ Network is allowed to indicate UL overriding DL for all the other use cases above
		- This is signaled by RRC configuration

Note: UE shall comply to the following existing procedure in 38.331:

UEs in RRC\_CONNECTED shall monitor for SI change indication in any paging occasion at least once per modification period if the UE is provided with common search space, including *pagingSearchSpace*, *searchSpaceSIB1* and *searchSpaceOtherSystemInformation*, on the active BWP to monitor paging, as specified in TS 38.213 [13], clause 13.

Agreement

The collision case 4 (Dynamically scheduled DL reception collides with dynamic scheduled UL transmission) is not considered as an error case for Rel-19 HD-FDD (e)Redcap UE in RRC connected mode.

* FFS whether to prioritize UL or prioritize DL

**2.1.1.2.3 NR-NTN uplink capacity/throughput enhancement**

Agreement

RAN1 to confirm the working assumption of RAN1#118bis with revisions as follows:

* Support OCC length 2 with inter-slot OCC to multiplex up to 2 UEs.
* Support Option 1: inter-slot OCC with OCC length 4 to multiplex up to 4 UEs using Hadamard sequences
* RAN1 does not pursue Option 2: Intra-symbol pre-DFT OCC with OCC length 4 to multiplex up to 4 UEs.
* RAN1 does not pursue Option 3: Combination of Inter-slot OCC with OCC length 2 and intra-symbol pre-DFT OCC with OCC length 2 to multiplex up to 4 UEs.

Note 1: there will be separate UE capabilities for OCC length 2 and OCC length 4, where UE capability for OCC length 2 is a prerequisite for UE capability for OCC length 4.

Note 2: gNB can ensure the performance of Option 1 by UE grouping with similar CFO (e.g. maximum differential CFO of 50 or 100 Hz or 200 Hz). Without CFO grouping (e.g. maximum differential CFO of 400 Hz), the performance of option 1 is degraded by at least 1 dB in several cases. For CFO grouping, several companies in RAN1 state that CFO grouping is feasible based on network implementation without any new specification impact.

* RAN1 assumes no specification impact for CFO grouping
* RAN1 does not pursue closed-loop frequency adjustment commands.
* RAN1 assumes that RAN4 does not define new UE requirements for CFO.

**Observation:**

Option 1 Inter-slot OCC with OCC length 4 to multiplex up to 4 UEs with 2 PRBs can meet VoIP 2% BLER within 1 dB of single UE baseline for 8 slots or larger with UE grouping with similar CFO (e.g. maximum differential CFO of 200 Hz).

**Observation:**

Option 2 Intra-symbol pre-DFT OCC with OCC length 4 to multiplex up to 4 UEs with TBoMS can meet VoIP 2% BLER target within 1 dB of single UE baseline with 2 PRBs and 4 repetitions or larger; and with 1 PRB and 8 repetitions or larger, without need for CFO grouping.

Agreement

For RV cycling for OCC with DG-PUSCH, the following are considered:

* Option 1: RV cycling is used across OCC groups
	+ Note 1: RV cycling is applied when the number of repetitions is greater than the OCC length
* Option 2: Fixed RV is used across OCC groups
* Option 3: For OCC length 2, fixed RV is used across two OCC groups, RV cycling is used across groups of two OCC groups

Agreement

If PUCCH without repetition overlaps with inter-slot OCC with any PUSCH repetitions in an OCC group, the following options to be considered:

* Option 1: UCI is dropped
	+ FFS: whether all UCI is dropped
* Option 2: UCI is transmitted on PUCCH, and all PUSCH repetitions within the OCC group are dropped.
* Option 3: UCI is multiplexed on PUSCH with inter-slot OCC
	+ Option 3-a: UCI is multiplexed on all PUSCH repetitions within an OCC group with inter-slot OCC
		- FFS: which OCC group
	+ Option 3-b: UCI is multiplexed on PUSCH and OCC is not applied within the OCC group
	+ Option 3-c: UCI is multiplexed on PUSCH and OCC is not applied within the PUSCH repetitions

Note: combination of the above can be considered

FFS Details timeline of PUCCH and PUSCH

FFS: handling of PUCCH with repetition

FFS: handling of different UCI types

#### 2.1.2 Remaining Open issues

1. Address the anticipated specs impacts due to the extended SSB periodicity up to 160ms.
	1. Note: The maximum of the additional default value (apart from the existing 20ms value) is set to be 160 ms. FFS: whether 320ms can be supported. There is no consensus within RAN1 on whether to support 320ms as the maximum of the additional default value of SSB periodicity instead of or in addition to 160ms
2. Introduce necessary features to support link level enhancements for the targeted physical channels, including: (1) PDCCH CSS for all CSS types except type 3. (2) PDSCH with Msg4. (3) PDSCH with SIB1.
3. Define necessary physical layer features enabling to support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands
4. Define necessary physical layer features to support NR-NTN uplink capacity/throughput enhancement

## 2.2 RAN2

#### 2.2.1 Agreements

2.2.1.1 Decisions during RAN2#127bis

**2.2.1.1.1 Downlink coverage enhancement**

Agreements:

1. If it turns out that there is a need to bar UEs not supporting DL-CE, Rel-19 UEs not supporting DL-CE can be barred from accessing a cell operating with DL-CE using the existing NTN bar bit, in the same way as pre-Rel19 NTN UEs (this is an extension of the previous agreement to include also Rel-19 UE not supporting DL-CE)

2. If it turns out that there is a need to bar UEs not supporting DL-CE, then we need to introduce a barring mechanism to control access of UEs supporting Rel19 NTN DL-CE. FFS on the details. (This also implies that UEs supporting Rel19 NTN DL-CE will not consider the existing NTN barring bit)

3. (also depending on the details of the RAN1 solution) we can further consider methods to allow UEs not supporting DL CE to down-prioritize or prevent re-selection to cells operating with DL CE.

**2.1.1.1.2 Uplink capacity/throughput enhancement**

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**2.1.1.1.3 Support of Broadcast**

Agreements:

1. For each MBS service we include one or more intended service area IDs into MCCH. FFS whether the list of the intended service areas (and related IDs) is also included in MCCH or if it is provided in a new or existing SIB. We will consider possible enhancements (including enhancements left up to UE implementation) to allow UE skipping MCCH re-acquisition when UE is not within intended service area of any interested broadcast service.

**2.1.1.1.4 Support of Regenerative payload**

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2.2.1.1 Decisions during RAN2#128

LS reply agreed:

1. R2-2411196 Reply on Supporting MBS broadcast service for NR NTN (Xiaomi) LSout To:RAN3, SA2; Cc: CT4

**2.2.1.2.1 Downlink coverage enhancement**

Agreements:

1. If we need to bar UEs not supporting DL-CE (via legacy mechanism), we introduce a new barring in SIB1 to be able to selectively bar “UEs supporting DL-CE” (FFS if we will finally refer to “UEs supporting extended SSB periodicity” instead). FFS on the details (e.g. how many bits, etc.)

Agreements:

1. As part of the work on DL-CE, RAN2 investigates related UE power consumption impact (including legacy UEs)

2. RAN2 will consider whether to introduce separate signalling (e.g. new SMTC5 list) for DL CE cells SMTCs, e.g. if different periodicities need to be signalled or to prevent reselection to specific cells

Agreements:

1. For cell level DTX for NTN DL coverage enhancement, RAN2 currently understands that there will be only two states: "cell DTX On period" and "Cell DTX Off period" (FFS if the UE behaviour will be different from the NES states or the same). FFS on Cell DRX states.

**2.1.1.2.2 Uplink capacity/throughput enhancement**

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**2.1.1.2.3 Support of Broadcast**

Agreements:

1. The encoding of TN coverage introduced in Rel-18 in TS38.331, including tn-ReferenceLocation-r18 and tn-DistanceRadius-r18, is reused for the geographical area of the circle.

2. The encoding of Polygon in TS37.355 is reused for the geographical area of the Polygon.

3. The IntendedServiceArea is considered as the IE name of the geographical area (we can still update the name in the CR implementation if needed)

4. A signalled intended service area for a MBS BC service may include geographic areas across the current serving cell and overlapping neighbor cell(s).

5. RAN2 understands that the geographic area information for the intended service areas can be semi-static and not cause frequent updates.

6. Introduce a new SIB to include a list of intended service areas and related pointer (FFS if we point to the intended services areas via the index in the list or with an ID or another way)

7. The legacy SIB modification procedure is applied to update the intended service area information in the new SIB.

**2.1.1.2.4 Support of Regenerative payload**

Agreements:

1 We to stick to 0 as minimum possible value for TA common without introducing the negative value for ta-Common.

#### 2.2.2 Remaining Open issues

**NR-NTN downlink coverage enhancement**

* Define procedures and related signalling for system-level power sharing following RAN1 conclusions and related signalling for link-level enhancements following RAN1 conclusion

**NR-NTN uplink capacity/throughput**

* Define necessary related procedures and signalling following RAN1 conclusions

**Support of broadcast**

* SIB content definition for intended service area and related procedures

## 2.3 RAN3

#### 2.3.1 Agreements

#### 2.3.1.1 Decisions during RAN3#125bis

**2.3.1.1.1 Support MBS Broadcast service**

**Agreement**

* RAN3 takes the assumption that geographical service area information can be transmitted from CN with the same format as defined in Uu.

**TPs agreed:**

* R3-245795 (TP for TS 38.413 and TS 38.300) Support MBS broadcast service (Huawei)
* R3-245843 Broadcast Service Area for NR NTN - NGAP Impacts (Ericsson, SES, ESA)

**LS out agreed:**

* R3-245844 LS on Supporting MBS broadcast service for NR NTN, To: RAN2, SA2, CT4

**2.3.1.1.2 Support of Regenerative payload**

**Agreements:**

* The supported TAIs of an on-board gNB could be provided to AMF by OAM/pre-configuration.
* The current mechanisms including, e.g. multiple TNLA association, are sufficient for TNL management during feeder link switch.

**Common understanding:**

* Legacy NG HO procedure can be reused for inter AMF HO for NTN regenerative payload.

**TPs agreed:**

* R3-245799 (TP for TS 38.413) Introduce NG Removal procedure (Nokia, Nokia Shanghai Bell, Huawei, CATT, CMCC, Ericsson, Qualcomm, Xiaomi) Other
* R3-245800 (TP for TS 38.410) Introduce NG Removal procedure (Huawei, Nokia, Nokia Shanghai Bell, CATT, CMCC, Ericsson, Qualcomm, Xiaomi) Other
* R3-245801 NG Removal – Stage 2 Description (Ericsson, Huawei, Nokia, Nokia Shanghai Bell, Xiaomi, CATT, Qualcomm Incorporated) Other

**LS out agreed:**

* R3-245845 LS on OAM requirements to support regenerative payload, To: SA2, SA5

**2.3.1.1.3 Baseline CRs/TPs endorsed**

Agreements

* R3-245761 (BL CR to 38.300) Support for Regenerative Payload in NR NTN (Ericsson, Thales, Deutsche Telekom, Nokia, ESA, CATT, ZTE, Sateliot, Huawei, Dish Networks, Echostar, Eutelsat Group, Xiaomi, Samsung, CMCC, LG Electronics, NEC, Lenovo)

#### 2.3.1.2 Decisions during RAN3#126

**2.3.1.2.1 Support MBS Broadcast service**

Agreements:

* The current MBS broadcast procedures can be reused for NR NTN without any enhancement.

TPs agreed:

* R3-247847 (TP to BL CR for TS 38.300 and TS 38.413) Discussion on the support of MBS Broadcast Service (Nokia, Nokia Shanghai Bell)
* R3-247899 (TP for TS 38.300 and TS 38.413) Support MBS broadcast service (Huawei)

**2.3.1.2.2 Support of Regenerative payload**

Agreements on Support of RRC\_INACTIVE:

* RAN3 assumes that current mechanisms to support UEs performing RRC connection resume and RRC connection re-establishment may be reused in regenerative payload architecture, subject to implementation and deployment.

**2.3.1.2.3 Baseline CRs/TPs endorsed**

* R3-247835 (BL CR to 38.300) Support for Regenerative Payload and MBS broadcast in NR NTN (Ericsson, Thales, Deutsche Telekom, Nokia, ESA, CATT, ZTE, Sateliot, Huawei, Dish Networks, Echostar, Eutelsat Group, Xiaomi, Samsung, CMCC, LG Electronics, NEC, Lenovo, ETRI) draftCR
* R3-247034 (BL CR to 38.410) Introduce NG Removal procedure (CMCC, Huawei, Nokia, Nokia Shanghai Bell, CATT, Ericsson, Qualcomm, Xiaomi, LG Electronics, China Telecom, Samsung, ZTE, NEC, ETRI) CR0051r1, TS 38.410 v18.2.0, Rel-19, Cat. B
* R3-247035 Support for Regenerative Payload and MBS broadcast in NR NTN (CATT, Thales, Nokia, Nokia Shanghai Bell, Ericsson, Huawei, ZTE, Qualcomm, Samsung, Xiaomi, CMCC, China Telecom, Jio, LG Electronics, NEC, ETRI, SES, ESA) CR1212r1, TS 38.413 v18.3.0, Rel-19, Cat. B

#### 2.3.2 Remaining Open issues

**Support of regenerative payload**

* Whether to make any enhancement to support RRC\_INACTIVE.
* Whether to support NG Suspend/Resume
* Any Xn enhancements whether to exchange some information for location based CHO or RRC\_INACTIVE UE support

## 2.4 RAN4

#### 2.4.1 Agreements

2.4.1.1 Decisions during RAN4#112bis

**2.4.1.1.1 UE RF requirements**

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**2.4.1.1.2 SAN RF requirements**

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**2.4.1.1.3 RRM requirements**

**2.4.1.1.3.1 (e)RedCap RRM requirements**

Agreement on RAN4 reply LS:

* No consensus on whether there is an issue due to non-negative value for common TA or whether negative values should be introduced for ta-common.
* Note: No more discussion of this issue is expected in RAN4.

Agreement:

* RAN4 to only consider NR SA operation mode with single carrier for (e)RedCap UE with FR1-NTN bands.

Agreement:

* Not define timing requirements for 60kHz SCS for (e)RedCap UE with FR1-NTN bands.
* Note: same as normal UE with FR1-NTN bands.

Agreement:

* Both bandwidth with and without reduction of R18 eRedCap UE should be supported for (e)RedCap UE with FR1-NTN bands.
* RRM requirements do not differentiate two different types of eRedCap UEs, and the same RRM requirements can be applied.

Agreement:

* The existing cell reselection requirements in RRC\_IDLE/RRC\_INACTIVE state defined for Rel-17 and Rel-18 (e)NTN can be the baseline for (e)RedCap 2Rx UE with FR1-NTN bands.
	+ Both time-based and location-based cell reselection measurement criteria will be defined.
		- For both earth fixed and earth moving scenario
	+ Both NTN-NTN and NTN-TN (from NTN to TN and from TN to NTN) cell reselection requirements will be defined.
	+ FFS The measurement requirements for inter-RAT (NTN to E-UTRA TN) measurement.

Agreement:

* Define NR Rel-17 and Rel-18 Conditional Handover requirements.
	+ Include location-based CHO and time-based CHO.
	+ Support earth moving cell scenario
* Define RACH-less Handover requirements.
* Define SDT requirements (including CG-SDT and RA-SDT) in RRC\_INACTIVE state.
	+ FFS TA validation based on the RSRP change criterion for RedCap in TN shall be removed and the requirements may refer to the PUR requirements for IoT for NTN.
* FFS MDT requirements in RRC\_IDLE and RRC\_INACTIVE state.

Agreement:

* FFS R17 NR NTN relaxations in GSO (corresponding to the TN R16 relaxation) for normal UE and are applicable for (e)RedCap UE with FR1-NTN bands.
* FFS RAN4 to define Rel-17 RedCap relaxed measurement requirements for cell reselection for (e)RedCap UE with FR1-NTN bands, and the corresponding requirements defined for RedCap UE can be the baseline.
	+ If defined, the requirements apply provided that target cell is GSO

Agreement:

* For GSO:
* Define eDRX related requirements in RRC\_Idle / RRC\_Inactive mode for (e)RedCap UE with FR1-NTN.
	+ For GSO, All DRX and eDRX cycle can be supported, and the DRX and eDRX related requirements for RedCap UE in TN are re-used.
* Further discuss for LEO

Agreed documents

* R4-2416920 Reply LS on common TA in a regenerative payload scenario CMCC
* R4-2416865 WF on RRM requirements for NR\_NTN\_Ph3\_Part1 CATT
* R4-2416866 WF on RRM requirements for NR\_NTN\_Ph3\_Part2 Qualcomm

2.4.1.1 Decisions during RAN4#113

**2.4.1.1.1 UE RF requirements**

Agreed documents

* R4-2419898 LS on simultaneous operation between GNSS and NR NTN Source: Huawei

**2.4.1.1.2 SAN RF requirements**

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**2.4.1.1.3 RRM requirements**

Agreement:

* Deprioritize parallel measurement gap for RedCap UE in NTN. Come back to this issue at Apr 2025 meeting.

Agreement:

For NR RACH-based HO requirements,

* + - For 2Rx (e)RedCap UEs with FR1-NTN bands, reuse the legacy FR1-NTN RACH-based HO requirements for normal UEs.
		- For 1Rx (e)RedCap UEs with FR1-NTN bands, RACH-based handover delays should be extended compared to those defined for 2Rx (e)RedCap UEs.
			* Define the relaxation on Tsearch for unknown intra/inter-frequency cell, and the same relaxation for 1 Rx RedCap UE in TN network can be reused.
* Relax by 1 sample: Tsearch = 2\*Trs for intra-frequency HO
* Relax by 2 samples: Tsearch = 5\* Trs for inter-frequency HO

For NR RACH-less HO requirements,

* + - For 2Rx (e)RedCap UEs with FR1-NTN bands, RAN4 to reuse the legacy FR1-NTN RACH-less based HO requirements for normal UEs.
		- For 1Rx (e)RedCap UEs with FR1-NTN bands, RACH-less based handover delays should be extended compared to those defined for 2Rx (e)RedCap UEs.
			* The relaxations of Tsearch is the same as the relaxations defined for RACH-based HO For 1Rx (e)RedCap UEs with FR1-NTN bands.

Agreement:

* + - For time/location-based CHO without L3 measurement,
			* RAN4 to reuse the legacy FR1-NTN Time/location-based CHO without L3 measurement defined requirements for normal UEs for 2Rx (e)RedCap UE with FR1-NTN.
			* Reuse the same relaxation on Tsearch of RACH-based HO requirements for 1Rx (e)RedCap UE with FR1-NTN compared to 2Rx (e)RedCap UEs.
		- For time/location-based CHO with L3 measurement,
			* RAN4 to reuse legacy FR1-NTN Time/location-based CHO with L3 measurement requirements defined for normal UEs with the following adaptation:
* For Tmeasure, i.e., Tidentify\_intra/inter\_with\_index or Tidentify\_intra/inter \_without\_index defined in Section 9 for 1Rx/2Rx (e)RedCap UE with FR1-NTN can be reused.

Agreement:

For Satellite switching with re-sync requirements (including both hard satellite switch with re-sync and soft satellite switch with re-sync),

* + - For 2Rx (e)RedCap UEs with FR1-NTN bands, reuse the legacy Satellite switching with re-sync requirements for normal UEs.
		- For hard Satellite switching with re-sync requirements, for 1Rx (e)RedCap UEs with FR1-NTN bands, the delays for Satellite switching with re-sync should be extended compared to those defined for 2Rx (e)RedCap UEs.
			* Define the relaxation on Tsearch by extending one more [SSB or SMTC] periodicity on the top of Tfirst\_SSB:

Tsearch = Tfirst\_SSB + [TSSB or TRS] ms if UE is only required to support 1 Rx antenna, where TSSB is the periodicity of the SSB of the source satellite

* + - FFS whether to define soft Satellite switching with re-sync requirements for 1Rx (e)RedCap UEs with FR1-NTN bands.

Agreement:

For 2Rx (e)RedCap UEs with FR1-NTN bands,

* + - RAN4 to reuse the legacy mobility requirements in RRC\_IDLE / RRC\_INACTIVE state defined for normal UEs with FR1-NTN in high level.
			* Depend on the supported UE capabilities (e.g., multiple SMTC), the existing NR NTN requirements may need be revised.

For 1Rx (e)RedCap UEs with FR1-NTN bands,

* + - RAN4 to reuse the same offset of 1Rx RedCap UEs in TN compared to 2Rx (e)RedCap UEs.
* For *Qrxlevmin* and *Qqualmin*: -1 dB offset can be reused.
* For the measurements of intra- and inter-frequency NR cells,
* +1 dB offset on the threshold of *absThreshSS-BlocksConsolidation* can be reused as a baseline.
* For the cases of *rangeToBestCell* is not configured and *rangeToBestCell* is configured, +1 dB offset can be reused for better cell ranked.
* In RRC\_IDLE / RRC\_INACTIVE state, +1 dB offset can be reused for a margin in FR1 for reselections when UE evaluating whether a newly detectable inter-frequency cell meets the reselection criteria.
* For 1 Rx RedCap by a margin of at least:
* 6 dB in FR1 for reselections based on ranking or
* 7 dB in FR1 for SS-RSRP reselections based on absolute priorities or
* 5 dB in FR1 for SS-RSRQ reselections based on absolute priorities.
	+ - RAN4 to reduce the number of NR inter-frequency carriers that UE shall at least be capable of monitoring.
			* 6 NR inter-frequency carriers can be reused.
		- The parameters of Nserv\_RedCap, Tdetect,NR\_Intra/Inter\_RedCap, Tmeasure,NR\_Intra/Inter\_RedCap and Tevaluate,NR\_Intra/Inter\_RedCap defined for cell re-selection requirements will be not distinguished between 1Rx and 2 Rx (e)RedCap UE, and the requirements for both will be the same.
		- For SDT requirements, +1 dB offset on the threshold of *sdt-RSRP-Threshold-r17* for 1 Rx RedCap UE.

Define the enhanced cell reselection measurement requirements for 1Rx and 2Rx (e)RedCap UE with FR1-NTN bands.

Agreement:

For earth-moving LEO scenario:

* + - All eDRX cycle cannot be applied for RedCap/eRedCap UEs in NTN and not to define requirements for eDRX in earth-moving beam LEO scenario.

For quasi-earth fixed LEO scenario:

* + - Define eDRX related requirements in RRC\_Idle / RRC\_Inactive mode for (e)RedCap UE with FR1-NTN.
			* Requirements are applicable for 2.56s and 5.12s eDRX cycle
			* FFS for 10.24s eDRX cycle and larger than 10.24s eDRX cycle

Agreement:

* For supported types of relaxations for (e)RedCap UE with FR1-NTN,
* Only to support R17 NR NTN relaxations in GSO (corresponding to the TN R16 relaxation) for cell reselection.
* RAN4 to further discuss the thresholds and specific relaxation factor in supported criteria.

Agreement:

* + - For 2Rx (e)RedCap UEs with FR1-NTN bands, RAN4 to reuse the legacy FR1-NTN RRC re-establishment delay requirements for normal UEs in high level.
			* Depend on the supported UE capabilities (e.g., multiple SMTC), the existing NR NTN requirements may need be revised.
		- For 1Rx (e)RedCap UEs with FR1-NTN bands, UE RRC re-establishment delay (TUE\_re-establish\_delay) should be extended compared to those defined for 2Rx (e)RedCap UEs.
			* Define the relaxation on Tidentify for known and unknown intra/inter-frequency cell, and the same relaxation for 1 Rx RedCap UE in TN network can be reused.
* Relax the Tidentify\_intra\_NR and Tidentify\_inter\_NR, i by [1] more samples for FR1 known and unknown intra/inter-frequency cell.

Agreement:

* + - For 2Rx (e)RedCap UEs with FR1-NTN bands, RAN4 to reuse the legacy random access requirements defined for normal UEs with FR1-NTN.
		- For 1Rx (e)RedCap UEs with FR1-NTN bands, RAN4 to consider the offset for the following relative cell-specific RSRP thresholds for random access requirements
			* +1 dB offset can be reused as a baseline for *rsrp-ThresholdSSB*, *msgA-RSRP-ThresholdSSB* and *msgA-RSRP-Threshold*.
			* -1 dB offset can be reused as a baseline for *rsrp-ThresholdMsg3*.

Agreement:

* + - For 2Rx (e)RedCap UEs with FR1-NTN bands, RAN4 to reuse the legacy FR1-NTN RLM/BFD/CBD requirements for normal UEs in high level.
			* Depend on the supported UE capabilities, the existing NR NTN requirements may need be revised.
		- For 1Rx (e)RedCap UEs with FR1-NTN bands,
			* For SSB based and CSI-RS based RLM/BFD requirements, some of hypothetical PDCCH parameters including aggregation level (CCE) and bandwidth (PRBs) are defined as follows:
* Aggregation level (CCE) of 16.
* Bandwidth (PRBs) of 48.
	+ - * For SSB based and CSI-RS based RLM/BFD requirements, SCS=60kHz is not applicable for (e)RedCap UEs with FR1-NTN.
			* The SSB and CSI-RS based RLM OOS and BFD evaluation periods should be extended for 1Rx (e)RedCap UEs with FR1-NTN bands compared to those defined for 2Rx (e)RedCap UEs.
* For RLM evaluation periods,
* RAN4 not to extend the TEvaluate\_in\_SSB/CSI-RS for FR1.
* RAN4 to extend the TEvaluate\_out\_SSB/CSI-RS by factor 2 for FR1.
* For BFD evaluation periods,
* RAN4 to extend the TEvaluate\_BFD\_SSB/CSI-RS by factor 2 for FR1.

Agreement:

* + - The existing following requirements defined for NTN can be reused for (e)RedCap UEs with FR1-NTN bands:
			* Active BWP switch delay,
			* active TCI state switch delay
			* UE specific CBW change requirements
			* Pathloss reference signal switching delay
		- The above requirements defined for 1Rx and 2Rx (e)RedCap UEs with FR1-NTN bands will be the same, and there is no need to differentiate 1Rx/2Rx requirements.

Agreement:

* + - The existing timing requirements defined for NTN can be reused for (e)RedCap UEs with FR1-NTN bands.
			* UE transmit timing
			* UE timer accuracy
			* Timing Advance
		- The timing requirements defined for 1Rx and 2Rx (e)RedCap UEs with FR1-NTN bands will be the same, and there is no need to differentiate 1Rx/2Rx requirements.

**Agreement:**

* RAN4 to define RRM requirements for multiple SMTC-s for a single frequency carrier for (e)RedCap UEs.
* For whether to support parallel measurements on multiple NGSO satellites within a SMTC (Feature 25-5) for (e)RedCap UEs?
	+ Option 1 (MTK, Xiaomi, Samsung, ZTE, Ericsson, LG, QC): Not support
	+ Option 2 (HW, Nokia): FFS
* Further discuss the supported the number of SMTCs, the number of cells and SSB, the number of supported satellites, the proximity distance between two SMTCs.
* Further discuss the specific measurement requirements, i.e, whether and how to extend measurement period.
* Further discuss other R17 NTN UE capabilities (25-2, 25-3) related to 'in parallel'.

Agreement:

For SSB periodicity up to 160ms:

* No further discussion on the impact on initial access from the perspective of RRM requirement
* Discuss whether to Modify the default values for SSB and SMTC periodicities for the following if the UE is not provided with SMTC configuration or measurement object on the corresponding frequency by NW
	+ RRC Re-establishment: TSMTC,i assumption
	+ RRC connection release with redirection to NR: Trs assumption
	+ Handover, Conditional handover, RACH-less HO and satellite switch with re-sync: Trs assumption
	+ Further discuss the details on how to update the requirement.
* Further discuss the following for SSB periodicity > 20ms:
	+ Cell Reselection: for the SSB-periodicity of 160ms, whether the values for Tmeasure\_NR\_xxx\_enh need to be updated for DRX Cycles equal to 0.32 s and other DRX cycles
	+ Paging interruption in RRC Idle/Inactive: whether/how to adjust the requirements when SSB periods =160 ms in NGSO scenarios
	+ RRC re-establishment: RRC re-establishment requirements for Serving cell SSB Ês/Iot < -8dB
	+ Handover, Conditional handover, RACH-less HO and satellite switch with re-sync
	+ Further discuss whether and how to update the requirement

Agreement:

For SSB periodicity larger than 160ms if supported by other WGs:

* Whether RAN4 will define the RRM requirements for SSB periodicity larger than 160ms is depending on whether it is supported by WGs.

Agreed documents

* R4-2420104 WF on RRM requirements for NR\_NTN\_Ph3\_Part1 CATT
* R4-2420105 WF on RRM requirements for NR\_NTN\_Ph3\_Part2 Qualcomm

#### 2.4.2 Remaining Open issues

Definition of RF and RRM requirements enabling

* NR-NTN downlink coverage enhancement covering both GSO and NGSO constellations operating in FR1-NTN or FR2-NTN
* NR-NTN uplink capacity/throughput enhancement
* Support of regenerative payload

##### Support of Rel-17 RedCap and Rel-18 eRedCap UEs with NR NTN operating in FR1-NTN bands

## 3. Detailed progress in SA/CT WGs since last TSG meeting (for all involved WGs)

NOTE: This section only needs to be filled in for WI/SIs where there is a corresponding relevant WI/SI in SA/CT.

## 3.1 SA2

#### 3.1.1 Agreements with cross-TSG impacts

#### 3.1.2 Remaining Open issues with cross-TSG impacts

NOTE: This section should also flag any critical dependencies that need TSG attention.

## 4. References

## 4.1 RAN1

**RAN1#118bis meeting, Heifei, China, October 14-18th, 2024:**

* R1-2409226 other Session notes for 9.11 (Non-Terrestrial Networks for NR Phase 3 and Internet of Things Phase 3) Ad-Hoc Chair (Huawei)
* R1-2409255 other IRIS² - The New EU Programme Providing Secure Communications Via Satellites ESA
* R1-2409256 discussion Moderator’s summary on the discussion of common TA in a regenerative payload scenario Moderator (CMCC)
* R1-2409257 LS out Draft Reply LS on common TA values in the regenerative payload scenario CMCC
* R1-2409258 LS out Reply LS on common TA in a regenerative payload scenario RAN1, CMCC
* R1-2407771 Work Plan Work plan for Rel-19 NR\_NTN\_Ph3 THALES, CATT
* R1-2407765 discussion Discussions on downlink coverage enhancement for NR NTN Fraunhofer IIS, Fraunhofer HHI
* R1-2407766 discussion NR NTN Downlink coverage enhancements THALES
* R1-2407767 discussion FL Summary #1: NR-NTN downlink coverage enhancements THALES
* R1-2407768 discussion FL Summary #2: NR-NTN downlink coverage enhancements THALES
* R1-2407769 discussion FL Summary #3: NR-NTN downlink coverage enhancements THALES
* R1-2407770 discussion FL Summary #4: NR-NTN downlink coverage enhancements THALES
* R1-2407878 discussion Discussion on NR-NTN downlink coverage enhancement vivo
* R1-2407816 discussion Discussion on DL coverage enhancements for NR-NTN NICT
* R1-2407933 discussion Discussion on DL coverage enhancement for NR NTN ZTE Corporation, Sanechips
* R1-2407920 discussion Discussion on NR-NTN DL coverage enhancement CMCC
* R1-2407721 discussion Discussion on NR-NTN downlink coverage enhancement Spreadtrum Communications
* R1-2407743 discussion Discussion on downlink coverage enhancements for NR NTN China Telecom
* R1-2407660 discussion Discussion on downlink coverage enhancements for NR NTN Huawei, HiSilicon
* R1-2408135 discussion Discussion on NR-NTN downlink coverage enhancement OPPO
* R1-2408237 discussion Discussion on NR-NTN downlink coverage enhancement HONOR
* R1-2408257 discussion Discussion on NR-NTN downlink coverage enhancement TCL
* R1-2408227 discussion NR-NTN downlink coverage enhancement NEC
* R1-2408033 discussion Further consideration on downlink coverage enhancement for NR NTN CATT
* R1-2407956 discussion Discussion on NR-NTN downlink coverage enhancement Xiaomi
* R1-2408880 discussion Downlink Coverage Enhancement for NR NTN Google Ireland Limited
* R1-2408824 discussion Discussion on NR-NTN DL coverage enhancement KT Corp.
* R1-2408894 discussion Discussion on downlink coverage enhancement for NR-NTN CSCN
* R1-2408937 discussion Downlink Coverage Enhancements for NR NTN CEWiT
* R1-2408867 discussion Downlink coverage enhancement for NR NTN Qualcomm Incorporated
* R1-2408716 discussion NR-NTN downlink coverage enhancement MediaTek Inc.
* R1-2408727 discussion Further discussion on downlink coverage enhancements for NR over NTN Nokia, Nokia Shanghai Bell
* R1-2408802 discussion Discussion on DL coverage enhancement for NR-NTN NTT DOCOMO, INC.
* R1-2408684 discussion Discussion on downlink coverage enhancements for NR NTN CCU
* R1-2408663 discussion Discussion on downlink coverage enhancement for NR-NTN Samsung
* R1-2408323 discussion Discussion on downlink coverage enhancement for NR NTN Lenovo
* R1-2408310 discussion NR-NTN downlink coverage enhancement Baicells
* R1-2408298 discussion Discussion on NR-NTN downlink coverage enhancement LG Electronics
* R1-2408361 discussion NR-NTN Downlink Coverage Enhancement Panasonic
* R1-2408426 discussion On NR-NTN downlink coverage enhancement Ericsson
* R1-2408506 discussion Discussion on downlink coverage enhancements Fujitsu
* R1-2408487 discussion Discussion on NR-NTN Downlink Coverage Enhancement Apple
* R1-2408552 discussion NR-NTN downlink coverage enhancement InterDigital, Inc.
* R1-2408528 discussion NR-NTN downlink coverage enhancement with beam groups Sharp
* R1-2408578 discussion Discussion on NR-NTN downlink coverage enhancement ETRI
* R1-2409288 LS out Draft Reply LS on DL coverage enhancements Moderator (THALES)
* R1-2408949 discussion Discussion on NTN System Level Downlink Coverage Enhancement EchoStar, Eutelsat Group, Thales, Terrestar
* R1-2408945 discussion Operator views on DL Coverage Enhancements for NR NTN Inmarsat, Viasat
* R1-2409004 discussion Operator views on DL Coverage Enhancements for NR NTN Inmarsat, Viasat
* R1-2409037 discussion Discussion on DL coverage enhancement for NR-NTN NTT DOCOMO, INC.
* R1-2409101 discussion Summary #1 for Support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands Moderator (CATT)
* R1-2409102 discussion Summary #2 for Support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands Moderator (CATT)
* R1-2409103 discussion Summary #3 for Support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands Moderator (CATT)
* R1-2409295 discussion Final Summary for Support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands Moderator (CATT)
* R1-2408579 discussion Discussion on HD UEs with NR NTN ETRI
* R1-2408553 discussion Discussion on half-duplex RedCap issues for NTN FR1 operation InterDigital, Inc.
* R1-2408488 discussion Discussion on support of RedCap UEs with NR NTN operation Apple
* R1-2408299 discussion Discussion on support of (e)RedCap UEs with NR-NTN operating in FR1-NTN bands LG Electronics
* R1-2408664 discussion Discussion on support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands Samsung
* R1-2408803 discussion Discussion on support of RedCap and eRedCap UEs in FR1-NTN NTT DOCOMO, INC.
* R1-2408728 discussion Additional considerations on (e)RedCap operation in NR over NTN Nokia, Nokia Shanghai Bell
* R1-2408734 discussion On HD-FDD Redcap UEs for NTN Ericsson
* R1-2408717 discussion Support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands MediaTek Inc.
* R1-2408868 discussion Support of Redcap and eRedcap UEs in NR NTN Qualcomm Incorporated
* R1-2408811 discussion Discussion on support of RedCap/eRedCap UEs in NTN CAICT
* R1-2407957 discussion Discussion on the support of Redcap and eRedcap UEs in NR NTN Xiaomi
* R1-2408034 discussion Discussion on the enhancement of RedCap and eRedCap UEs In NTN CATT
* R1-2408258 discussion Discussion on HD-FDD Redcap UEs and eRedcap UEs for FR1-NTN TCL
* R1-2408238 discussion Discussion on support of RedCap and eRedCap UEs in NR NTN HONOR
* R1-2408136 discussion Discussion on supporting of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands OPPO
* R1-2407661 discussion Discussion on HD-FDD RedCap UEs and eRedCap UEs for FR1-NTN Huawei, HiSilicon
* R1-2407744 discussion Discussion on Support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands China Telecom
* R1-2407722 discussion Discussion on support of RedCap and eRedCap UEs with NR NTN operating in FR1-NTN bands Spreadtrum Communications
* R1-2407921 discussion Discussion on the collision issues of HD-FDD Redcap UE in FR1-NTN CMCC
* R1-2407934 discussion Discussion on support of RedCap/eRedCap UEs for NR NTN ZTE Corporation, Sanechips
* R1-2407879 discussion Discussion on support of RedCap and eRedCap UEs with NR-NTN vivo
* R1-2407880 discussion Discussion on NR-NTN uplink capacity enhancement vivo
* R1-2407935 discussion Discussion on UL capacity enhancement for NR NTN ZTE Corporation, Sanechips
* R1-2407817 discussion Discussion on NR-NTN uplink capacity/throughput enhancement NICT
* R1-2407922 discussion Discussion on the NR-NTN uplink capacity/throughput enhancements CMCC
* R1-2407723 discussion Discussion on NR-NTN uplink capacity/throughput enhancement Spreadtrum Communications, SGITG
* R1-2407745 discussion Discussion on NR-NTN uplink enhancement China Telecom
* R1-2407662 discussion Discussion on uplink capacity/throughput enhancement for FR1-NTN Huawei, HiSilicon
* R1-2408137 discussion Discussion on NR-NTN uplink capacity/throughput enhancement OPPO
* R1-2408239 discussion Discussion on NR-NTN UL capacity/throughput enhancement HONOR
* R1-2408228 discussion NR-NTN uplink capacity/throughput enhancement NEC
* R1-2408242 discussion Discussion on the NR-NTN uplink capacity/throughput enhancements TCL
* R1-2408035 discussion Discussion on UL capacity enhancement for NR NTN CATT
* R1-2407958 discussion Discussion on NR-NTN PUSCH capacity enhancement Xiaomi
* R1-2408869 discussion NR-NTN uplink capacity / throughput enhancement Qualcomm Incorporated
* R1-2408718 discussion NR-NTN uplink capacity and throughput enhancements MediaTek Inc.
* R1-2408729 discussion Further discussion on uplink capacity enhancements for NR over NTN Nokia, Nokia Shanghai Bell
* R1-2408804 discussion Discussion on NR-NTN uplink capacity/throughput enhancement NTT DOCOMO, INC.
* R1-2408665 discussion Discussion on uplink capacity/throughput enhancement for NR-NTN Samsung
* R1-2408686 discussion On uplink capacity/cell throughput enhancement for NR NTN Ericsson
* R1-2408300 discussion Discussion on NR-NTN uplink capacity/throughput enhancement LG Electronics
* R1-2408330 discussion NR-NTN uplink capacity enhancement Sharp
* R1-2408489 discussion Discussion on NR-NTN Uplink Capacity Enhancement Apple
* R1-2408505 discussion Discussion on uplink capacity/cell throughput enhancement for FR1-NTN Fujitsu
* R1-2408554 discussion NR-NTN uplink capacity/throughput enhancement InterDigital, Inc.
* R1-2408540 discussion Uplink capacity/throughput enhancement for NR-NTN Panasonic
* R1-2408580 discussion Discussion on NR-NTN uplink capacity/throughput enhancement ETRI
* R1-2408543 discussion Discussion on the NR-NTN uplink capacity/throughput enhancements Lenovo
* R1-2409092 discussion Discussion on uplink capacity/throughput enhancement for FR1-NTN Huawei, HiSilicon
* R1-2408946 discussion Operator views on UL Capacity Enhancements for NR NTN Inmarsat, Viasat
* R1-2408965 discussion Views on NR-NTN PUSCH capacity enhancement Mitsubishi Electric RCE
* R1-2409018 discussion Feature lead summary #1 of AI 9.11.3 on NR-NTN uplink capacity and throughput enhancements Moderator (MediaTek)
* R1-2409019 discussion Feature lead summary #2 of AI 9.11.3 on NR-NTN uplink capacity and throughput enhancements Moderator (MediaTek)
* R1-2409020 discussion Feature lead summary #3 of AI 9.11.3 on NR-NTN uplink capacity and throughput enhancements Moderator (MediaTek)

**RAN1#119 meeting, Orlando, USA, November 18-22th, 2024:**

## 4.2 RAN2

**RAN2#127bis meeting, Heifei, China, October 14-18th, 2024:**

* R2-2407963 draftCR Introduction of LTE TN to NR NTN IDLE mode mobility CATT
* R2-2407919 LS in Reply LS on DL coverage enhancements (R1-2407538; contact: CMCC) RAN1
* R2-2408014 draftCR Introduction of LTE TN to NR NTN Mobility UE Capability vivo
* R2-2408805 draftCR Stage 2 Running CR for E-UTRAN to NR NTN mobility Samsung
* R2-2409183 CR Running RRC CR for NR NTN phase 3 Ericsson
* R2-2407960 discussion Discussion on Downlink Coverage Enhancements CATT
* R2-2407983 discussion Consideration on downlink coverage enhancements NERCDTV
* R2-2408015 discussion Discussion on Cell Bar Control for DL Coverage Enhancement vivo
* R2-2408046 discussion Discussion of NR NTN coverage enhancement China Telecom
* R2-2408097 discussion RAN2 Impact on DL coverage enhancements CMCC
* R2-2408155 discussion Discussions on cell DTX during satellite dynamic power sharing Fujitsu
* R2-2408160 discussion Discussion on DL coverage enhancement for NTN OPPO
* R2-2408284 discussion Discussion on downlink coverage enhancement HONOR
* R2-2408300 discussion Access control for NTN downlink coverage enhancement Lenovo
* R2-2408337 discussion Discussion on DL coverage enhancements Huawei, HiSilicon, Turkcell
* R2-2408411 discussion Consideration on downlink coverage enhancement NEC Corporation.
* R2-2408459 discussion DL coverage enhancement at system level Google
* R2-2408465 discussion Discussion on cell DTX/DRX for NTN Xiaomi
* R2-2408593 discussion DL coverage enhancement in NTN Apple
* R2-2408655 discussion Consideration on downlink coverage enhancements ZTE Corporation, Sanechips
* R2-2408699 discussion Discussion on NTN downlink coverage enhancement Nokia
* R2-2408719 discussion SMTC impacts due to NTN downlink coverage enhancements Sony
* R2-2408739 discussion Discussion on Downlink Coverage Enhancements CSCN
* R2-2408894 discussion Discussion on cell DTX Qualcomm Incorporated
* R2-2408920 discussion Downlink coverage enhancement for NTN InterDigital
* R2-2408970 discussion Downlink coverage enhancement SMTC impacts Sequans Communications
* R2-2408981 discussion Discussion on downlink coverage enhancements LG Electronics Inc.
* R2-2409004 discussion Discussion on Downlink Coverage Enhancements Sharp
* R2-2409025 discussion Discussion on Downlink Coverage Enhancement Samsung
* R2-2409051 discussion Discussion on the impact of SSB extension for NR NTN NTPU
* R2-2409180 discussion DL coverage enhancements Ericsson
* R2-2407961 discussion Discussion on support of broadcast service in NR NTN CATT
* R2-2407982 discussion Discussion on support of broadcast service in NTN NERCDTV
* R2-2408016 discussion Further Discussion on MBS Broadcast Provision in NTN vivo
* R2-2408047 discussion Consideration of service area in NR NTN China Telecom
* R2-2408080 discussion Discussion on MBS broadcast service for NR NTN CMCC
* R2-2408138 discussion Discussion on providing MBS service area in NTN network OPPO
* R2-2408156 discussion Discussions on supporting broadcast intended to serve partial cell Fujitsu
* R2-2408285 discussion Discussion on the support of broadcast service HONOR
* R2-2408301 discussion Further considerations for broadcast service area indication Lenovo
* R2-2408338 discussion Discussion on MBS broadcast over NTN Huawei, HiSilicon, Turkcell
* R2-2408464 discussion Discussion on Support of MBS Broadcast Service over NTN TCL
* R2-2408488 discussion Discussion on MBS Broadcast service area signaling THALES
* R2-2408592 discussion Intended broadcast service area provision over NTN Apple
* R2-2408602 discussion Further details on intended service area for MBS and ETWS NEC
* R2-2408619 discussion Discussion on the support of broadcast service Xiaomi
* R2-2408656 discussion Consideration on broadcast service ehancements ZTE Corporation, Sanechips
* R2-2408685 discussion Discussions on MCCH reacquiring ITRI
* R2-2408892 discussion Signaling of MBS broadcast service area information Qualcomm Incorporated
* R2-2408946 discussion On MBS Support in Rel-19 NR NTN Nokia, Nokia Shanghai Bell
* R2-2408958 discussion Support for broadcast service in non-terrestrial networks InterDigital, Europe, Ltd.
* R2-2408988 discussion Discussion on support of broadcast service in NTN LG Electronics France
* R2-2409002 discussion UE behaviour for MBS related procedures Sharp
* R2-2409003 discussion Discussion on MBS service area information Sharp
* R2-2409026 discussion Discussion on MBS Broadcast Service Intended Area Samsung
* R2-2409113 discussion Remaining issues for the support of broadcast service in NTN ETRI
* R2-2409184 discussion Support for broadcast services in NR NTN Ericsson
* R2-2407962 discussion Further discussion on regenerative payload CATT
* R2-2408161 discussion Discussion on satellite switch with resynch for regenerative payload OPPO
* R2-2408283 discussion Discussion on regenerative payload HONOR
* R2-2408302 discussion UE location verification in NTN regenerative architecture Lenovo
* R2-2408339 discussion Discussion on regenerative payload Huawei, HiSilicon, Turkcell
* R2-2408657 discussion Consideration on NTN remaining issues ZTE Corporation, Sanechips
* R2-2408716 discussion Satellite switch with re-sync in regenerative payload Sony
* R2-2408806 discussion On adaptations related to regenerative payload for NR NTN Samsung
* R2-2408893 discussion Discussion on regenerative payload Qualcomm Incorporated
* R2-2408947 discussion Remaining Issues for NTN over Regenerative Architecture Nokia, Nokia Shanghai Bell
* R2-2408980 discussion Discussion on regenerative payload Fujitsu Limited
* R2-2409071 discussion Discussion on support of regenerative payload ETRI
* R2-2409179 discussion Regenerative payload Ericsson

**RAN2#128 meeting, Orlando, USA, November 18-22th, 2024:**

* R2-2409512 RAN1 Reply LS on common TA in a regenerative payload scenario (R1-2409258; contact: CMCC) LS in
* R2-2409519 RAN3 LS on Supporting MBS broadcast service for NR NTN (R3-245844; contact: Xiaomi) LS in
* R2-2409522 RAN4 Reply LS on common TA in a regenerative payload scenario (R4-2416920; contact: CMCC) LS in
* R2-2409536 vivo Introduction of LTE TN to NR NTN Mobility UE Capability CR
* R2-2409537 vivo Further Discussion on MBS Broadcast Service Area Provision discussion
* R2-2409538 vivo Discussion on MBS Broadcast Service Continuity in NTN discussion
* R2-2409615 LG Electronics France Discussion on support of broadcast service in NTN discussion
* R2-2409666 LG Electronics Inc. Discussion on downlink coverage enhancements discussion
* R2-2409669 CATT Introduction of LTE TN to NR NTN IDLE mode mobility CR
* R2-2409670 CATT, CBN Further discussion on support of broadcast service in NR NTN discussion
* R2-2409671 CATT Further discussion on downlink coverage enhancements discussion
* R2-2409821 Google Ireland Limited Discussion on the DL coverage enhancement at system level discussion
* R2-2409848 Fujitsu Discussions on cell DTX during satellite dynamic power sharing discussion
* R2-2409849 Fujitsu Discussions on supporting broadcast intended to serve partial cell discussion
* R2-2409893 OPPO Discussion on providing MBS service area in NTN network discussion
* R2-2409938 Samsung Introduction of stage 2 for LTE to NR NTN idle mode mobility CR
* R2-2409977 Apple Intended broadcast service area provision over NTN discussion
* R2-2409978 Apple DL coverage enhancement in NTN discussion
* R2-2409981 TOYOTA Info Technology Center Regenerative payload for NTN for NR Ph3 discussion
* R2-2410011 NEC Discussion on intended service area signalling discussion
* R2-2410046 Qualcomm Incorporated Signaling of MBS broadcast service area information discussion
* R2-2410048 Qualcomm Incorporated Discussion on cell DTX discussion
* R2-2410066 Xiaomi Discussion on DL coverage enhancement discussion
* R2-2410067 Xiaomi Discussion on uplink capacity enhancement discussion
* R2-2410107 China Telecom NR NTN coverage enhancement discussion
* R2-2410108 China Telecom Broadcast service area information in NR NTN discussion
* R2-2410122 OPPO Discussion on DL coverage enhancement for NTN discussion
* R2-2410123 OPPO Discussion on satellite switch with resynch for regenerative payload discussion
* R2-2410213 Nokia Discussion on NTN downlink coverage enhancement discussion
* R2-2410231 ITRI Discussions on configuration of intended service areas discussion
* R2-2410267 Lenovo Cell barring and reselection for NTN DL-CE discussion
* R2-2410268 Lenovo NTN broadcast service area indication and service continuity discussion
* R2-2410269 Lenovo UE location verification in NTN regenerative architecture discussion
* R2-2410293 NEC Corporation Consideration on downlink coverage enhancement discussion
* R2-2410330 CMCC Discussion on uplink capacity/throughput enhancement for NR NTN discussion
* R2-2410331 CMCC Considerations on broadcast service for NR NTN discussion
* R2-2410365 ZTE Corporation, Sanechips Consideration on downlink coverage enhancements discussion
* R2-2410366 ZTE Corporation, Sanechips Consideration on broadcast service enhancements discussion
* R2-2410367 ZTE Corporation, Sanechips Consideration on NTN miscellaneous issues discussion
* R2-2410384 Sony Satellite switch with re-sync in regenerative payload discussion
* R2-2410386 Sony SMTC impacts due to NTN downlink coverage enhancements discussion
* R2-2410434 Huawei, HiSilicon, Turkcell Discussion on Uplink Capacity Enhancements discussion
* R2-2410440 Nokia, Nokia Shanghai Bell On the Open Points for Supporting MBS in Rel-19 NR NTN discussion
* R2-2410521 Huawei, HiSilicon, Turkcell Discussion on MBS broadcast over NTN discussion
* R2-2410525 Samsung Discussion on Downlink Coverage Enhancement discussion
* R2-2410526 Samsung Discussion on MBS Broadcast Service Intended Area discussion
* R2-2410549 InterDigital Downlink coverage enhancement for NTN discussion
* R2-2410590 Huawei, HiSilicon, Turkcell Discussion on regenerative payload discussion
* R2-2410597 InterDigital, Inc. Support for broadcast service in non-terrestrial networks discussion
* R2-2410638 Xiaomi Discussion on the reply LS to RAN3 on supporting MBS broadcast service for NR NTN discussion
* R2-2410639 Xiaomi Discussion on the support of broadcast service discussion
* R2-2410649 Fujitsu Limited Discussion on regenerative payload discussion
* R2-2410662 TCL Further Discussion on Support of MBS Broadcasting over NTN discussion
* R2-2410671 CMCC RAN2 Impact on DL coverage enhancements discussion
* R2-2410677 NERCDTV NTN DL coverage enhancements discussion
* R2-2410691 HONOR Discussions on downlink coverage enhancement discussion
* R2-2410699 Sharp Discussion on Downlink Coverage Enhancements discussion
* R2-2410700 Sharp Discussion on UE behaviours within intended service area discussion
* R2-2410713 ETRI Discussion on the support of broadcast service in NR-NTN discussion
* R2-2410715 ETRI, Korea University Discussion on downlink coverage enhancements in NR NTN discussion
* R2-2410764 Continental Automotive Further considerations on intended broadcast service area provision discussion
* R2-2410804 Sequans Communications Downlink coverage enhancement SMTC impacts discussion
* R2-2410806 Sequans Communications Downlink coverage enhancement access control discussion
* R2-2410861 Ericsson Running RRC CR for NR NTN phase 3 CR
* R2-2410862 Ericsson Support for broadcast services in NR NTN discussion
* R2-2410870 THALES Discussion on RAN2 Aspects for system-level Downlink Coverage enhancements discussion
* R2-2410871 THALES Discussion on MBS Broadcast service area signaling discussion
* R2-2410880 Ericsson Regenerative payload discussion
* R2-2410881 Ericsson DL coverage enhancements discussion
* R2-2410968 CATT Introduction of LTE TN to NR NTN IDLE mode mobility CR
* R2-2410969 Samsung Introduction of stage 2 for LTE to NR NTN idle mode mobility CR
* R2-2410972 Xiaomi Draft reply on Supporting MBS broadcast service for NR NTN LS out
* R2-2411196 RAN2 Reply on Supporting MBS broadcast service for NR NTN LS out

## 4.3 RAN3

**RAN3#125bis meeting, Heifei, China, October 14-18th, 2024:**

* R3-245861 draftCR (BL CR to 38.300) Support for Regenerative Payload and MBS broadcast in NR NTN Ericsson, Thales, Deutsche Telekom, Nokia, ESA, CATT, ZTE, Sateliot, Huawei, Dish Networks, Echostar, Eutelsat Group, Xiaomi, Samsung, CMCC, LG Electronics, NEC, Lenovo, ETRI
* R3-245033 draftCR (BL CR to 38.300) Support for Regenerative Payload in NR NTN Ericsson, Thales, Deutsche Telekom, Nokia, ESA, CATT, ZTE, Sateliot, Huawei, Dish Networks, Echostar, Eutelsat Group, Xiaomi, Samsung, CMCC, LG Electronics, NEC, Lenovo
* R3-245761 draftCR (BL CR to 38.300) Support for Regenerative Payload in NR NTN Ericsson, Thales, Deutsche Telekom, Nokia, ESA, CATT, ZTE, Sateliot, Huawei, Dish Networks, Echostar, Eutelsat Group, Xiaomi, Samsung, CMCC, LG Electronics, NEC, Lenovo, ETRI
* R3-245177 other (TP for TS 38.300) Discussion on the support of MBS Broadcast Service Nokia, Nokia Shanghai Bell
* R3-245056 other (TP to BL CR for TS 38.413) Support of MBS broadcast service for NR NTN CATT
* R3-245360 other (TP for TS 38.413 and TS 38.300) Support MBS broadcast service Huawei
* R3-245795 other (TP to BL CR for TS 38.300) Supporting MBS broadcast service for NR NTN Huawei, Nokia, Nokia Shanghai Bell, Ericsson, Xiaomi, NEC, ZTE
* R3-245433 other (TP for TS38.300) Discussion on Support for NR NTN MBS Broadcast Service Qualcomm Incorporated
* R3-245490 discussion Broadcast Service Area for NR NTN Ericsson, SES, ESA
* R3-245084 other (TP to BL CR for TS 38.413) Support of Broadcast service Xiaomi
* R3-245208 other (TP for TS 38.413 and TS 38.300) Discussion on NTN broadcast service supporting ZTE Corporation
* R3-245125 discussion Further discussion on support MBS broadcast service for NR NTN Samsung
* R3-245139 discussion Support of MBS broadcast service China Telecom
* R3-245287 other (TP for TS 38.300 and TS 38.413) Discussion on NR NTN supporting MBS broadcast service NEC
* R3-245374 discussion Discussion on Support of MBS Broadcast Service TCL
* R3-245450 discussion Broadcast service area indication and service continuity in NTN Lenovo
* R3-245491 other Broadcast Service Area for NR NTN - NGAP Impacts Ericsson, SES, ESA
* R3-245796 other (TP to BL CR for TS 38.413) Supporting MBS broadcast service for NR NTN Ericsson, SES, ESA, Nokia, Nokia Shanghai Bell
* R3-245843 other (TP to BL CR for TS 38.413) Supporting MBS broadcast service for NR NTN Ericsson, SES, ESA, Nokia, Nokia Shanghai Bell, Xiaomi, Huawei, ZTE
* R3-245520 discussion Discussion on Supporting MBS broadcast service for NR NTN CMCC
* R3-245794 LS out [Draft] LS on Supporting MBS broadcast service for NR NTN RAN3(Xiaomi)
* R3-245844 LS out LS on Supporting MBS broadcast service for NR NTN RAN3(Xiaomi)
* R3-245862 CR (BL CR to 38.410) Introduce NG Removal procedure CMCC, Huawei, Nokia, Nokia Shanghai Bell, CATT, Ericsson, Qualcomm, Xiaomi, LG Electronics, China Telecom, Samsung, ZTE, NEC, ETRI
* R3-245863 CR (BL CR to 38.413) Support for Regenerative Payload and MBS broadcast in NR NTN CATT, Thales, Nokia, Nokia Shanghai Bell, Ericsson, Huawei, ZTE, Qualcomm, Samsung, Xiaomi, CMCC, China Telecom, Jio, LG Electronics, NEC, ETRI, SES, ESA
* R3-245057 other (TP to BL CRs) Support of regenerative payload CATT
* R3-245179 other (TP for TS 38.413) Introduce NG Removal procedure Nokia, Nokia Shanghai Bell, Huawei, CATT, CMCC, Ericsson, Qualcomm, Xiaomi
* R3-245799 other (TP for TS 38.413) Introduce NG Removal procedure Nokia, Nokia Shanghai Bell, Huawei, CATT, CMCC, Ericsson, Qualcomm, Xiaomi, LG Electronics, China Telecom, Samsung, ZTE, NEC, ETRI
* R3-245362 other (TP for TS 38.410) Introduce NG Removal procedure Huawei, Nokia, Nokia Shanghai Bell, CATT, CMCC, Ericsson, Qualcomm, Xiaomi
* R3-245800 other (TP for TS 38.410) Introduce NG Removal procedure Huawei, Nokia, Nokia Shanghai Bell, CATT, CMCC, Ericsson, Qualcomm, Xiaomi, LG Electronics, China Telecom, Samsung, ZTE, NEC, ETRI
* R3-245493 other NG Removal – Stage 2 Description Ericsson, Huawei, Nokia, Nokia Shanghai Bell, Xiaomi, CATT, Qualcomm Incorporated
* R3-245801 other NG Removal – Stage 2 Description Ericsson, Huawei, Nokia, Nokia Shanghai Bell, Xiaomi, CATT, Qualcomm Incorporated, LG Electronics Inc., China Telecom, Samsung, ZTE, NEC, ETRI
* R3-245085 discussion Support of regenerative payload Xiaomi
* R3-245126 discussion Further discussion on support of regenerative payload for NR NTN Samsung
* R3-245140 discussion Support of regenerative payload in NR NTN China Telecom
* R3-245178 other (TP for TS 38.300) Discussion on the support of Regenerative payload Nokia, Nokia Shanghai Bell
* R3-245288 other (TP for TS 38.300) Discussion on regenerative payload enhancement for NR NTN NEC
* R3-245340 discussion Discussion on support of regenerative payload for NR NTN CSCN
* R3-245361 other (TP for BLCR for TS 38.300) Support of regenerative payload (including LS responses to SA2) Huawei
* R3-245373 discussion Discussion on Support of NTN Regenerative Architecture TCL
* R3-245404 discussion Discussion on interfaces mobility aspects for regenerative payload THALES
* R3-245410 discussion Discussion on UE-Sat-UE communications THALES
* R3-245434 other (TP for TS 38.300) Discussion on RAN Signaling impacts for NR NTN Regenerative Payload Qualcomm Incorporated
* R3-245451 discussion Interface management for regenerative payload in NTN Lenovo
* R3-245494 discussion Further Discussion on NTN Regenerative Payload Issues in Rel-19 Ericsson, Thales, SES, ESA, Sateliot
* R3-245495 LS out [DRAFT] Reply LS on Support of Regenerative Payload Issues in Rel-19 Ericsson
* R3-245519 discussion Discussion on Support of regenerative payload for NR NTN CMCC
* R3-245571 discussion Discussions on NG management and Inactive support LG Electronics Inc.
* R3-245572 other (TP for NR\_NTN\_Ph3 TS 38.300) LG Electronics Inc.
* R3-245586 discussion Discussion on Xn impact for NR NTN regenerative payload NTT DOCOMO INC..
* R3-245588 discussion Discussion on NG interface management through ISL ETRI
* R3-245666 other Further discussion on support of regenerative payload ZTE Corporation
* R3-245768 discussion CB:#NRNTN2\_RegenerativePayload CATT
* R3-245802 LS out LS on OAM requirements to support regenerative payload RAN3(CATT)
* R3-245845 LS out LS on OAM requirements to support regenerative payload RAN3(CATT)

**RAN3#126 meeting, Orlando, USA, November 18-22th, 2024:**

* R3-247033 (BL CR to 38.300) Support for Regenerative Payload and MBS broadcast in NR NTN (Ericsson, Thales, Deutsche Telekom, Nokia, ESA, CATT, ZTE, Sateliot, Huawei, Dish Networks, Echostar, Eutelsat Group, Xiaomi, Samsung, CMCC, LG Electronics, NEC, Lenovo, ETRI)
* R3-247034 (BL CR to 38.410) Introduce NG Removal procedure (CMCC, Huawei, Nokia, Nokia Shanghai Bell, CATT, Ericsson, Qualcomm, Xiaomi, LG Electronics, China Telecom, Samsung, ZTE, NEC, ETRI)
* R3-247035 Support for Regenerative Payload and MBS broadcast in NR NTN (CATT, Thales, Nokia, Nokia Shanghai Bell, Ericsson, Huawei, ZTE, Qualcomm, Samsung, Xiaomi, CMCC, China Telecom, Jio, LG Electronics, NEC, ETRI, SES, ESA)
* R3-247398 (TP for BLCR for TS 38.300) Correction on stage 2 (Huawei, Nokia, Nokia Shanghai Bell, Thales, CATT)
* R3-247214 (TP for TS 38.300 and TS 38.413) Discussion on NR NTN supporting MBS broadcast service (NEC)
* R3-247282 Support of MBS broadcast service for NR NTN (CATT)
* R3-247344 (TP to BL CR for TS 38.300 and TS 38.413) Discussion on the support of MBS Broadcast Service (Nokia, Nokia Shanghai Bell)
* R3-247379 Support of MBS broadcast service for NTN (China Telecom)
* R3-247399 (TP for TS 38.300 and TS 38.413) Support MBS broadcast service (Huawei)
* R3-247435 Broadcast service continuity in NTN (Lenovo)
* R3-247607 Further discussion on support broadcast service for NR NTN (Samsung)
* R3-247654 (TP for TS 38.300) Discussion on NTN broadcast service supporting (ZTE Corporation)
* R3-247674 (TP to 38.300) Discussion on Supporting MBS broadcast service for NR NTN (CMCC)
* R3-247016 Reply LS on Support of Regenerative-based Satellite Access (SA2(Qualcomm))
* R3-247215 (TP for TS 38.300) Discussion on regenerative payload enhancement for NR NTN (NEC)
* R3-247283 (TP to BL CR for 38.413) Support of regenerative payload (CATT)
* R3-247316 Support of Inactive UE mobility NTN (Xiaomi, Qualcomm Incorporated, Nokia, Nokia Shanghai Bell, China Telecom, Lenovo)
* R3-247317 (TP for TS 38.300) Support of regenerative payload (Xiaomi)
* R3-247328 (TP for TS 38.300) NR NTN Regenerative Payload Architecture (Qualcomm Incorporated, Xiaomi, LGE, NTT Docomo)
* R3-247329 (TP for TS 38.300) Discussion on RAN Signaling impacts for NR NTN Regenerative Payload (Qualcomm Incorporated)
* R3-247330 Draft Reply for LS on Support of Regenerative-based Satellite Access (Qualcomm Incorporated)
* R3-247345 (TP for TS 38.300) Discussion on the support of Regenerative payload (Nokia, Nokia Shanghai Bell)
* R3-247380 Discussion on regenerative payload enhancement (China Telecom)
* R3-247400 (TP for TS 38.300) Support of regenerative payload (Huawei)
* R3-247436 Interface management for regenerative payload in NTN (Lenovo)
* R3-247461 Considerations on NG Interface Management over the Feeder Link (Ericsson, Thales)
* R3-247462 Making the Case for Location-Based CHO in Rel-19 (Ericsson, Thales, ESA, Inmarsat, Viasat)
* R3-247463 Location-Based CHO in Rel-19 - XnAP Aspects (Ericsson, Thales, ESA, Inmarsat, Viasat)
* R3-247547 Further discussion on support of regenerative payload (ZTE Corporation)
* R3-247593 Discussions on NG management from satellite gNB and Inactive support (LG Electronics Inc.)
* R3-247594 (TP for NR\_NTN\_Ph3 TS 38.300 BL CR) (LG Electronics Inc.)
* R3-247600 Discussion on NG interface management through ISL (ETRI)
* R3-247608 Further discussion on support of regenerative payload for NR NTN (Samsung)
* R3-247675 Discussion on support of regenerative payload for NR NTN (CMCC)
* R3-247847 (TP to BL CR for TS 38.300 and TS 38.413) Discussion on the support of MBS Broadcast Service (Nokia, Nokia Shanghai Bell)
* R3-247899 (TP for TS 38.300 and TS 38.413) Support MBS broadcast service (Huawei)

## 4.4 RAN4

**RAN4#112bis meeting, Heifei, China, October 14-18th, 2024:**

* R4-2416256 other General issue for NTN RedCap Ericsson
* R4-2416068 LS out Reply LS on common TA in a regenerative payload scenario Ericsson
* R4-2416045 other Discussion on the potential specification updates due to simultaneous operation with GNSS Huawei, HiSilicon
* R4-2415741 discussion Discussion on Rel-19 NR-NTN RedCap UE RF requirements Mediatek India Technology Pvt.
* R4-2415609 discussion Discussion on NTN (e)Redcap UE RF requirements Spreadtrum Communications
* R4-2415586 discussion UE RF requirement for NTN Redcap and eRedcap Sony
* R4-2415710 other RedCap NTN UEs Nokia
* R4-2415057 discussion Discussion on RF requirement for redcap UE in FR1 NTN band. Xiaomi
* R4-2415041 discussion Discussion on RedCap UE RF requirements with NR NTN operating in FR1-NTN bands OPPO
* R4-2415096 other Discussion on RF requirements for NTN RedCap UE CATT
* R4-2416257 other RedCap UE RF impact Ericsson
* R4-2416197 other Views on increasing MOP tolerance for NTN HD-FDD Redcap NTT DOCOMO INC.
* R4-2416302 other On NR-NTN Ph3 UE RF Samsung
* R4-2416462 other UE RF requirements for NR NTN RedCap Qualcomm Inc.
* R4-2416463 other NR NTN UL capacity enhancements Qualcomm Inc.
* R4-2415334 other On NTN simultaneous operation with GNSS Apple
* R4-2415095 other Discussion on NTN SAN RF requirements CATT
* R4-2416411 discussion Clarification on SAN architecture for the regenerative payload introduction Huawei, HiSilicon
* R4-2416520 discussion Discussion on the RAN2 LS Reply on Common TA in a Regenerative Payload Scenario THALES
* R4-2415956 discussion Discussion on RRM requirements for NR NTN phase 3 MediaTek inc.
* R4-2415867 discussion Discussion on RRM requirements for RedCap UE in NTN Huawei, HiSilicon
* R4-2415881 discussion Discussion on RRM requirements for (e)RedCap in NTN LG Electronics Inc.
* R4-2416126 other Discussion on (e)RedCap RRM requirements of R19 NR NTN OPPO
* R4-2416076 discussion Discussion on RedCap RRM requirements for NTN for NR Phase 3 Ericsson
* R4-2415555 discussion Discussion on RRM requirements of RedCap in Rel-19 NTN phase 3 Samsung
* R4-2415542 discussion On R19 NTN (e)RedCap RRM requirements Apple
* R4-2415068 discussion Discussion on (e)RedCap RRM requirements in NTN for NR Phase 3 Xiaomi
* R4-2415149 discussion Discussion on RRM requirements on (e)RedCap for R19 NR NTN Phase 3 vivo
* R4-2415157 discussion Discussion on (e)RedCap RRM requirements for Rel-19 NTN phase3 CATT
* R4-2415009 discussion (NR\_NTN\_Ph3-Core) Discussion on the RRM requirement for Redcap over NTN CMCC
* R4-2415351 discussion RedCap for NTN Qualcomm Incorporated
* R4-2416368 other Discussion on RRM requirements for RedCap NTN ZTECorporation,Sanechips
* R4-2416189 discussion Adapting NGSO requirements for RedCap support in Rel-19 Nokia
* R4-2416190 discussion Discussing general RRM requirements for Rel-19 WI and LS Reply to RAN2 Nokia
* R4-2416369 other Discussion on RRM requirements for regenerative NTN and downlink coverage enhancement ZTECorporation,Sanechips
* R4-2416371 other Discussion on LS on common TA for regenerative NTN ZTECorporation,Sanechips
* R4-2416372 LS out LS on common TA for regenerative NTN ZTECorporation,Sanechips
* R4-2416912 LS out Reply LS on common TA in a regenerative payload scenario CMCC
* R4-2416920 LS out Reply LS on common TA in a regenerative payload scenario CMCC
* R4-2415352 discussion Downlink coverage enhancement for NTN Qualcomm Incorporated
* R4-2415010 discussion (NR\_NTN\_Ph3-Core) Discussion on the RRM requirement for NTN phase3 CMCC
* R4-2415011 LS out Reply LS on common TA in a regenerative payload scenario CMCC
* R4-2415158 discussion Discussion on other RRM requirements for Rel-19 NTN phase3 CATT
* R4-2415159 LS out Draft reply LS on common TA in a regenerative payload scenario CATT
* R4-2415148 discussion Discussion on potential RRM impacts on DL coverage and regenerative payload for R19 NR NTN Phase 3 vivo
* R4-2415069 discussion Discussion on other RRM core requirements in NTN for NR Phase 3 Xiaomi
* R4-2415543 discussion On R19 other NTN RRM requirements Apple
* R4-2415556 discussion Discussion on RRM requirements of other aspects in Rel-19 NTN phase 3 Samsung
* R4-2416077 discussion Discussion on other RRM requirements for NTN for NR Phase 3 Ericsson
* R4-2416127 other Discussion on other RRM requirements of R19 NR NTN OPPO
* R4-2415882 discussion Discussion on RRM requirements for regerative payload NTN LG Electronics Inc.
* R4-2415868 discussion Discussion on other RRM requirements for Rel-19 NTN Huawei, HiSilicon
* R4-2415668 other Topic summary for [112bis][221] NR\_NTN\_Ph3\_Part1 Moderator (CATT)
* R4-2415669 other Topic summary for [112bis][222] NR\_NTN\_Ph3\_Part2 Moderator (Qualcomm)
* R4-2416586 other Way Forward for [112bis][310] NR\_NTN\_Ph3\_UE\_RF Qualcomm
* R4-2416908 other Ad-hoc minutes for NR\_NTN\_Ph3 Qualcomm
* R4-2416530 other Topic summary for [112bis][309] NR\_NTN\_Ph3\_General\_SAN\_RF Moderator (Thales)
* R4-2416531 other Topic summary for [112bis][310] NR\_NTN\_Ph3\_UE\_RF Moderator (Qualcomm)
* R4-2416865 other WF on RRM requirements for NR\_NTN\_Ph3\_Part1 CATT
* R4-2416866 other WF on RRM requirements for NR\_NTN\_Ph3\_Part2 Qualcomm
* R4-2416561 other Way Forward for [112bis][310] NR\_NTN\_Ph3\_UE\_RF Qualcomm

**RAN4#113 meeting, Orlando, USA, November 18-22th, 2024:**

***END***