3GPP TSG-RAN WG2 Meeting #116 electronic R2-2111292

Online, November 1-12, 2021

**Agenda item: 10.2**

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

**Title: Report from Break-out session on R17 NTN, REDCAP and CE**

**Document for: Approval**

General

Recording of voice or video at meetings is not used in 3GPP. This applies also to this e-Meeting. At this e-Meeting, no specific actions are taken to prevent the recording of web conferences. Companies that have concerns related to recordings, if any, may express those by email in the main meeting organizational thread [AT116-e][000]

Organizational

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

* [116-e][100] ****Organizational - NTN, REDCAP and CE session (RAN2 VC)****

Scope:

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

Schedule/Plan

WEEK 1:

|  |  |  |  |
| --- | --- | --- | --- |
| **Time Zone UTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Monday** |  |  |  |
| 12:05-12:15 | Rel17 Planning (TS creation, UE caps, RRC parameters, running CRs, need for coord etc) |
| 12:15-13:05 | NR17 Measurement Gap Enh (Johan) | NR16 Pos (Nathan) | NR17 NTN, non-pos aspects (Sergio)  [8.10.1]  [8.10.2] |
| 13:05-14:25 | NR15 NR16 Main session (Johan) | NR17 Multi-SIM (Tero) | NR17 NTN (Sergio)  [8.10.3.3] only SMTC/gaps  [8.10.3.1]  [8.10.3.2] |
| 14:25-15:45 | NR17 TEI (Johan) | NR17 SL enh (Kyeongin) | LTE17 IoT (Brian) |
| **Tuesday** |  |  |  |
| 12:15-13:05 | NR17 QoE (Johan) | NR17 RAN Slicing (Tero) | NR17 Small Data Enh (Diana) |
| 13:05-14:25 | NR17 eIAB (Johan) | NR16 V2X (Kyeongin) | NR17 Small Data Enh (Diana) |
| 14:25-15:45 | NR17 ePowSav (Johan) | NR17 SL enh (Kyeongin)  15:15: NR17 NTN (Sergio)  [8.10.3.1]  [8.10.3.3] | NR17 DCCA (Tero) |
| **Wednesd** |  |  |  |
| 12:15-13:05 | NR17 eNPN (Johan) | 12:15-13:35: NR17 RedCap (Sergio)  [8.12.1]  [8.12.2.2] outcome of [offline-104]  [8.12.2.1]  [8.12.3.1] outcome of [offline-105] | NR17 SL Relay (Nathan) |
| 13:05-14:25 | NR17 Multicast (Johan) | 13:35-14:25: NR17 CovEnh (Sergio) | NR17 Pos (Nathan) |
| 14:25-15:45 | NR17 Multicast (Johan) | NR17 SONMDT (HuNan) | NR17 IIOT URLLC (Diana) |
| **Thursday** |  |  |  |
| 04:30-05:30 | NR17 feMIMO (Johan) | NR17 SL Relay (Nathan) | LTE16e IoT (Emre, Brian) |
| **Friday** |  |  |  |
| 04:30-05:30 | NR17 Other (Johan) | NR17 SL Relay (Nathan) | LTE All releases Misc (Tero) |

WEEK 2:

|  |  |  |  |
| --- | --- | --- | --- |
| **Time Zone UTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Monday** |  |  |  |
| 12:45-13:35 | NR17 IoT NTN (Johan) | NR17 up to 71 GHz (Tero) | NR16 SONMDT (HuNan) |
| 13:35-14:55 | NR17 Other (Johan) | CB Tero | CB Kyeongin |
| 14:55-16:15 | NR15 NR16 Main session  CB Measurement Gap Enh (Johan) | NR17 RACH indication / partitioning (Diana) | NR17 Pos (Nathan) |
| **Tuesday** |  |  |  |
| 12:45-13:35 | CB eNPN, QoE, (Johan) | CB Sergio  NR17 NTN  - 8.10.3.1: Outcome of [108],[109]  - 8.10.3.2: Outcome of [102]  - 8.10.3.3: Outcome of [103]  (if time runs out, some discussions might be postponed to Friday CB session) | CB Nathan |
| 13:35-14:55 | CB eIAB, TEI (Johan) | CB Tero | CB Brian Emre |
| 14:55-16:15 | CB Multicast, IoT NTN (Johan) | CB Diana | CB Kyeongin |
| **Wednesd** |  |  |  |
| 05:00-06:00 | CB ePowsav, feMIMO (Johan) | CB Sergio  NR17 RedCap CB  - 8.12.2.2: Outcome of [104],[113],[110]  - 8.12.3.1: Outcome of [105]  - 8.12.3.2: Outcome of [111]  (if time runs out, some discussions might be postponed to Friday CB session)  NR17 CovEnh CB  - 8.12.3.2: Outcome of [112] | CB TBD Kyeongin |
| **Thursday** |  |  |  |
| 05:00-06:00 | CB NR16 NR15 (Johan) | CB HuNan | CB Nathan |
| **Friday** |  |  |  |
| 05:00-06:00 | CB TBD (Johan) | CB Sergio  NR17 NTN CB  - 8.10.2.1: Outcome of [106]  - 8.10.2.2: Outcome of [101]  NR17 RedCap CB  - leftovers from Wednesday CB session | CB TBD |

List and status of offline email discussions

NOTE: No offline email discussions will be kicked off before Monday Nov 1st, 07:00 UTC

* [AT116-e][101][NTN] Other MAC aspects (Interdigital)

Updated scope: Continue the discussion on remaining aspects of timers, HARQ, and LCP including CG/SPS aspects, based on the outcome of the discussion in [R2-2111351](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)

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

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

Updated deadline (for companies' feedback): Monday 2021-11-08 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2111354](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Monday 2021-11-08 2000 UTC

Proposals marked "for agreement" in [R2-2111354](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip) not challenged until Tuesday 2021-11-09 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue in the CB session in Week2).

Status: Ongoing

* [AT116-e][102][NTN] Idle mode aspects (Intel)

Updated scope: Continue the discussion on cell (re)selection aspects, based on [R2-2111341](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111341.zip)

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

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

Updated deadline (for companies' feedback): Monday 2021-11-08 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2111352](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Monday 2021-11-08 1800 UTC

Proposals marked "for agreement" in [R2-2111352](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip) not challenged until Tuesday 2021-11-09 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue in the CB session in Week2).

Status: Closed

* [AT116-e][103][NTN] SMTC and gaps (Nokia)

Updated scope: Continue the discussion on SMTC and gaps, based on [R2-2111340](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111340.zip)

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

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

Updated deadline (for companies' feedback): Monday 2021-11-08 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2111353](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Monday 2021-11-08 1800 UTC

Proposals marked "for agreement" in [R2-2111353](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip) not challenged until Tuesday 2021-11-09 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue in the CB session in Week2).

Status: Closed

* [AT116-e][104][RedCap] NCD-SSB (Ericsson)

Updated scope: Based on [R2-2111334](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111334.zip) continue the discussion and attempt to draft a reply LS to RAN1

Updated intended outcome: Summary of the offline discussion with a possible draft reply LS

Updated deadline (for companies' feedback): Tuesday 2021-11-09 1200 UTC

Updated deadline (for rapporteur's summary in R2-2111348): Tuesday 2021-11-09 1800 UTC

Status: Ongoing

* [AT116-e][105][RedCap] eDRX cycles aspects (Apple)

Updated scope: continue the discussion based on the proposals in [R2-2111335](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111335.zip)

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

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

Updated deadline (for companies' feedback): Friday 2021-11-05 1000 UTC

Updated deadline (for rapporteur's summary in [R2-2111350](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111350.zip)): Friday 2021-11-05 1800 UTC

Proposals marked "for agreement" in [R2-2111350](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111350.zip) not challenged until Monday 2021-11-08 1200 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Status: Ongoing

* [AT116-e][106][NTN] RACH aspects (Oppo)

Updated scope: Continue the discussion on RACH aspects, based on [R2-2111338](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)

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

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

Updated deadline (for companies' feedback): Monday 2021-11-08 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2111351](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Monday 2021-11-08 1800 UTC

Proposals marked "for agreement" in [R2-2111351](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip) not challenged until Tuesday 2021-11-09 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue in the CB session in Week2).

Status: Ongoing

* [AT116-e][107][NTN] Stage 2 running CR (Thales)

Initial scope: continue the discussion on the Stage 2 CR (mainly on the structure) and try and reach a version that can be endorsed

Initial intended outcome: endorsable CR

Initial deadline (for companies' feedback): Thursday 2021-11-10 1100 UTC

Initial deadline (for rapporteur's running CR in R2-2111336): Thursday 2021-11-10 1700 UTC

Status: Ongoing

* [AT116-e][108][NTN] Extended NAS timers (Ericsson)

Updated scope: Draft a reply LS based on the outcome of [R2-2111342](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111342.zip)

Updated intended outcome: Draft reply LS

Updated deadline (for companies' feedback): Thursday 2021-11-11 1600 UTC

Updated deadline (for draft reply LS in R2-2111358): Thursday 2021-11-11 1800 UTC

Status: Ongoing

* [AT116-e][109][NTN] Reply LS to SA2 on the number of TACs (Qualcomm)

Scope: Discuss the possible content of a reply LS to SA2 to ask their view on the number of TACs to be broadcast in an NTN cell

Intended outcome: Draft reply LS

Updated deadline (for companies' feedback): Thursday 2021-11-11 1800 UTC

Updated deadline (for draft reply LS in R2-2111357): Thursday 2021-11-11 2000 UTC

Status: Ongoing

* [AT116-e][110][RedCap] Identification and access restriction (Huawei)

Updated scope: Continue the discussion on remaining aspects of RedCap identification (msg1/msg3/msgA) and access restriction (cell barring/UAC), based on [R2-2111344](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111344.zip)

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

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

Updated deadline (for companies' feedback): Tuesday 2021-11-09 1400 UTC

Updated deadline (for rapporteur's summary in [R2-2111356](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Tuesday 2021-11-09 1800 UTC

Status: Ongoing

* [AT116-e][111][RedCap] RRM relaxation (Qualcomm)

Updated scope: Continue the discussion on remaining aspects of RRM relaxation, based on [R2-2111345](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111345.zip)

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

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

Updated deadline (for companies' feedback): Tuesday 2021-11-09 1800 UTC

Updated deadline (for rapporteur's summary in [R2-2111355](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Tuesday 2021-11-09 2100 UTC

Status: Ongoing

* [AT116-e][112][CovEnh] Coverage enhancements aspects (ZTE)

Initial scope: Continue the discussion on proposals in [R2-2109894](file:///C:\Data\3GPP\Extracts\R2-2109894%20Consideration%20on%20Msg3%20repetition%20in%20CE.docx) and on CFRA/CBRA issues raised in other contributions, also taking into account the outcome of the session on RACH partitioning (when/if available), where applicable. For any proposal that might not require to be checked in the common session on RACH partitioning, also attempt email agreements.

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

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

Initial deadline (for companies' feedback): Friday 2021-11-05 0900 UTC

Initial deadline (for rapporteur's summary in [R2-2111346](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111346.zip)): Friday 2021-11-05 1200 UTC

Proposals marked "for agreement" in [R2-2111346](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111346.zip) not challenged until Monday 2021-11-08 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue during the CB session in Week2).

Status: Closed

* [AT116-e][113][RedCap] LS on inter-gNB coordination (Ericsson)

Scope: Draft a reply LS for [R2-2109342](file:///C:\Data\3GPP\Extracts\R2-2109342_R3-214422.docx)

Intended outcome: Draft reply LS to RAN3

Initial deadline (for companies' feedback): Tuesday 2021-11-09 1200 UTC

Initial deadline (for draft reply LS in R2-2111349): Tuesday 2021-11-09 1800 UTC

Status: Ongoing

## 8.10 NR Non-Terrestrial Networks (NTN)

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

Time budget: 1.5 TU

Tdoc Limitation: 5 tdocs

Email max expectation: 5 threads

### 8.10.1 Organizational

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

Including outcome of:

[Post115-e][101][NTN] Stage 2 running CR (Thales)

[Post115-e][103][NTN] RRC running CR (Ericsson)

[Post115-e][104][NTN] MAC running CR (Interdigital)

[Post115-e][105][NTN] 38.304 running CR (ZTE)

incoming LSs

* extended NAS supervision timers

[R2-2109307](file:///C:\Data\3GPP\Extracts\R2-2109307_C1-215074.doc) LS on extended NAS supervision timers at satellite access (C1-215074; contact: Ericsson) CT1 LS in Rel-17 5GSAT\_ARCH-CT To:RAN2 Cc:RAN2

- Oppo thinks this is related to a previous LS

* To be discussed in the CP session
* Reply LS in R2-2111358
* Noted
* TA pre-compensation and TA reporting

[R2-2109312](file:///C:\Data\3GPP\Extracts\R2-2109312_R1-2108410.docx) Reply LS on TA pre-compensation (R1-2108410; contact: OPPO) RAN1 LS in Rel-17 NR\_NTN\_solutions-Core To:RAN2

* Noted

[R2-2111221](file:///C:\Data\3GPP\Extracts\R2-2111221_R1-2110663.docx) LS on UE TA reporting (R1-2110663; contact: Ericsson) RAN1 LS in Rel-17 NR\_NTN\_solutions To:RAN2

* Noted
* UE location aspects

[R2-2109373](file:///C:\Data\3GPP\Extracts\R2-2109373_S2-2106651.docx) LS Response to Reply LS on UE location aspects in NTN (S2-2106651; contact: Qualcomm) SA2 LS in Rel-17 5GSAT\_ARCH To:RAN3, RAN2, CT1

- Vivo thinks we also indicated we would provide some input

* We might come back to discuss this further this week
* Reply LS in R2-2111357
* Noted

[R2-2109815](file:///C:\Data\3GPP\Extracts\R2-2109815_C1-216250.doc) Reply LS on UE location aspects in NTN (C1-216250; contact: Nokia) CT1 LS in Rel-17 5GSAT\_ARCH To:SA2 Cc:RAN2, RAN3

* Noted

running CRs

[R2-2109586](file:///C:\Data\3GPP\Extracts\R2-2109586_Stg2%20Running%20CR_NR-NTN_v30.docx) [Post115-e][101][NTN] Stage 2 running CR (Thales) THALES draftCR Rel-17 38.300 16.7.0 NR\_NTN\_solutions

- Ericsson thinks there are still a lot of aspects that would still need to be fixed and prefer to just note this

- Nokia agrees and thinks that in any case there is no plan to send Stage 2 CRs to RANP

* Continue in offline discussion 107
* Revised in R2-2111336
* [AT116-e][107][NTN] Stage 2 running CR (Thales)

Initial scope: continue the discussion on the Stage 2 CR (mainly on the structure) and try and reach a version that can be endorsed

Initial intended outcome: endorsable CR

Initial deadline (for companies' feedback): Thursday 2021-11-10 1100 UTC

Initial deadline (for rapporteur's running CR in R2-2111336): Thursday 2021-11-10 1700 UTC

R2-2111336 Stage 2 running CR (Thales) THALES draftCR Rel-17 38.300 16.7.0 NR\_NTN\_solutions

[R2-2110466](file:///C:\Data\3GPP\Extracts\R2-2110466_Stage-3%20running%20304%20CR%20for%20NTN.docx) Stage-3 running 304 CR for NTN ZTE corporation, Sanechips draftCR Rel-17 38.304 16.6.0 B NR\_NTN\_solutions-Core

* Endorsed

[R2-2110710](file:///C:\Data\3GPP\RAN2\Docs\R2-2110710.zip) Stage-3 running RRC CR for NTN Rel-17 Ericsson draftCR Rel-16 38.331 16.6.0 NR\_NTN\_solutions-Core Late

- QC has a comment on the terminology "white cells" (which should not be used). Also wonders whether we need to consider separated lists or just one list.

- VC suggests to add a note to the part affected by the QC comment and endorse a revision on this CR

* Revised in R2-2111337

R2-2111337 Stage-3 running RRC CR for NTN Rel-17 Ericsson draftCR Rel-16 38.331 16.6.0 NR\_NTN\_solutions-Core

[R2-2110864](file:///C:\Data\3GPP\RAN2\Docs\R2-2110864.zip) Stage 3 NTN running CR for 38.321 - RAN2#116e InterDigital draftCR Rel-17 38.321 16.6.0 NR\_NTN\_solutions-Core Late

* Endorsed

[R2-2110863](file:///C:\Data\3GPP\Extracts\R2-2110863%20(R17%20NTN%20WI%20AI%208.10.1)%20MAC%20Open%20Issues_116e.docx) MAC open issues in NTN - RAN2#116e InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

### 8.10.2 User Plane

#### 8.10.2.1 RACH aspects

[R2-2109498](file:///C:\Data\3GPP\Extracts\R2-2109498%20-%20Discussion%20on%20RACH%20and%20TA%20report%20in%20NTN.doc) Discussion on RACH and TA report in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

p1. RAN2 discuss where to provide K\_mac value in SIB, e.g. in SIB1, or in the NTN-specific SIB carrying satellite ephemeris.

- QC wonders why we focus on K\_mac? why not the common TA? Anyway, this can be in SIB1

- vivo thinks RAN1 identified the need for sending ephemeris. This will need a new SIB and we could also put K\_mac there. Xiaomi agrees. Samsung/Nokia/LGE/Oppo agree.

- Ericsson thinks there are other cell specific values as well.

- Intel/CMCC/CATT think SIB1 is better as this used for initial access and SIB1 is quicker

- Oppo thinks that there is no difference in terms of speed, as the UE needs to acquire the common TA and ephemeris in another SIB

- Apple thinks that ephemeris info will change more slowly than K\_mac so we need to take this into account.

* Continue in offline 106

p2. Use UE location information combined with RSRP for RA type selection in NTN.

- Ericsson thinks we cannot agree on this because of diverging views and we can keep it for the next release. ZTE agrees

- Lenovo thinks that only RSRP might not work well in NTN

- LGE thinks we should not specify a UE location based mechanism. However it's ok to delay this to the next release.

- Samsung thinks we should exclude all options or reopen the discussion. Oppo/Vivo/Ericsson agree.

- Nokia wonders whether this refers only to selection of 4-step RA or 2-step RA or to BSR for 2-step RACH as well. LGE thinks that BSR for 2-step RACH is also an optimization not needed now. Ericsson/ Vivo/Oppo/ZTE/Intel/Huawei agree.

* Enhancements for RA type selection in NTN will not be pursued in Rel-17. FFS for BSR

p3. RAN2 discuss the logical channel priority for the new TA Report MAC CE.

p4. SR can be triggered if TA reporting has been triggered but there is no available UL-SCH resources, or if the UL-SCH resources cannot accommodate the TA report MAC CE plus its subheader as a result of LCP.

p5. A report MAC CE can be mapped to one SR configuration, which is configured by RRC using a new parameter, e.g. schedulingRequestID-TA-Report-r17.

p6. Include UE-specific TA (i.e.) in the new TA Report MAC CE.

Agreements:

1. Enhancements for RA type selection in NTN will not be pursued in Rel-17. FFS for BSR

[R2-2110019](file:///C:\Data\3GPP\Extracts\R2-2110019%20%20RACH%20Type%20selection%20and%20TA%20report.doc) RACH Type selection and TA report Xiaomi discussion Rel-17

Proposal 1 QoS/LCH based RA type selection for connected mode is implemented without specification impact.

Proposal 2 QoS/LCH based RA type selection for idle/inactive mode is not considered in Rel-17.

Proposal 3 Location/Distance based RA type selection together with RSRP are supported for both idle/inactive and connected mode.

Proposal 4 During RACH, TA report MAC CE can either be included in MsgA/Msg3, or Msg5, depending on the UL grant size for Msg3 or MsgA PUSCH resource size.

Proposal 5 RAN2 to agree “If the reported content of information about UE specific TA is TA pre-compensation value in connected mode, MAC CE is used to report”.

Proposal 6 In connected mode, TA report MAC CE can be sent during RACH (i.e. in MsgA/Msg3/Msg5) if it is triggered based on the trigger condition configuration, regardless of the enable/disable configuration of TA report during RACH in SI.

Proposal 7 Do not support TA report MAC CE triggering SR/RACH procedure.

Proposal 8 The logical channel priority of TA report MAC CE is higher than MAC CE for SL-BSR prioritized and lower than LBT failure MAC CE.

Proposal 9 Reserved LCID instead of eLCID is used for TA report MAC CE.

Proposal 10 The size of TA report MAC CE is limited within 1 byte.

Proposal 11 Network request based TA report is supported.

Proposal 12 Periodic TA report is not supported.

Proposal 13 For TA report using RRC, reuse existing signalling method(potential enhancement are not precluded) i.e., by configuring includeCommonLocationInfo in the corresponding reportConfig.

Proposal 14 Send LS to SA3 to ask whether user consent for NTN TA report purpose reuse the user consent for NTN LCS purpose.

Proposal 15 if the gNB has user consent to obtain UE location for NTN TA report purpose, reporting of finer location information/full GNSS coordinates in RRC\_CONNECTED can be supported after AS security is enabled.

Proposal 16 When UE needs to report UE location for TA report purpose, UE acquires location information to report if location information is not available.

Proposal 17 If gNB has no user consent for NTN TA report purpose, UE specific TA is used for TA report.

[R2-2110733](file:///C:\Data\3GPP\Extracts\R2-2110733%20Remaining%20issues%20on%20TA%20report.doc) Remaining issues on TA report ZTE Corporation, Sanechips discussion Rel-17

Proposal 1: For connected UE, TA can be configured to report via RACH procedure if timeAlignmentTimer is stopped.

Proposal 2: The same indication used for TA report via RACH in idle/inactive state is used for enabling TA report via RACH in connected state.

Proposal 3: TA reported via RACH procedure is Full TA, i.e, T\_TA (applied TA for UL transmission) as defined in the UE’s TA formula: T\_TA=(N\_TA+N\_(TA,UE-specific)+N\_(TA,common)+N\_(TA,offset) )×T\_c

Proposal 4: Msg3 is used for TA report via 4stepRACH if enabled by NW.

Proposal 5: Enhancements is needed to allow inclusion of TA information without extending message size.

Proposal 6: It is kindly asked RAN2 to further discuss enhancement on RACH at least based on the alternatives listed below:

Option 1: CCCH with cut-off UE identity

Option 2: 64-bit CCCH is always configured in NTN when TA report is enabled

Option 3: Additional Msg3 for TA report in 4stepRACH

Proposal 7: The priority of TA report MAC CE is right below C-RNTI MAC CE or data from UL-CCCH.

Proposal 8: A variable (e.g., UE\_REPORTED\_TA) is defined in MAC entity to store the last successfully reported TA.

Proposal 9: UE initializes the variable defined for TA report (e.g., UE\_REPORTED\_TA) each time configuration for event triggered TA report is received or updated.

Proposal 10: When event triggered TA is configured, UE reports full TA using RRC signalling in a first report, and reports delta TA in subsequent TA report using MAC CE.

Proposal 11: TA report via PDCCH ordered RACH is supported in NTN.

* [AT116-e][106][NTN] RACH aspects (Oppo)

Initial scope: Continue the discussion on RACH aspects (with focus on TA reporting)

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

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

Initial deadline (for companies' feedback): Thursday 2021-11-04 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2111338](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Thursday 2021-11-04 1600 UTC

Updated scope: Continue the discussion on RACH aspects, based on [R2-2111338](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)

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

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

Updated deadline (for companies' feedback): Monday 2021-11-08 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2111351](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Monday 2021-11-08 1800 UTC

Proposals marked "for agreement" in [R2-2111351](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip) not challenged until Tuesday 2021-11-09 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue in the CB session in Week2).

[R2-2111338](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip) [offline-106] RACH aspects Oppo discussion Rel-17 NR\_NTN\_solutions-Core

For easy agreements:

Proposal 1: Regarding the content of TA reporting, RAN2 further discuss between the following two options:

(12) Option 1: Full TA (i.e., T\_TA as defined in the UE’s TA formula)

(11) Option 2: UE’s service link TA (i.e., NTA, UE-specific as defined in the UE’s TA formula)

- Ericsson thinks the section the questions is asked in is related to reporting during RACH, this should be reflected in the proposals, this is also related to the size of the report P3b

- Oppo (offline rapporteur) thinks that “during RACH” can be added to the proposal, but meanwhile we should also discuss the case for connected mode reporting not during RACH

- VC suggests to reword as:

"Regarding the content of TA reporting during RACH, RAN2 further discuss between the following two options:

Option 1: Full TA (i.e., T\_TA as defined in the UE’s TA formula)

Option 2: UE’s service link TA (i.e., NTA, UE-specific as defined in the UE’s TA formula)

FFS for TA reporting during connected mode"

* Continue in offline 106

Proposal 2: (21/2) Do not mandatory Msg3/MsgA or Msg5 to include TA report MAC CE, and whether it can be included depends on the TB size of Msg3/MsgA or Msg5.

- Vivo thinks another purpose of the proposal is to confirm that besides the related mandatory texts already in the MAC running CR, no other Spec change is needed for this Msg3/A/5 related issue.

* Agreed as: "Do not mandate Msg3/MsgA or Msg5 to include TA report MAC CE, and whether it can be included depends on the TB size of Msg3/MsgA or Msg5. No spec change is needed for this"

Proposal 3a: (20/2) Reserved LCID is used for the TA report MAC CE.

* Agreed

Proposal 3b: (18/4) Postpone the discussion on the size of the TA report MAC CE until RAN2 concludes on the content of TA report.

* Agreed

Proposal 4: (23/0) RAN2 do not pursue any enhancements to allow inclusion of TA information without extending Msg3 size.

* Agreed

Proposal 5: (23/0) Logical channel priority of the TA report MAC CE should be lower than that of “C-RNTI MAC CE or data from UL-CCCH” and higher than that of “data from any Logical Channel, except data from UL-CCCH”.

* Agreed

Proposal 6: (16/3) RAN2 further discuss the exact priority of the TA report MAC CE between “C-RNTI MAC CE or data from UL-CCCH” and “MAC CE for BSR, with exception of BSR included for padding”.

- Ericsson would like to further discuss this

* Continue in offline 106

Proposal 7: (16/5) TA reporting during RACH in connected mode should not be controlled by the enable/disable indication configured in SI, but should depend on whether a TA update event is triggered.

- Vivo thinks there is still a concern on whether the TA reporting events to be specified can cover all the RACH trigger events related to the loss of Sync. If not, then p7 does not seem to be sufficient and we should have a further discussion on this issue.

- Nokia doesn’t agree on p7 since it seems to mandate the UE and NW to implement TA reporting for UE in RRC Connected mode. If the TA reporting is disabled in SI for RACH in RRC idle, we want to clarify the expected behaviour for UE when it enters RRC Connected mode. Does it mean UE is mandated to report a TA once it is in connected mode? Otherwise how UE can trigger a TA update event for RACH in connected mode? Nokia thinks it is NW implementation to decide UE should report a TA or not and proposes to revise the proposal as: "(modified) P7: If the TA reporting is enabled by NW, TA reporting during RACH in connected mode depends on whether a TA update event is triggered."

* Continue in offline 106

Proposal 8: (19/3) RAN2 confirm the working assumption that if the reported content of information about UE specific TA is TA pre-compensation value in connected mode, MAC CE is used to report.

- Ericsson would like to further discuss this

* Continue in offline 106

Proposal 9: (21/1) Do not introduce additional parameters, e.g. hysteresis and time to trigger, to define the trigger event for TA reporting.

- Ericsson would like to postpone until more details are available for the report, for example if UE location is reported, or if TA pre-compensation value is reported

* Continue in offline 106

Proposal 10: (19/4) Other than event-triggered TA reporting, no more triggers are introduced for TA reporting in connected mode.

- Ericsson would like to postpone until more details are available for the report

* Continue in offline 106

Proposal 11: (19/4) In case UE location information can be reported to network, RRC signaling is used to configure UE to report either the UE location or the UE specific TA information for the purpose of TA reporting.

- Ericsson thinks there is a difference between the question and the proposal

- Mediatek would like to flag this (and p12) as these two proposals involve Location information, which is still a Working Assumption, pending confirmation from other Working Groups (SA3). We need to wait for SA3 response before considering further on UE location reporting options and making agreements based on Working Assumptions.

- Oppo (offline rapporteur) thinks both p11 and p12 have the pre-conditions “In case UE location information can be reported to network” and “If the content of TA reporting is UE location information” and this should already address the concerns

* Continue in offline 106

Proposal 12: (16/4) If the content of TA reporting is UE location information, reuse the TA-based trigger condition, i.e. when TA change between current UE-estimated TA and the last successfully reported TA is larger than network configured threshold.

- Ericsson would like to further discuss this

- Mediatek would like to flag this

- ZTE would like to flag this as well: so far RAN2 only agreed on two methods for location report, one is coarse location report in Msg5, and the other is MDT frame work based location report by OtherConfig. No explicit agreement has been made on event triggered location report. Considering the feasibility has not yet confirmed by SA3 as well, we prefer to avoid discussion on event triggered location report at this stage, and focus on resolving details on event triggered TA report.

* Continue in offline 106

Proposal 16: (23/0) K-mac is included in the new SIB, e.g. the one carrying satellite ephemeris and/or common TA.

- Ericsson would like to postpone and treated together for Kmac, cell-specific Koffset, ephemeris and common TA because the update frequencies are not yet decided by RAN1/RAN2, for example it seems RAN1 have assumed ephemeris and common TA is in the same SIB but ephemeris may change much slower than common TA thus they may be suitable in different SIBs

- Oppo (offline rapporteur) notes the wording “K-mac is included in the new SIB, e.g. the one carrying satellite ephemeris and/or common TA” does not exclude the case Ericsson mentioned. Or is it acceptable to reformulate the proposal as “K-mac is not carried in SIB1”?

* Continue in offline 106

Proposal 17: (17/4) Do not introduce additional enhancement on BSR over 2-step RACH.

- QC would like to flag p17. Unless it is clarified that network will provide configuration such that UE will not have both SR and 2 step RACH to send BSR triggered by a LCH, p17 is incomplete.

- Oppo (offline rapporteur) thinks that in the current MAC spec, as long as SR is available for a LCH, 2-step RACH will not be triggered for sending BSR unless SR max is reached. The intention of P17 is that any enhancement is not pursued even when both SR and 2-step RACH are configured to the UE.

- Nokia shares the understanding from OPPO that SR (for a LCH) can be configured with 2-step RACH while 2-step RACH will not be triggered for sending BSR unless SR max is reached. Nokia proposes to revise the proposal as: "(modified) P17: Do not introduce additional enhancement on BSR over 2-step RACH in Rel-17."

* Continue in offline 106

Proposal 18: (20/1) UE should stop ra-ContentionResolutionTimer once receiving PDCCH which schedules Msg3 retransmission and then start ra-ContentionResolutionTimer after the end of the Msg3 retransmission plus UE-gNB RTT.

- Nokia would like to further discuss this as P18 implicitly adds a restriction to NW implementation. The blind scheduling of MSG3 retransmissions is not possible since the contention resolution timer is stopped immediately after UE receiving one Msg3 retx grant. This really limits the scheduling flexibility for NW. If the proposal is agreed, the delay of the RA procedure may be increased a lot considering the long RTT in NTN as the Msg3 retx can only be scheduled after another UE-gNB RTT.

* Continue in offline 106

For further discussion:

Proposal 13: (11/9) RAN2 further discuss whether SR/RACH should be triggered when TA reporting has been triggered but there is no available UL-SCH resources for TA reporting.

* Continue in offline 106

Proposal 14: (14/7) do not start or restart the timeAlignmentTimer after UE reports its TA.

* Continue in offline 106

Agreements via email - from offline 106:

1. Do not mandate Msg3/MsgA or Msg5 to include TA report MAC CE, and whether it can be included depends on the TB size of Msg3/MsgA or Msg5. No spec change is needed for this
2. Reserved LCID is used for the TA report MAC CE.
3. Postpone the discussion on the size of the TA report MAC CE until RAN2 concludes on the content of TA report.
4. RAN2 do not pursue any enhancements to allow inclusion of TA information without extending Msg3 size.
5. Logical channel priority of the TA report MAC CE should be lower than that of “C-RNTI MAC CE or data from UL-CCCH” and higher than that of “data from any Logical Channel, except data from UL-CCCH”.

[R2-2111351](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111351.zip) [offline-106] RACH aspects - second round Oppo discussion Rel-17 NR\_NTN\_solutions-Core

For easy agreements:

Proposal 17bis: (19/0) Do not introduce additional enhancement on BSR over 2-step RACH in Rel-17.

* Agreed

For further discussion:

Proposal 1: (18/2) Regarding the content of TA reporting during RACH, RAN2 further discuss between the following two options:

• Option 1: Full TA (i.e., T\_TA as defined in the UE’s TA formula)

• Option 2: UE’s service link TA (i.e., NTA, UE-specific as defined in the UE’s TA formula)

FFS for TA reporting during connected mode.

* Continue online

Proposal 6: (18/2) RAN2 further discuss the exact priority of the TA report MAC CE between “C-RNTI MAC CE or data from UL-CCCH” and “MAC CE for BSR, with exception of BSR included for padding”.

Proposal 7ter: (12/8) TA reporting during RACH in connected mode is not controlled by the enable/disable indication configured in SI.

* Continue online

Proposal 8: (18/2) RAN2 confirm the working assumption that if the reported content of information about UE specific TA is TA pre-compensation value in connected mode, MAC CE is used to report.

* Continue online

Proposal 9: (15/4) Do not introduce additional parameters, e.g. hysteresis and time to trigger, to define the trigger event for TA reporting.

* Continue online

Proposal 10: (16/4) Other than event-triggered TA reporting, no more triggers are introduced for TA reporting in connected mode.

* Continue online

Proposal 11: (13/6) In case UE location information can be reported to network, RRC signaling is used to configure UE to report either the UE location or the UE specific TA information for the purpose of TA reporting.

* Continue online

Proposal 12bis: (12/7) Postpone discussion on the trigger condition for reporting UE location information and wait for SA3 response.

* Continue online

Proposal 13bis: (13/8) SR/RACH should be triggered when TA reporting has been triggered but there is no available UL-SCH resources for TA reporting.

* Continue online

Proposal 14: (17/2) Do not start or restart the timeAlignmentTimer after UE reports its TA.

* Continue online

Proposal 16: (16/4) K-mac is included in the new SIB, e.g. the one carrying satellite ephemeris and/or common TA.

* Continue online

Proposal 18: (19/5) UE should stop ra-ContentionResolutionTimer once receiving PDCCH which schedules Msg3 retransmission and then start ra-ContentionResolutionTimer after the end of the Msg3 retransmission plus UE-gNB RTT.

* Continue online

Agreements via email - from offline 106 (second round):

1. Do not introduce additional enhancement on BSR over 2-step RACH in Rel-17.

[R2-2109551](file:///C:\Data\3GPP\Extracts\R2-2109551%20Discussion%20on%20UE-specific%20%20TA%20information%20reporting%20in%20NTN.docx) Discussion on UE-specific TA information reporting in NTN CATT discussion Rel-17 NR\_NTN\_solutions-Core Revised

[R2-2109660](file:///C:\Data\3GPP\Extracts\R2-2109660%20Further%20consideration%20on%20TA%20reporting.doc) Further consideration on TA reporting Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110044](file:///C:\Data\3GPP\Extracts\._R2-2110044%20UE%20Reported%20UE%20Specific%20TA%20Pre-Compensation.docx) UE Reported UE Specific TA Pre-Compensation Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110125](file:///C:\Data\3GPP\Extracts\R2-2110125%20TA%20report%20%20procedure.doc) TA report procedure Spreadtrum Communications discussion Rel-17

[R2-2110703](file:///C:\Data\3GPP\Extracts\R2-2110703%20Reporting%20information%20about%20UE%20specific%20TA%20and%20RA%20Type%20Selection.docx) Reporting information about UE specific TA and RA Type Selection Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110765](file:///C:\Data\3GPP\Extracts\R2-2110765_TA%20reporting%20Remaining%20issues.docx) TA reporting Remaining issues NEC Telecom MODUS Ltd. discussion

[R2-2110774](file:///C:\Data\3GPP\Extracts\R2-2110774.docx) Further considerations on TA report Samsung Research America discussion NR\_NTN\_solutions-Core

[R2-2110941](file:///C:\Data\3GPP\Extracts\R2-2110941.docx) Additional criterion for RA type selection Samsung Research America discussion

[R2-2110952](file:///C:\Data\3GPP\Extracts\R2-2110952%20-%20Reporting%20information%20about%20UE%20specific%20TA%20pre-compensation%20in%20NTNs.docx) Reporting information about UE specific TA pre-compensation in NTNs Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2111005](file:///C:\Data\3GPP\Extracts\R2-2111005%20Discussion%20on%20LCH-based%20RA%20type%20selection.docx) Discussion on LCH-based RA type selection ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2111006](file:///C:\Data\3GPP\Extracts\R2-2111006%20Discussion%20on%20issue%20of%20restarting%20contention%20resolution%20timer.docx) Discussion on issue of restarting contention resolution timer ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2111140](file:///C:\Data\3GPP\Extracts\R2-2111140_Discussion%20on%20RACH%20and%20TA%20report%20aspects.docx) Discussion on RACH and TA report aspects LG Electronics Inc. discussion NR\_NTN\_solutions-Core

[R2-2111207](file:///C:\Data\3GPP\Extracts\R2-2111207%20%20Discussion%20on%20UE-specific%20%20TA%20information%20reporting%20in%20NTN.docx) Discussion on UE-specific TA information reporting in NTN CATT discussion Rel-17 NR\_NTN\_solutions-Core [R2-2109551](file:///C:\Data\3GPP\Extracts\R2-2109551%20Discussion%20on%20UE-specific%20%20TA%20information%20reporting%20in%20NTN.docx)

withdrawn

R2-2110018 RACH Type selection and TA report Xiaomi discussion Rel-17 Late

#### 8.10.2.2 Other MAC aspects

[R2-2111331](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111331.zip) [101][NTN] Summary on remaining aspects of timers, HARQ, and LCP including CG/SPS aspects in AI 8.10.2.2 ​Interdigital discussion Rel-17 NR\_NTN\_solutions-Core

* Possibly agreeable

Proposal 4: The extended values for sr-ProhibitTimer in NTN can include values less than UE-gNB RTT (as in legacy). FFS how this is extended.

- QC wonders what details FFS means. IDC thinks this is about the exact mechanism for extension.

* The extended values for sr-ProhibitTimer in NTN can include values less than UE-gNB RTT (as in legacy). FFS on the actual values and how this is extended

Proposal 9: RAN2 to confirm that RRC parameter “allowedHARQ-DRX-LCP” is included in LogicalChannelConfig.

- Huawei agrees with the principle but would like to change the name into "allowedHARQ-state"

* RRC parameter “allowedHARQ-DRX-LCP” is included in LogicalChannelConfig (FFS on the actual name of the parameter)

Proposal 13: configuredGrantTimer can be extended in NTN. FFS details of when extension is applicable and method of extention.

* Agreed

Proposal 15: The ConfiguredGrantConfiguration shall allow for up to 32 in nrofHARQ-Processes, and up to 31 in harq-ProcID-Offset and harq-ProcID-Offset2.

- IDC clarifies this is to reflect some RAN1 agreement

* Agreed

Proposal 16: The SPS-Config shall allow up to 32 for nrofHARQ-Processes, and up to 31 in harq-ProcID-Offset.

* Agreed

Proposal 17: HARQ feedback shall always be sent for SPS deactivation (i.e. regardless of HARQ feedback enabled/disabled).

- QC wonders whether we need to inform RAN1. IDC/Ericsson think this comes from a RAN1 agreement

* Agreed

Agreements:

1. The extended values for sr-ProhibitTimer in NTN can include values less than UE-gNB RTT (as in legacy). FFS on the actual values and how this is extended
2. RRC parameter “allowedHARQ-DRX-LCP” is included in LogicalChannelConfig (FFS on the actual name of the parameter)
3. configuredGrantTimer can be extended in NTN. FFS details of when extension is applicable and method of extention.
4. The ConfiguredGrantConfiguration shall allow for up to 32 in nrofHARQ-Processes, and up to 31 in harq-ProcID-Offset and harq-ProcID-Offset2.
5. The SPS-Config shall allow up to 32 for nrofHARQ-Processes, and up to 31 in harq-ProcID-Offset.
6. HARQ feedback shall always be sent for SPS deactivation (i.e. regardless of HARQ feedback enabled/disabled).

* Needs further discussion

Proposal 1: RAN2 to discuss the following options to support reception of blind UL retransmission grant for HARQ process(es) configured with HARQ mode B:

1) Rely on UE being in DRX Active Time via other means (e.g. Inactivity Timer);

2) Start drx-RetransmissionTimerUL at the end of PUSCH transmission;

3) Start drx-RetransmissionTimerUL at offset indicated by NW after the end of PUSCH transmission.

Proposal 2: RAN2 to discuss the following options to support reception of blind retransmission for HARQ process(es) configured with disabled HARQ feedback:

1) Rely on UE being in DRX Active Time via other means (e.g. Inactivity Timer);

2) Start drx-RetransmissionTimerDL in the first symbol after the end of the reception of the last PDSCH or slot-aggregated PDSCH;

3) Start drx-RetransmissionTimerDL in the first symbol after the end of the reception of the last PDSCH or slot-aggregated PDSCH plus X (X = T\_proc,1);

4) Start drx-RetransmissionTimerDL with offset indicated by NW after the end of the reception of the last PDSCH.

Proposal 3: For HARQ process(es) not configured with DL HARQ feedback enabled/disabled, RAN2 to discuss the following options for drx-HARQ-RTT-TimerDL behaviour:

1) drx-HARQ-RTT-TimerDL is extended by UE-gNB RTT;

2) drx-HARQ-RTT-TimerDL is not changed (i.e. legacy behaviour applies).

Proposal 5: RAN2 to discuss if UE ignores HARQ process configuration (e.g. configured HARQ mode) for the case of a PUSCH transmission scheduled by RAR.

Proposal 6: RAN2 to discuss if uplinkHARQ-DRX-LCP-Mode-r17 is configured, a HARQ process may be mapped to:

1) ‘HARQ mode A’ or ‘HARQ mode B’;

2) ‘HARQ mode A’, ‘HARQ mode B’, or ‘Legacy’.

Proposal 7: RAN2 to discuss valid LCH to HARQ process mapping configurations.

Proposal 8: RAN2 to discuss whether RRC parameter uplinkHARQ-DRX-Mode is included in 1) MAC-CellGroupConfig; or 2) PUSCH-ServingCellConfig

Proposal 10: RAN2 to discuss the following options for configuring enabled/disabled DL HARQ feedback for SPS:

1) DL HARQ feedback is enabled/disabled per HARQ process (as in DG);

2) DL HARQ feedback is enabled/disabled per SPS configuration.

Proposal 11: RAN2 to discuss the following options for configuration of HARQ mode for configured grant:

1) HARQ mode is configured per CG;

2) Signalling of HARQ mode for DG (i.e. per HARQ process) also applies to CG and NW implementation guarantees that the calculated HARQ processes for configured grant have the same HARQ mode;

3) Signalling of HARQ mode for DG (i.e. per HARQ process) also applies to CG and CG is mapped to the HARQ processes with the same HARQ mode.

Proposal 12: RAN2 to discuss whether new LCP restriction introduced for dynamic grant also applies to configured grant.

Proposal 14: RAN2 to discuss whether a UL HARQ mode is associated with configuredGrantTimer configuration (i.e., configuredGrantTimer configured = HARQ mode A and configuredGrantTimer NOT configured = HARQ mode B).

* [AT116-e][101][NTN] Other MAC aspects (Interdigital)

Initial scope: Continue the discussion on remaining aspects of timers, HARQ, and LCP including CG/SPS aspects, based on the proposals in [R2-2111331](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111331.zip)

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

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

Initial deadline (for companies' feedback): Thursday 2021-11-04 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2111339](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111339.zip)): Thursday 2021-11-04 1600 UTC

Updated scope: Continue the discussion on remaining aspects of timers, HARQ, and LCP including CG/SPS aspects, based on the outcome of the discussion in [R2-2111351](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)

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

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

Updated deadline (for companies' feedback): Monday 2021-11-08 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2111354](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Monday 2021-11-08 2000 UTC

Proposals marked "for agreement" in [R2-2111354](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip) not challenged until Tuesday 2021-11-09 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue in the CB session in Week2).

[R2-2111339](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111339.zip) [offline-101] Other MAC aspects Interdigital discussion Rel-17 NR\_NTN\_solutions-Core

* For email agreement

Proposal 3: For HARQ process(es) not configured with DL HARQ feedback enabled/disabled, drx-HARQ-RTT-TimerDL behaves as per legacy. (15/20)

* Agreed

Proposal 4: Introduce a new sr-ProhibitTimerExt-r17 IE. Values FFS (13/18)

* Agreed

Proposal 6: If uplinkHARQ-DRX-LCP-Mode-r17 is configured, a HARQ process may be mapped to either ‘HARQ mode A’ or ‘HARQ mode B’. (17/19)

* Agreed

Proposal 7: The following LCH to HARQ process mapping rules are supported:

1) LCH shall be mapped only to HARQ process(es) configured with the HARQ mode A;

2) LCH shall be mapped only to HARQ process(es) configured with the HARQ mode B;

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

- Samsung wonders if this still allows to map a LCH to HARQ mode without configuration

- Ericsson thinks that, based on previous agreement ("If HARQ process has not been configured with an UL HARQ retransmission state, new LCH mapping rule has no effect (i.e. UE applies legacy behaviour)"), the wording should be:

"P7.1: The following LCH to HARQ process mapping rules are supported:

1) LCH shall be mapped only to a HARQ process configured with HARQ mode A or a HARQ process not configured with a HARQ mode;

2) LCH shall be mapped only to a HARQ process configured with HARQ mode B or a HARQ process not configured with a HARQ mode;

3) If an LCH is not configured with a mapping rule, it may be mapped to any HARQ process."

 - vivo suggests to change "shall be" into "is". Regarding the comment from Ericsson, vivo has no strong view whether to include this in p7 but notes that this has already been captured in the MAC running CR.

- IDC (offline rapporteur) understands the concerns and thinks the confusion comes due to the two-stage mapping procedure. This can be simplified based on proposal 6. Assuming P6 is agreed, if uplinkHARQ-DRX-LCP-Mode-r17 is configured every HARQ process will be configured as either mode A or B. So in this case, P7 can be simplified as follows:

"p7.2:       If*uplinkHARQ-DRX-LCP-Mode-r17*is configured,the following LCH to HARQ process mapping rules are supported:

1) LCHismapped only to a HARQ process configured with HARQ mode A;

2) LCHismapped only to a HARQ process configured with HARQ mode B;

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

On the other hand, if uplinkHARQ-DRX-LCP-Mode-r17 is NOT configured, then all HARQ processes will be not configured with an HARQ mode (as indicated above, this case is already covered by past agreement, i.e. LCH configuration does not apply and LCH can be mapped to any HARQ process).

* Continue in offline 101

Proposal 8: uplinkHARQ-DRX-Mode shall be included in PUSCH-ServingCellConfig. (consensus)

* Agreed

Proposal 10: All HARQ processes used by an SPS configuration shall have the same HARQ feedback mode.

- Ericsson does not see the need for introducing such limitations, it can be seen as a bad configuration by the gNB or something useful that the gNB is in control of. It is sufficient to capture that the same way to configure the HARQ feedback enable/disable is applied for SPS as for dynamic grants.

* Continue in offline 101

Proposal 11: It is up to network implementation to ensure all HARQ processes calculated for an SPS configuration have the same HARQ feedback mode (i.e. DL HARQ feedback is enabled/disabled per SPS configuration is not supported). (14/20)

- Regarding p11 and p13, vivo thinks both of them are proposing to leave the HARQ state configuration towards SPS/CG to NW implementation. Considering their similarity, it is unclear why there is a bracket “(i.e. no specification impact)” in p13, but there isn’t in p11. They should follow the same principle, e.g. also adding (i.e. no specification impact) into P11.

- Huawei also thinks p11 and p13 should be classified into the same category and more discussion is needed on both.

- IDC (offline rapporteur) suggests to revise p11 and p13 correspondingly (also taking Ericsson comment for p12 into account):

"P11.1:      It is up to network implementation to ensure*downlinkHARQ-FeedbackDisabled*, if configured,has the same value for each HARQ process used in an SPS configuration(i.e. no specification impact)."

* Continue in offline 101

Proposal 12: All HARQ processes used by a CG configuration shall have the same UL HARQ mode.

- Ericsson wonders what this means. Is it the uplinkHARQ-DRX-LCP-Mode-r17 must have the same value for each HARQ process in a CG-config? In that case, such a limitation is not useful to specify – it is up to network configuration.

- IDC (offline rapporteur) thinks Ericsson interpretation of P12 is correct. The intention of P10/P12 was more to capture the issue on a high-level, whereas P11/P13 were the proposals which actually address the issue. Based on the comments it seems that P11 is agreeable, so it's okay to only consider P11/P13.

* No further discuss this

Proposal 16: An association between UL HARQ mode configuration and configuredGrantTimer configuration is not supported. (14/17)

- QC would like to flag p16. For configured grant associated with HARQ state B, HARQ RTT timer is not used because retransmission is not expected. Then it is not clear why configuredGrantTimer needs to be used for this. It should be clarified that the network should not configure this timer for such CG configuration, otherwise it will block any new transmission in any CG associated with the same HARQ process.

- Ericsson wonders what this means. Is it that we do not require the CGT setting / CGT not configured to match the HARQ mode uplinkHARQ-DRX-LCP-Mode-r17 of each HARQ process that belongs to the CG-config? That is fine to leave to NW implementation.

- IDC (offline rapporteur) thinks P16 relates to P12/13. Ok to discuss P16 later after we further progress on how the HARQ mode will be configured for HARQ processes used by a CG configuration.

* Continue in offline 101
* For online discussion

Proposal 9: downlinkHARQ-FeedbackDisabled shall be included in PDSCH-ServingCellConfig.

Proposal 13: It is up to network implementation to ensure that all HARQ processes allocated to an CG configuration shall have the same UL HARQ mode (i.e. no specification impact). (13/20)

- vivo thinks this has the same level of support of p11 and then it could be for agreement

- IDC (offline rapporteur) suggests to revise p13 as:

"p13.1:      It is up to network implementation to ensure*uplinkHARQ-DRX-LCP-Mode-r17*, if configured,has the same value for each HARQ process used in a configured grant configuration (i.e. no specification impact)."

* Continue in offline 101

Proposal 14: New LCP mapping restriction introduced for dynamic grant does not apply to configured grant (12/20).

* Requires further discussion

Proposal 1: RAN2 to down-select between the following options to support blind retransmission for HARQ process(es) configured with HARQ state B: 1) Rely on UE being in DRX Active Time via other means (e.g. Inactivity Timer); or 2) Start drx-RetransmissionTimerUL at the end of PUSCH transmission;

Proposal 2: RAN2 to down-select between the following options to support blind retransmission for HARQ process(es) configured with disabled HARQ feedback: 1) Rely on UE being in DRX Active Time via other means (e.g. Inactivity Timer); or 2) Start drx-RetransmissionTimerDL in the first symbol after the end of the reception of the last PDSCH or slot-aggregated PDSCH plus X (X = T\_proc,1);

Proposal 5: For RACH in RRC\_CONNECTED mode, it is FFS whether UE ignores HARQ process configuration (e.g. configured HARQ mode) for the case of a PUSCH transmission scheduled by RAR.

Proposal 15: RAN2 to down-select between the following options to extend configuredGrantTimer: 1) Introducing value(s) of configuredGrantTimer larger than 64; 2) Value of the configuredGrantTimer is extended by UE-gNB-RTT;

Agreements via email - from offline 101:

1. For HARQ process(es) not configured with DL HARQ feedback enabled/disabled, drx-HARQ-RTT-TimerDL behaves as per legacy.
2. Introduce a new sr-ProhibitTimerExt-r17 IE. Values FFS
3. If uplinkHARQ-DRX-LCP-Mode-r17 is configured, a HARQ process may be mapped to either ‘HARQ mode A’ or ‘HARQ mode B’.
4. uplinkHARQ-DRX-Mode shall be included in PUSCH-ServingCellConfig.

[R2-2111354](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111354.zip) [offline-101] Other MAC aspects - second round Interdigital discussion Rel-17 NR\_NTN\_solutions-Core

For email agreement

Proposal 1: If uplinkHARQ-DRX-LCP-Mode-r17 is configured, the following LCH to HARQ process mapping rules are supported: (consensus)

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

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

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

* Agreed

Proposal 4: If uplinkHARQ-DRX-LCP-Mode-r17 is configured, proper configuration of the configuredGrantTimer is left to network implementation. (19/20)

- QC thinks it’s not clear what proper configuration is (i.e., configure proper value?). It is also not clear yet how the value CG timer is extended. Network may NOT need to configure CG timer for some CG, like CG type 1

- Ericsson agrees that "proper configuration" is a bit vague but are fine with it

* Continue online

Proposal 5: downlinkHARQ-FeedbackDisabled shall be included in PDSCH-ServingCellConfig. (consensus)

* Agreed

For online discussion

Proposal 2: It is up to network implementation to ensure downlinkHARQ-FeedbackDisabled, if configured, has the same value for each HARQ process used in an SPS configuration (i.e. no specification impact). (13/18)

- Ericsson thinks nothing on how the UE shall act is undefined if we do not agree to p2 and p3, so there is no need to agree on them

- IDC (offline rapporteur) sympathizes with Ericsson point and wonders if the following proposal could be agreed instead: "Proposal: No further enhancements are considered in this release regarding configuration of uplinkHARQ-DRX-LCP-Mode-r17 or downlinkHARQ-FeedbackDisabled for a CG or SPS configuration (i.e. up to network implementation)"

* Continue online

Proposal 3: It is up to network implementation to ensure uplinkHARQ-DRX-LCP-Mode-r17, if configured, has the same value for each HARQ process used in a configured grant configuration (i.e. no specification impact). (14/19)

* Continue online

Additionally, from phase 1:

**Proposal 14:      New LCP mapping restriction introduced for dynamic grant does not apply to configured grant (12/20).**

* Continue online

Proposals suggested for next meeting:

RAN2 to down-select between the following options to support blind retransmission for HARQ process(es) configured with HARQ state B: 1) Rely on UE being in DRX Active Time via other means (e.g. Inactivity Timer); or 2) Start drx-RetransmissionTimerUL at the end of PUSCH transmission;

RAN2 to down-select between the following options to support blind retransmission for HARQ process(es) configured with disabled HARQ feedback: 1) Rely on UE being in DRX Active Time via other means (e.g. Inactivity Timer); or 2) Start drx-RetransmissionTimerDL in the first symbol after the end of the reception of the last PDSCH or slot-aggregated PDSCH plus X (X = T\_proc,1);

For RACH in RRC\_CONNECTED mode, it is FFS whether UE ignores HARQ process configuration (e.g. configured HARQ mode) for the case of a PUSCH transmission scheduled by RAR.

RAN2 to down-select between the following options to extend configuredGrantTimer: 1) Introducing value(s) of configuredGrantTimer larger than 64; 2) Value of the configuredGrantTimer is extended by UE-gNB-RTT;”

Agreements via email - from offline 101 (second round):

1. If uplinkHARQ-DRX-LCP-Mode-r17 is configured, the following LCH to HARQ process mapping rules are supported:

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

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

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

2. downlinkHARQ-FeedbackDisabled shall be included in PDSCH-ServingCellConfig.

[R2-2109499](file:///C:\Data\3GPP\Extracts\R2-2109499%20-%20Discussion%20on%20HARQ%20related%20aspects%20in%20NTN.doc) Discussion on HARQ related aspects in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109552](file:///C:\Data\3GPP\Extracts\R2-2109552%20Co-existence%20issue%20of%20BSR%20over%20CG%20and%20BSR%20over%202-step%20RA.docx) Co-existence issue of BSR over CG and BSR over 2-step RA CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109631](file:///C:\Data\3GPP\Extracts\R2-2109631%20Remaining%20issue%20on%20disabling%20uplink%20HARQ%20retransmission.docx) Remaining issue on disabling uplink HARQ retransmission MediaTek Inc. discussion

* Revised in [R2-2111267](file:///C:\Data\3GPP\RAN2\Docs\R2-2111267.zip)

[R2-2111267](file:///C:\Data\3GPP\RAN2\Docs\R2-2111267.zip) Remaining issue on disabling uplink HARQ retransmission MediaTek Inc. discussion

[R2-2109632](file:///C:\Data\3GPP\Extracts\R2-2109632%20Round%20trip%20delay%20offset%20for%20configured%20grant%20timer.docx) Round trip delay offset for configured grant timers MediaTek Inc. discussion [R2-2108319](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2108319.zip)

[R2-2109661](file:///C:\Data\3GPP\Extracts\R2-2109661%20Further%20consideration%20on%20LCP%20and%20HARQ.doc) Further consideration on LCP and HARQ Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

R2-2109922 On Updating SR-Prohibit Timer in NR-NTN MediaTek Inc. discussion Late

[R2-2109968](file:///C:\Data\3GPP\Extracts\R2-2109968%20SPS%20CG.doc) HARQ process for SPS and CG Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110017](file:///C:\Data\3GPP\Extracts\R2-2110017%20%20Remaining%20issues%20related%20to%20HARQ%20retransmission%20state.doc) Remaining issues related to HARQ retransmission state Xiaomi discussion Rel-17

[R2-2110045](file:///C:\Data\3GPP\Extracts\._R2-2110045%20NTN%20HARQ%20Management.docx) NTN HARQ Management Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110126](file:///C:\Data\3GPP\Extracts\R2-2110126%20Discussion%20on%20HARQ%20and%20LCP%20remaining%20issues.doc) Discussion on HARQ and LCP remaining issues Spreadtrum Communications discussion Rel-17

[R2-2110308](file:///C:\Data\3GPP\Extracts\R2-2110308%20Remaining%20UP%20issues%20for%20NR%20NTN.docx) Remaining UP issues for NR NTN Lenovo, Motorola Mobility discussion Rel-17

[R2-2110354](file:///C:\Data\3GPP\Extracts\R2-2110354.doc) CG enhancements in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110704](file:///C:\Data\3GPP\Extracts\R2-2110704%20Discussion%20on%20UL%20scheduling,%20DRX%20and%20other%20MAC%20aspects.docx) Discussion on UL scheduling, DRX and other MAC aspects Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110734](file:///C:\Data\3GPP\Extracts\R2-2110734%20Remaining%20issues%20on%20HARQ%20aspects.doc) Remaining issues on HARQ aspects ZTE Corporation, Sanechips discussion Rel-17

[R2-2110859](file:///C:\Data\3GPP\Extracts\R2-2110859%20(R17%20NTN%20WI%20AI%208.10.2.2)%20Remaining%20UP%20open%20issues.docx) Remaining MAC open issues in NTN InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110926](file:///C:\Data\3GPP\Extracts\R2-2110926_Updating%20SR-Prohibit%20Timer.docx) Updating SR-Prohibit Timer MediaTek Inc. discussion

[R2-2110951](file:///C:\Data\3GPP\Extracts\R2-2110951%20-%20On%20configured%20scheduling%20DRX%20LCP%20HARQ%20and%20SR%20BSR%20in%20NTNs.docx) On configured scheduling, DRX, LCP, HARQ and SR/BSR in NTNs Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2111044](file:///C:\Data\3GPP\Extracts\R2-2111044%20Remaining%20Issue%20on%20LCP%20Restrictions%20and%20CG%20Impact%20in%20NTN.docx) Remaining Issue on LCP Restrictions and CG Impact in NTN CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2111139](file:///C:\Data\3GPP\Extracts\R2-2111139_Discussion%20on%20other%20MAC%20aspects_r2.DOCX) Discussion on other MAC aspects LG Electronics Inc. discussion NR\_NTN\_solutions-Core

[R2-2111151](file:///C:\Data\3GPP\Extracts\R2-2111151.docx) Retransmission timer for HARQ state B ITL discussion Rel-17

[R2-2111154](file:///C:\Data\3GPP\Extracts\R2-2111154.docx) HARQ State A/B for CG aspects ITL discussion Rel-17

#### 8.10.2.3 RLC and PDCP aspects

[R2-2110548](file:///C:\Data\3GPP\Extracts\R2-2110548%20Consequences%20of%20long%20propagation%20delays%20on%20RLC.docx) Consequences of long propagation delays on RLC Interdigital, Inc. discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110766](file:///C:\Data\3GPP\Extracts\R2-2110766_RLC%20t-Reassembly%20timer.docx) RLC t-Reassembly timer NEC Telecom MODUS Ltd. discussion

[R2-2110925](file:///C:\Data\3GPP\Extracts\R2-2110925_On%20RLC%20t-Reassembly%20for%20NTN.docx) On RLC t-Reassembly for NTN Sequans Communications discussion Rel-17 NR\_NTN\_solutions-Core [R2-2108460](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2108460.zip)

[R2-2110950](file:///C:\Data\3GPP\Extracts\R2-2110950%20-%20On%20RLC%20and%20PDCP%20for%20NTNs.docx) On RLC and PDCP for NTNs Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

### 8.10.3 Control Plane

#### 8.10.3.1General aspects

Including Earth fixed/moving beams related issues, TAC update and LCS aspects

extended NAS supervision timers

[R2-2110388](file:///C:\Data\3GPP\Extracts\R2-2110388%20Discussion%20on%20reply%20LS%20to%20CT1%20on%20extended%20NAs%20supervision%20timers%20at%20satellite%20access.docx) Discussion on reply LS to CT1 on extended NAs supervision timers at satellite access Ericsson discussion NR\_NTN\_solutions-Core

Observation 1 Long propagation delay is a big factor in how long time it takes to complete the AS and NAS procedures, and thus the NAS and AS timers may need to be adapted.

Observation 2 Due to the range of MEO altitudes there are no typical propagation delays for MEO.

Observation 3 Propagation delays of MEO can in general be said to be somewhere between LEO and GEO and the delays in the procedures would also be somewhere between that of LEO and GEO.

Observation 4 From RAN1 point of view there will be no requirements on when the UE shall perform GNSS position acquisition, only that the GNSS position shall be available when computing the pre-compensated Timing Advance.

Observation 5 The GNSS receiver can have 3 states when performing a GNSS fix; hot, warm and cold where some reference requirements are from 2 to 100 seconds for the time until a first fix.

Observation 6 Delays for non-initial NAS message in UL with 4 retransmissions are 170 ms and 3.52 s in LEO and GEO respectively.

Observation 7 Delays for NAS message in the downlink with 4 retransmissions are 117 ms and 2.44 s in LEO and GEO respectively.

Observation 8 Delays for initial NAS message in uplink are 481 ms and 10.30 s in LEO and GEO respectively.

Observation 9 There may be cases when GNSS fix may need to be performed when NAS or AS timers are running according to current procedures.

Observation 10 For the UE in a cold state in our example it can take up to 110 seconds in GEO in worst case scenario.

Observation 11 For the UE in a hot GNSS state or with GNSS available in our example it would take about 12 seconds in GEO and with GNSS available just above 10 seconds.

Observation 12 For several alternatives RAN2 cannot judge the feasibility.

Based on the discussion in the previous sections we propose the following:

Proposal 1 RAN2 to include the delay results for non-initial NAs message in uplink direction.

Proposal 2 RAN2 to include the delay results for NAS message in the downlink.

Proposal 3 RAN2 to include the delay results for initial NAS message in uplink direction.

Proposal 4 RAN2 to notify CT1 about potential problem of the need to perform GNSS fix during on-going timers.

Proposal 5 RAN2 to discuss RAN2-based options on AS/NAS timers or whether RAN2 shall solve the problem related to potential needed GNSS fix.

Proposal 6 RAN2 to avoid extending NAS and AS timers and rely on UE either keeping an accurate recent GNSS position or by keeping the GNSS in a hot state by implementation.

Proposal 7 RAN2 to consider the draft reply LS in R2-2110386.

- QC wonders if the intention is to target also IoT NTN. Ericsson thinks this is only about NR NTN, and this could be clarified in the reply LS. QC thinks we should aim at providing some information for IoT NTN as well. Oppo thinks we should try to focus on NR NTN, as the repetition schemes could be different in the two cases and then the conclusions could be different. ZTE thinks we could suggest to treat this LS also in the IoT NTN session.

- HW thinks the delay results for initial NAS message assumes 16 retx. Do we need that many? Ericsson agrees we could have less. vivo thinks the original LS was asking about the worst case so it makes sense to consider 16. Nokia thinks it makes sense to provide few differente values for the different cases. Thales agrees

- Apple thinks Ericsson analysis is good. However cannot agree with the conclusions on p5 and p6 for now.

- QC thinks we should identify which solution to go

* VC will check with RAN2 chair and decide how to address the IoT NTN aspects
* Continue in offline 108

[R2-2110386](file:///C:\Data\3GPP\Extracts\R2-2110386%20Draft%20reply%20LS%20to%20CT1%20on%20extended%20NAS%20supervision%20timers%20at%20satellite%20access.doc) DRAFT Reply LS on extended NAS supervision timers at satellite access Ericsson LS out Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH-CT To:CT1 Cc:RAN3, SA2

* Revised in R2-2111358

R2-2111358 DRAFT Reply LS on extended NAS supervision timers at satellite access Ericsson LS out Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH-CT To:CT1 Cc:RAN3, SA2

[R2-2109500](file:///C:\Data\3GPP\Extracts\R2-2109500%20NTN%20T300.doc) Discussion on T300’s extension in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

* [AT116-e][108][NTN] Extended NAS timers (Ericsson)

Initial scope: continue the discussion on extended NAS timers and attempt a reply LS

Initial intended outcome: Summary of the offline discussion and draft reply LS.

Initial deadline (for companies' feedback): Tuesday 2021-11-09 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2111342](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111342.zip)): Tuesday 2021-11-09 1200 UTC

Updated scope: Draft a reply LS based on the outcome of [R2-2111342](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111342.zip)

Updated intended outcome: Draft reply LS.

Updated deadline (for companies' feedback): Thursday 2021-11-11 1600 UTC

Updated deadline (for draft reply LS in R2-2111358): Thursday 2021-11-11 1800 UTC

[R2-2111342](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111342.zip) [offline-108] Extended NAS timers Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

Proposals for agreement:

Proposal 1 RAN2 responds only from NR NTN WI perspective

* Agreed

Proposal 2 RAN2 to use the RTT values shown in TR 38.821 Table 4.2-2 for LEO and GEO. FFS if these values are shared in the LS with CT1

* Agreed

Proposal 3 RAN2 to state that MEO delay may be anything in between what is stated for LEO&GEO and provide values only for LEO&GEO

* Agreed

Proposal 4 RAN2 to use formula (N\_initialaccessexchange + N\_retransmissionfactor)\*RTT as an approximative formula for calculating the delay for initial NAS message in uplink without GNSS impact

- QC thinks we can take into account how many times the random access procedure can be repeated.

- Ericsson and Nokia think this is an approximate formula. Defining a precise formula would take time.

- ZTE suggests to agree on p4 and then actually discuss the values in Table 1.

* Agreed

Proposal 5 RAN2 to agree with the values in Table 1 as approximations for the delay for initial NAS message in UL

* Agreed

Proposal 6 RAN2 to use formula (N\_sr-bsr + 0.5 + N\_retransmissionfactor)\*RTT as an approximative formula for calculating the delay for non-initial NAS message in uplink without GNSS impact

* Agreed

Proposal 7 RAN2 to agree with the values in Table 2 as approximations for the delay for non-initial NAS message in UL

* Agreed

Proposal 8 RAN2 to use formula (0.5 + N\_retransmissionfactor)\*RTT as an approximative formula for calculating the delay for NAS message in DL without GNSS impact

* Agreed

Proposal 9 RAN2 to agree with the values in Table 3 as approximations for the delay for NAS message in DL

* Agreed

Proposal 11 RAN2 to use formula (N\_initialaccessexchange + N\_retransmissionfactor)\*RTT + TTFF\_state as an approximative formula for calculating the GNSS impact

* Agreed

Proposal 12 RAN2 to agree with the values in Table 4 as approximative exampled for the GNSS impact

* Agreed

Companies had diverting views on the number and scale of values for delay to be included in the LS. 7 companies preferred to give only worse case values and 7 companies preferred to show all values

Proposal 10 RAN2 to discuss how many and which values to include in the LS to CT1

- Nokia thinks the incoming LS was asking about worst case but it's ok to provide both best and worst case

- CMCC thinks we should cover both LEO and GEO.

- Ericsson thinks that for MEO we can simply say that values are in between

- For the worst case, Huawei thinks we should indicate the retx factor

* Include the best and the worst case in the LS (indicating the assumed retx factor)

Companies had diverting views on the number and scale of values for GNSS impact to be included in the LS. 6 companies preferred to give only worse case values and 6 companies preferred to show all values

Proposal 13 RAN2 to discuss how many and which values to include in the LS to CT1 for GNSS impact

- Huawei thinks that for GNSS impact we don't need to provide extra set of values but just say that extra time needs to be added to previous values

* Include the best and the worst case in the LS (indicating the assumed retx factor)

TAC aspects

* TAC in ULI

Background information: Options mentioned in SA2 LS

Option A: The ULI contains a TAC selected by NG-RAN out of the TAC(s) broadcast by the serving radio cell for the UE. Different options are available for how this TAC is selected. For example:

* The TAC could be selected by NG-RAN and correspond to the TA in which the UE is physically located if this is one of the TACs broadcast in the serving radio cell. NG-RAN selects the TAC based on its available knowledge of the UE location. This option does not apply in case the UE is located in a TAI and the corresponding TAC is not broadcast in UE’s serving cell (e.g. in case of hard TAC).
* The TAC could be selected by NG-RAN and corresponding to the TA with greatest geographic overlap with the current earth area projected by the NTN Uu cell.

Option B: The ULI contains a TAC selected by the UE out of the TAC(s) broadcast by the serving radio cell. The TAC could be selected by the UE based on the Registration Area and other information. The UE provides the selected TAC to NG-RAN and NG-RAN provides it to the CN in the ULI.

Option C: The ULI contains the TAC for the TA in which the UE is physically located, independent of whether the TAC is broadcast in the serving radio cell or not. NG-RAN determines the TAC based on its available knowledge of the UE location. NG-RAN may also indicate in the ULI whether the TAC is broadcast in the serving radio cell.

Option D: The ULI contains all TAC(s) currently broadcast by the serving radio cell.

[R2-2109973](file:///C:\Data\3GPP\Extracts\R2-2109973%20Discussion%20on%20UE%20reporting%20of%20selected%20TAI.docx) Discussion on UE reporting of selected TAI vivo, Nokia, Nokia Shanghai Bell, Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1: CT1 decided to introduce TAI selection at UE’s NAS layer for NTN and informed the decision to RAN2. RAN2 confirmed this decision from AS perspective, provided necessary information needed by CT1 and introduced necessary RAN2 impact to support such TAI selection.

Observation 2: In RAN2 #115e, there were a number of companies sharing the view to consider the possibility for the UE to directly report the TAC of the TAI selected by the NAS to the RAN, with the UE anyway needing to select the actual TA in which it is located at the NAS as per CT1’s decision.

Proposal 1: RAN2 concludes to support UE reporting of the NAS-selected TAC to the RAN which then can fill in the ULI with the reported TAC received from the UE.

- HW prefers option D because of security risks

* RAN2 understanding is that with any option we select we will not transfer a finer UE location during initial access than what already agreed about the coarse UE location

- QC thinks RAN2 doesn't have to discuss this.

- Intel thinks it's up to NG-RAN. No need to enhance Uu for this. CATT agrees

- Apple also think this is not urgent to discuss in RAN2

[R2-2110528](file:///C:\Data\3GPP\Extracts\R2-2110528.doc) Further considerations on TAC selection in NTN Samsung R&D Institute UK discussion

Observation 1: In Option A, the NG-RAN selects a TAC that corresponds to a TA in which the UE is located, or a TA with greatest geographic overlap with the current earth area covered by the NTN cell.

Observation 2: Option A may have two issues:

1. The NG-RAN requires knowledge of the UE location information. This could cause privacy concern and NG-RAN may need user consent on reporting the UE location information.

2. The selected TAC may not be consistent with the UE’s Registration Area. This may have issues to support e.g. reachability/paging or mobility restrictions.

Observation 3: in Option B, the UE selects a TAC, from multiple TACs broadcast by its serving cell, based on its Registration Area.

Observation 4: Option B may avoid the issues faced by Option A, but it will have impact on the UE due to TAC selection.

Observation 5: in Option C, the NG-RAN selects a TAC based on UE location information and independent whether this TAC is broadcast by the serving cell.

Observation 6: Option C has similar issues to Option A, in addition to the problem of possibility of the NG-RAN selecting a TAC that is not broadcast by the serving cell.

Observation 7: no TAC selection in Option D, all TACs are provided by the NG-RAN to CN in ULI. This option may have the least impact at the CN side.

Proposal 1: RAN2 to discuss cons and pros of the different TAC selection options provided by SA2.

Proposal 2: RAN2 to agree on selection of Option A or Option D

Proposal 3: RAN2 to provide a reply LS to SA2 with feedback on the selected option(s).

* Validity timer

[R2-2109587](file:///C:\Data\3GPP\Extracts\R2-2109587%20NTN%20TAC%20validity%20timer_v03.docx) Validity timer of a broadcasted TAC THALES, Ericsson discussion Rel-17 NR\_NTN\_solutions

Proposal 1 : A validity timer associated to each TAI is broadcasted in the SI

Proposal 2 : UE uses the validity timer associated to the broadcasted TAC when selecting which TAC to update to NAS layer as well as when performing location update.

Proposal 3 : The validity timer associated to a broadcasted TAC can be described with 16 bits and support a timing accuracy of +/-100 ms.

- VC wonders how many TACs would typically be broadcast in an NTN cell. Ericsson thinks it's difficult to provide a number but this could be in the range of 2~4.

- QC thinks that we might need to wait for an SA2 decision on this.

* Postpone the discussion on how many TAC are broadcast pending feedback from SA2.
* Discuss offline the possible content of an LS to SA2 to ask their view on the number of TACs to be broadcast in an NTN cell
* Continue in offline 109

[R2-2109975](file:///C:\Data\3GPP\Extracts\R2-2109975%20Discussion%20on%20the%20remaining%20issue%20on%20TAC%20update.docx) Discussion on the remaining issue on TAC update vivo discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1: Regardless of earth-fixed cell and earth-moving cell scenario, the SI change notification due to TAC change may not need to be performed for most of cases, if hard TAC update is applied, meaning that paging for SI modification in hard TAC update may not frequently happen.

Observation 2: If the soft TAC update is applied, the paging overhead for SI change notification due to TAC update can be balanced via reasonable NW deployment.

Proposal 1: Do not support broadcasting TAC update time.

* [AT116-e][109][NTN] Reply LS to SA2 on the number of TACs (Qualcomm)

Scope: Discuss the possible content of a reply LS to SA2 to ask their view on the number of TACs to be broadcast in an NTN cell

Intended outcome: Draft reply LS

Initial deadline (for companies' feedback): Tuesday 2021-11-09 0200 UTC

Initial deadline (for draft reply LS in [R2-2111343](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111343.zip)): Tuesday 2021-11-09 0400 UTC

Updated deadline (for companies' feedback): Thursday 2021-11-11 1800 UTC

Updated deadline (for draft reply LS in R2-2111357): Thursday 2021-11-11 2000 UTC

[R2-2111343](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111343.zip) Draft Reply on UE location aspects in NTN (contact: Qualcomm) RAN2 LS in Rel-17

NR\_NTN\_solutions-Core To:SA2 Cc:RAN3,CT1

- QC also prefers to add some RAN2 assumption in the reply LS. We could indicate that we could have max 12 TACs, from the same or different PLMNs

- Nokia is fine to indicate this, saying that this comes from multiple PLMNs

- ZTE thinks we can have an annex with the Thales analysis to support the assumption

- Ericsson is fine to have a RAN2 assumption and wonders whether SA2 can say more on this

- Huawei is also fine, but thinks that in our signalling we need to indicate the max TACs per PLMN. Also thinks we could add analysis from Thales

* RAN2 assumption is that there will be max 12 TACs per NR NTN cell, including same or different PLMNs.
* Include this assumption in a revision of the reply LS. Also check whether it's possible to summarize the analysis (e.g. mention the typical beam size and number of countries expected to be covered by one beam)
* Revised in R2-2111357 to reflect changes above

RAN2 assumption:

1. There will be max 12 TACs per NR NTN cell, including same or different PLMNs.

R2-2111357 Draft Reply on UE location aspects in NTN (contact: Qualcomm) RAN2 LS in Rel-17

NR\_NTN\_solutions-Core To:SA2 Cc:RAN3,CT1

[R2-2110127](file:///C:\Data\3GPP\Extracts\R2-2110127%20Discussion%20on%20stop%20serving%20time%20of%20NTN%20cell.doc) Discussion on stop serving time of NTN cell Spreadtrum Communications discussion Rel-17

[R2-2110136](file:///C:\Data\3GPP\Extracts\R2-2110136%20Discussion%20on%20TAC%20update%20in%20NTN.doc) Discussion on TAC update in NTN Spreadtrum Communications discussion Rel-17

[R2-2110467](file:///C:\Data\3GPP\Extracts\R2-2110467_UE%20location%20report%20and%20TAC%20in%20NTN.docx) UE location report and TAC in NTN ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

UE capability

[R2-2109636](file:///C:\Data\3GPP\Extracts\R2-2109636%20Consideration%20on%20RAN2-determined%20NTN%20UE%20capabilities.docx) Consideration on RAN2-determined NTN UE capabilities Intel Corporation discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: for NTN enhancements to user plane, the adaptations of RACH and HARQ, and the timer extension to accommodate long RTT in RLC and PDCP layers are essential sub-features.

Proposal 2: for NTN enhancements to user plane, TA reporting, disabling HARQ feedback for downlink transmission, new HARQ state for uplink transmission and the corresponding new LCP rule for dynamic grants, are optional sub-features.

Proposal 3: for NTN enhancements to control plane, the following sub-features are essential:

TN prioritization over NTN, soft TAC update, reporting coarse UE location, and periodic location reporting.

Proposal 4: for NTN enhancements to control plane, the following sub-features are optional:

Stop-time based neighbour cell measurements, location based cell reselection, location reporting triggered by a location event, SMTC enhancements and CHO enhancements.

Proposal 5: RAN2 to discuss whether to define separate UE capabilities for GEO case and LEO case.

- CMCC thinks this is related to the UL power capability. It might involve RAN4

- QC thinks we need to discuss this and how capabilities would be handled by the CN.

* Come back at the end of the meeting to decide how to progress on UE capabilities

[R2-2109974](file:///C:\Data\3GPP\Extracts\R2-2109974%20Discussion%20on%20UE%20capability%20for%20Rel-17%20NTN.docx) Discussion on UE capability for Rel-17 NR NTN vivo discussion Rel-17 NR\_NTN\_solutions-Core

* CP related UE capabilities

Proposal C1: Introduce two UE capabilities on whether the UE supports time-based CHO and location-based CHO, respectively. They are optional capabilities with signalling based on the per UE granularity.

Proposal C2a: Introduce a UE capability on whether the UE supports time-based cell (re)selection. It is an optional capability w/o signalling based on the per UE granularity.

Proposal C2b: Introduce a UE capability on whether the UE supports location-assisted cell (re)selection. It is an optional capability w/o signalling based on the per UE granularity.

Proposal C3: Introduce a UE capability on the support of multiple SMTCs. It is an optional capability with signalling. FFS on the signalling type for this capability, i.e. a Boolean bit (i.e. support with a fixed number or not) or a value of SMTC actually supported by the UE.

Proposal C3a: RAN2 further discusses the granularity of this UE capability for multi-SMTC support. If RAN2 cannot decide, send LS to RAN4 for clarification.

Proposal C4: Introduce a UE capability for whether the UE supports coarse location reporting (once confirmed with SA3 reply). It is an optional capability. FFS whether it needs to be signalled to the gNB.

- vivo thinks this is an NTN specific capability so we might need to have it. Nokia agrees

Proposal C5a: Introduce a UE capability for the handling of multiple TACs broadcast in the SIB. This capability must be supported for an NTN UE without capability signalling.

Proposal C5b: RAN2 confirms whether every UE supporting NR NTN in this release must be with GNSS capability, and whether such a GNSS capability needs to be signalled to the gNB.

- LG thinks this is already assumed in the WID. IDC agrees. QC agrees but thinks we stil need to discuss whether this is conditionally mandatory.

* UP related UE capabilities

Proposal U1: UE capabilities related to RACH/Pre-compensation depend on RAN1 feature list discussion. RAN2 may discuss whether any L2 capability needs to be introduced on top of related FGs agreed by RAN1.

Proposal U2a: Introduce a UE capability on whether the UE supports DL HARQ feedback enabling/disabling operation. It is an optional capability with signalling based on the per UE granularity.

Proposal U2b: Introduce a UE capability on whether the UE supports UL HARQ retransmission state configuration. It is an optional capability with signalling based on the per UE granularity.

Proposal U3: Introduce a UE capability on whether the UE supports the new LCP restriction based on UL HARQ retransmission state. It is an optional capability with signalling based on the per UE granularity.

UE locations aspects

[R2-2109553](file:///C:\Data\3GPP\Extracts\R2-2109553%20Discussion%20on%20UE%20coarse%20location%20information%20report%20in%20NTN.docx) Discussion on UE coarse location information report in NTN CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109969](file:///C:\Data\3GPP\Extracts\R2-2109969%20Coarse%20location.docx) Coarse UE location report in RRC\_CONNECTED Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110355](file:///C:\Data\3GPP\Extracts\R2-2110355.doc) Event triggered location reporting in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110614](file:///C:\Data\3GPP\Extracts\R2-2110614_Final%20views%20on%20location%20aspects%20for%20Rel-17%20NTN.docx) Final views on location aspects for Rel-17 NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2111007](file:///C:\Data\3GPP\Extracts\R2-2111007%20Discussion%20on%20event%20triggered%20based%20UE%20location%20report.docx) Discussion on event triggered based UE location report ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2111043](file:///C:\Data\3GPP\Extracts\R2-2111043%20Discussion%20on%20UE%20Coarse%20Location%20Information%20Report%20in%20NTN.docx) Discussion on UE Coarse Location Information Report in NTN CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2111110](file:///C:\Data\3GPP\Extracts\R2-2111110%20Discussion%20on%20UE%20location%20reporting%20in%20NTN.doc) Discussion on UE location reporting in NTN Xiaomi discussion

#### 8.10.3.2 Idle/Inactive mode

Idle/inactive mode specific issues.

cell selection / reselection

[R2-2111332](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111332.zip) [102][NTN] Summary of cell (re)selection aspects in AI 8.10.3.2 Intel discussion Rel-17 NR\_NTN\_solutions-Core

Easy agreements:

Proposal 1: RAN2 to agree:

Location assisted cell reselection, with the distance between UE and the reference location of the cell (serving cell and/or neighbor cell) taken into account, is supported for quasi-earth fixed cell. FFS on how UE performs location acquisition.

- QC wonders if this just to reconfirm the WA we had last time.

- Vivo/Mediatek think we should discuss this together with p2

* Location assisted cell reselection, with the distance between UE and the reference location of the cell (serving cell and/or neighbor cell) taken into account, is supported for quasi-earth fixed cell. FFS on how UE performs location acquisition (discussed as part of p2).

Proposal 6: For quasi-earth fixed cell, UE should perform neighbour cell measurements if the distance between UE and serving cell reference location is larger than a threshold.

- NEC wonders what neighbour cell measurements means here. Is this intra-freq or inter-freq? Does this means that no measurement is performed also on higher priority measurements. NEC is ok not perform measurements on frequency with lower or equal priorities but not on higher priority ones. HW agrees with the point raised by NEC but think the proposal applies to all measurements and also to timer based reselection. Oppo agrees with NEC

* Continue in offline 102

Agreements:

1. Location assisted cell reselection, with the distance between UE and the reference location of the cell (serving cell and/or neighbor cell) taken into account, is supported for quasi-earth fixed cell. FFS on how UE performs location acquisition.

For further discussion:

Proposal 2: regarding how UE performs location acquisition, RAN2 to further discuss the following options:

Option 1: location acquisition will not be triggered at UE side only for location assisted cell reselection;

Option 2: it depends on UE implementation to perform location acquisition for cell reselection;

Option 3: UE tracks the location intermittently or periodically instead of continuously tracking for cell reselection.

Proposal 3: RAN2 to discuss how to apply distance based cell reselection for quasi-earth fixed cell:

Option 1: only neighbour cells with distance shorter than a threshold will be considered during cell reselection;

Option 2: distance based ranking is used together with legacy R criteria.

Proposal 4: For quasi-earth fixed cell, the cell stop time of neighbor cell(s) is broadcast.

Proposal 5: if P4 is agreed, RAN2 to further discuss about the usage of remaining serving time in cell reselection:

Option 1: only neighbour cells with remaining serving time longer than a threshold will be considered during cell reselection;

Option 2: remaining serving time based ranking is used together with legacy R criteria;

Option 3: remaining serving time is used as supplementary condition, e.g. a UE selects the second-best ranked cell if the selected cell has cell stop time that is too near.

Proposal 7: RAN2 to discuss whether to broadcast the reference location of the cell (serving cell and/or neighbor cell) for earth moving cell.

Proposal 8: RAN2 to discuss whether to provide the information of the next candidate cell(s) to UE.

* [AT116-e][102][NTN] Idle mode aspects (Intel)

Initial scope: Continue the discussion on cell (re)selection aspects, based on proposals in [R2-2111332](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111332.zip)

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

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

Initial deadline (for companies' feedback): Thursday 2021-11-04 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2111341](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111341.zip)): Thursday 2021-11-04 1600 UTC

Updated scope: Continue the discussion on cell (re)selection aspects, based on [R2-2111341](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111341.zip)

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

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

Updated deadline (for companies' feedback): Monday 2021-11-08 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2111352](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Monday 2021-11-08 1800 UTC

Proposals marked "for agreement" in [R2-2111352](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip) not challenged until Tuesday 2021-11-09 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue in the CB session in Week2).

[R2-2111341](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111341.zip) [offline-102] Idle mode aspects Intel discussion Rel-17 NR\_NTN\_solutions-Core

* List of proposals for agreement:

(21/22) Proposal 1: it depends on UE implementation whether/when to perform location acquisition for cell reselection.

- Samsung wonders if this implies that when location information is available then location criterion is used for cell reselection and when location information is not available then RSRP/RSRQ criterion (legacy criterion) only is used for cell reselection. Then we think it can bring the frequent cell reselection measurement quantity changes time to time, which can cause unnecessary cell reselections, which also consumes UE power.

- Intel (offline rapporteur) thinks there is no “the cell reselection criterion change”. When the UE uses location based cell reselection enhancements, the available/valid location information should be guaranteed by UE implementation (e.g. using GNSS capabilities), with no need to specify the detailed UE behavior on whether/when UE performs location acquisition. This is the intention of P1.

* Agreed as: "When UE uses location based cell reselection enhancements, it's up to UE implementation to guarantee that a valid location information is available"

(19/22) Proposal 4: For quasi-earth fixed cell, same as legacy, UE shall perform neighbour cell measurements of “higher priority NR inter-frequency or inter-RAT frequencies” regardless of the distance between UE and serving cell reference location.

* Agreed
* List of proposals that require online discussions:

(15/22) Proposal 2: For quasi-earth fixed cell, distance based cell reselection criteria is supported. FFS on the detail (e.g., exclude neighbour cells too far away or distance based ranking).

* Continue in offline 102

(16/22) Proposal 3: For quasi-earth fixed cell, the cell stop time of neighbour cell(s) is NOT broadcast.

* Continue in offline 102

(16/22) Proposal 5: For quasi-earth fixed cell, UE may choose not to perform neighbour cell measurements of “NR intra-freq or inter-freq with equal or lower priority” if the distance between UE and serving cell reference location is shorter than a threshold.

* Continue in offline 102

Proposal 6: if P5 is agreed, further discuss the exact UE behaviour under the combination of new distance based measurement principle, cell stop time based measurement principle which has been agreed before, and legacy measurement principle.

* Continue in offline 102

(14/22) Proposal 8: the information of the next candidate cell(s) is NOT provided to UE.

* Continue in offline 102
* List of proposals that should not be pursued:

(11/21 Support, 10/21 Don’t support/Not clear) Proposal 7: postpone the following discussion point to next meeting:

Whether/how to broadcast the reference location of the cell (serving cell and/or neighbour cell) for earth moving cell.

Agreements via email - from offline 102:

1. When UE uses location based cell reselection enhancements, it's up to UE implementation to guarantee that a valid location information is available
2. For quasi-earth fixed cell, same as legacy, UE shall perform neighbour cell measurements of “higher priority NR inter-frequency or inter-RAT frequencies” regardless of the distance between UE and serving cell reference location.

[R2-2111352](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111352.zip) [offline-102] Idle mode aspects - second round Intel discussion Rel-17 NR\_NTN\_solutions-Core

List of proposals for agreement:

(Proponents:23, Opponents:0) Proposal 2: For quasi-earth fixed cell, UE should start measurements on neighbour cells before the serving cell stops covering the current area, regardless of (the distance between UE and serving cell reference location) or (if legacy Srxlev/Squal condition is met, i.e., serving cell’s Srxlev/Squal is better than a threshold).

* Agreed

(Proponents:22, Opponents:1) Proposal 5: postpone the following discussion point to next meeting:

Whether/how to broadcast the reference location of the cell (serving cell and/or neighbour cell) for earth moving cell.

* Agreed (discussion postponed to the next meeting)

List of proposals that require online discussions:

(Proponents:13, Opponents:7) Proposal 1: RAN2 to discuss whether to support the following location based neighbour cell measurement rule:

For quasi-earth fixed cell, UE may choose not to perform neighbour cell measurements of “NR intra-freq or inter-freq with equal or lower priority”, if (the distance between UE and serving cell reference location is shorter than a threshold) AND (legacy Srxlev/Squal condition is met, i.e., serving cell’s Srxlev/Squal is better than a threshold)

* Continue online
* Postponed

(Proponents:18, Opponents:5) Proposal 3: RAN2 to discuss whether to support distance based cell reselection criteria for quasi-earth fixed cell.

* Continue online
* Agreed as: "Distance based cell reselection criteria for quasi-earth fixed cell is supported"

(Proponents:17, Opponents:6) Proposal 4: RAN2 to discuss whether to support the following proposal:

For quasi-earth fixed cell, the cell stop time of neighbour cell(s) is NOT broadcast.

* Continue online

- Huawei thinks if we agree on this then the cell stop time is not used for cell ranking but only to start measurements

- Nokia is fine with p4

- Oppo is fine not to use the cell stop time for cell ranking

- Intel also supports p4

- LG still thinks the stop time of neighbour cells is useful.

- Ericsson thinks it would be useful to have this information to stop measurements but not for cell ranking

- ZTE thinks this is useful to exclude some cells but can accept p4

* Agreed as "For quasi-earth fixed cell, the cell stop time of neighbour cell(s) is NOT broadcast"

(Proponents:12, Opponents:11) Proposal 6: RAN2 to discuss whether to support the following proposal:

the information of the next candidate cell(s) is NOT provided to UE.

* Continue online
* Postponed

Agreements via email - from offline 102 - second round:

1. For quasi-earth fixed cell, UE should start measurements on neighbour cells before the serving cell stops covering the current area, regardless of (the distance between UE and serving cell reference location) or (if legacy Srxlev/Squal condition is met, i.e., serving cell’s Srxlev/Squal is better than a threshold).

Agreements online:

1. Distance based cell reselection criteria for quasi-earth fixed cell is supported
2. For quasi-earth fixed cell, the cell stop time of neighbour cell(s) is NOT broadcast

[R2-2109501](file:///C:\Data\3GPP\Extracts\R2-2109501%20NTN%20Idle%20inactive%20mode%20procedures.doc) Discussion on idle/inactive mode procedures in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109554](file:///C:\Data\3GPP\Extracts\R2-2109554%20Further%20Discussion%20on%20the%20Leftover%20Issues%20of%20IDLE_INACTIVE.docx) Further Discussion on the Leftover Issues of IDLE/INACTIVE CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109637](file:///C:\Data\3GPP\Extracts\R2-2109637%20Discussion%20on%20enhancements%20to%20cell%20reselection.docx) Discussion on enhancements to cell reselection Intel Corporation discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109765](file:///C:\Data\3GPP\Extracts\R2-2109765%20Cell%20selection%20and%20reselection%20enhancements%20for%20NTN.doc) Cell selection and reselection enhancements for NTN China Telecom discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109970](file:///C:\Data\3GPP\Extracts\R2-2109970%20Idle%20mode.docx) Enhancement to cell selection and reselection Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109976](file:///C:\Data\3GPP\Extracts\R2-2109976%20Remaining%20issues%20on%20cell%20reselection%20for%20NTN.docx) Remaining issues on cell reselection for NTN vivo discussion Rel-17 NR\_NTN\_solutions-Core

moved here from 8.10.3.1

[R2-2110043](file:///C:\Data\3GPP\Extracts\._R2-2110043%20NTN%20Ephemeris%20Definition%20and%20Signaling.docx) NTN Ephemeris definition and signaling Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110046](file:///C:\Data\3GPP\Extracts\._R2-2110046%20NTN%20Cell%20Selection%20And%20Cell%20Reselection.docx) NTN Cell Selection and Cell Reselection Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110228](file:///C:\Data\3GPP\Extracts\R2-2110228%20Remaining%20issues%20in%20NTN%20idle%20mode.DOC) Remaining issues in NTN idle mode LG Electronics Inc. discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110265](file:///C:\Data\3GPP\Extracts\R2-2110265 Discussion on cell reselection.docx) Discussion on cell reselection CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110275](file:///C:\Data\3GPP\Extracts\R2-2110275%20Discussion%20on%20cell%20reselection.doc) Discussion on cell reselection Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

moved here from 8.10.3.1

[R2-2110309](file:///C:\Data\3GPP\Extracts\R2-2110309%20Considerations%20on%20ephemeris%20provision%20for%20NTN%20(Revision%20of%20R2-2107910).docx) Considerations on ephemeris provision for NTN Lenovo, Motorola Mobility discussion Rel-17

[R2-2110356](file:///C:\Data\3GPP\Extracts\R2-2110356.doc) Idle mode enhancement in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110468](file:///C:\Data\3GPP\Extracts\R2-2110468_Consideration%20on%20the%20system%20information%20and%20idle%20mode%20mobility%20for%20intra-NTN%20and%20TN-NTN%20case.docx) Consideration on the system information and idle mode mobility for intra-NTN and TN-NTN case ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110769](file:///C:\Data\3GPP\Extracts\R2-2110769_Time%20and%20Location-assisted%20cell%20reselection.docx) Time and Location-assisted cell reselection NEC Telecom MODUS Ltd. discussion

[R2-2110862](file:///C:\Data\3GPP\Extracts\R2-2110862%20(R17%20NTN%20WI%20AI%208.10.3.2)%20Cell%20reselection.docx) Cell reselection for earth moving cells InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110943](file:///C:\Data\3GPP\Extracts\R2-2110943.docx) Further considerations on idle/inactive behaviours Samsung Research America discussion

[R2-2111111](file:///C:\Data\3GPP\Extracts\R2-2111111%20Cell%20selection%20and%20reselection%20enhancements%20for%20NTN.doc) Cell selection and reselection enhancements for NTN Xiaomi discussion

NTN-TN mobility

[R2-2109639](file:///C:\Data\3GPP\Extracts\R2-2109639%20Discussion%20on%20TN%20prioritization%20over%20NTN%20for%20idle%20mode.docx) Discussion on TN prioritization over NTN for idle mode Intel Corporation discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110211](file:///C:\Data\3GPP\Extracts\R2-2110211%20NTN-TN%20Mobility%20Enhancement%20in%20IDLE%20and%20INACTIVE%20State.docx) NTN-TN Mobility Enhancement in IDLE and INACTIVE State FGI, Asia Pacific Telecom discussion

[R2-2110768](file:///C:\Data\3GPP\Extracts\R2-2110768_NTN%20to%20TN%20in%20Idle%20or%20Inactive%20mode%20mobility.docx) NTN to TN mobility in Idle or Inactive mode NEC Telecom MODUS Ltd. discussion

R2-2110375 Idle mode aspects for NTN Ericsson discussion NR\_NTN\_solutions-Core Late

#### 8.10.3.3 Connected mode

Connected mode specific issues.

SMTC/gaps

[R2-2111333](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111333.zip) [103][NTN] Summary of SMTC/gaps aspects in AI 8.10.3.3 Nokia discussion Rel-17 NR\_NTN\_solutions-Core

Proposal for agreement:

Proposal 7: Configured SMTCs for NTN neighbour measurements cannot be activated/deactivated.

- CATT is ok with this. Oppo agrees

- QC wonders whether the NW can still deconfigure this. Nokia thinks this means to avoid (de)activation by means like MAC CE, but RRC can always (re)configure

- Huawei thinks this is lagacy behaviour and we should not word it as new agreement

- LGE agrees but thinks this clashes with p8. Nokia agrees that agreeing on p7 resolves the discussion in p8

- Intel assumes this means UE should use all SMTCs in parallel and is ok with this

- ZTE also supports proposal p7. Would have preferred the first formulation but can accept the rewording for now.

- Oppo thinks the UE based solution is not fully excluded with this agreement

* We don't introduce new mechanisms (e.g. based on MAC CE) to activate/deactivate SMTCs for NTN neighbour measurements. Which SMTCs the UE will consider is only based on RRC configuration (UE based solutions are not excluded by this)

Agreements:

1. We don't introduce new mechanisms (e.g. based on MAC CE) to activate/deactivate SMTCs for NTN neighbour measurements. Which SMTCs the UE will consider is only based on RRC configuration (UE based solutions are not excluded by this)

Proposals for discussion:

Proposal 1: RAN2 is asked to decide if NTN assistance information for SMTC/MG configuration is in the form of a propagation delay or UE location reporting.

Proposal 2: If propagation delay related assistance information for SMTC/MG configuration is supported, RAN2 decides how it is implemented (using SFTD, propagation delay, propagation delay difference, delay modulo periodicity in milliseconds or other option).

Proposal 3: RAN2 is asked to consider if/how neighbour cell ephemeris information and feeder link delay component needs to be considered for propagation delay estimation.

Proposal 4: RAN2 is asked to decide if the assistance information reporting is event-triggered, e.g. based on UE’s location or time window shift by more than a NW-configurable threshold.

Proposal 5: RAN2 is asked to decide if the UE can apply e.g. a shift of the time window, or switch to another configuration provided earlier by the NW, based on the configurable event trigger.

Proposal 6: RAN2 is asked to consider supporting UE-based SMTC adjustment scheme which may be actually quite similar to NW-based approach, so a small specification effort on top of NW-based approach is foreseen.

Proposal 8: RAN2 is asked to decide if the UE is capable/can use all configured SMTCs in parallel or needs to use one at a time and report/switch to another only if the event triggers.

- QC thinks this still allows a RRC method to indicate to the UE to consider only a subset of the SMTCs

Proposal 9: RAN2 is asked to decide if a single smtc per MO principle is kept, but up to 4 periodicityAndOffset parameters per smtc are allowed.

Proposal 10: RAN2 is asked to decide if multiple gaps or multiple gap patterns can be configured for NTN UE and how many are needed.

Proposal 11: RAN2 is asked to discuss how to ensure the gaps are aligned with SMTC windows for all SMTC durations.

Proposal 12: RAN2 is asked to decide which SMTC-related decisions can be also adopted for measurement gaps.

* [AT116-e][103][NTN] SMTC and gaps (Nokia)

Initial scope: Continue the discussion on SMTC and gaps, based on the proposals in [R2-2111333](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111333.zip)

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

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

Initial deadline (for companies' feedback): Thursday 2021-11-04 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2111340](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111340.zip)): Thursday 2021-11-04 1600 UTC

Updated scope: Continue the discussion on SMTC and gaps, based on [R2-2111340](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111340.zip)

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

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

Updated deadline (for companies' feedback): Monday 2021-11-08 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2111353](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Monday 2021-11-08 1800 UTC

Proposals marked "for agreement" in [R2-2111353](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip) not challenged until Tuesday 2021-11-09 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue in the CB session in Week2).

[R2-2111340](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111340.zip) [offline-103] SMTC and gaps Nokia discussion Rel-17 NR\_NTN\_solutions-Core

Proposals for agreement:

Proposal 1: RAN2 will decide which option to choose for NTN assistance information for SMTC/MG once SA3 feedback on user consent is received.

* Agreed

Proposal 2: If propagation delay based UE assistance information for NTN SMTC is agreed, it is defined in the form of propagation delay difference.

* Agreed

Proposal 3: RAN2 assumes FL delay is known to and compensated by the network. RAN2 also assumes the UE needs to have neighbour cell ephemeris for the propagation delay estimation.

* Agreed

Proposal 4: UE assistance information for NTN SMTC is event-triggered. FFS if distance threshold or configured measurement window change by more than a threshold is used for triggering.

- Samsung has concern with p4: UE assistance information for NTN SMTC is event-triggered, but with FFS details of trigger event. The current FFS is restrictive. If UE location is used as assistance information, the event defined for LCS aspects should be reused

- Nokia (offline rapporteur) understands (based on the views provided) that even for UE location based assistance information the reporting shall be based on the event (and not e.g. periodic). Thus, Nokia does not get the point about using ‘event defined for LCS aspects’.

* continue in offline 103

Proposal 5: In NW-based SMTC solution the UE is not allowed to apply shifts to configured SMTCs.

* Agreed

Proposal 7: In NW-based solution the UE uses all configured SMTCs in parallel, i.e. there is no switching between configured SMTCs and no activation.

- Mediatek would like to flag p7 as it forces UE to use all configured SMTCs in parallel. With 4 SMTCs configured, according to p 7, the UEs will need to perform cell searching for the entire 20ms (=5ms x 4) frame. First of all this will seriously affect UE’s power consumption. Moreover, if the UE is required to do cell searching in the entire time, there is no need to provide SMTC. Hence, if multiple SMTCs are configured, either network should explicitly configures with RRC signaling or provide multiple configurations with time window, mentioning when each configuration to use

- Huawei is supportive of p7: the NW will not configure multiple SMTCs if one SMTC can cover all SSBs of neighbour cells on a particular frequency. The SMTC window has a maximum duration of 5ms, and SS burst of one cell is within 5ms. Considering there’s propagation delay difference between cells, it is possible that one SMTC window cannot cover SSBs of all neighbour cells, in this case, the NW can configure multiple SMTCs (differ only in offsets), but that does not mean it always occupies 20ms of search time because there can be some overlap.

- Nokia (offline rapporteur) understands the concerns from MTK, however, this is what the majority supports. Nokia also thinks Huawei is right and there may be time window overlap for measuring SSBs in different cells, so 4x5 ms may be an extreme example (not necessarily a realistic one). Nokia thinks we still have a possibility to reduce the number of supported SMTCs (e.g. from 4 to 2) if the problem is acknowledged and cannot be addressed differently.

* continue in offline 103

Proposal 8: Measurement gap related aspects for Rel-17 NTN will be addressed in Rel-17 NTN WI. Coordination and avoiding overlap with other WIs and WGs is recommended.

* Agreed

Proposal 9: RAN2 assumes the number of configurable measurement gaps for NTN shall be aligned with the number of SMTCs.

- Huawei thinks p9 is unclear. By “aligned with”, does it mean the number of gaps is the same as the number of SMTCs? There’s no need for this one-to-one correspondence. In R15, the UE can be configured with only one gap (at most two, one for FR1 and the other for FR2) but many SMTCs (e.g. one SMTC on each MO, and the SMTCs from different MOs may not be aligned in time domain). Huawei shares the view from MediaTek during the offline that the gaps should be as few as possible.

- ZTE understands that for some cases extending the gap length would be sufficient so maybe the number of gaps does not need to be equal to the number of SMTCs all the time. The configuration of gap(s) should cater to the configuration of SMTC (s) as usual but the number does not need to be the same.

- Nokia (offline rapporteur) acknowledges the wording may be a bit misleading. The intention, based on the comments provided, was to say the number of measurement gaps shall not exceed the number of SMTCs and the configurations should be aligned (i.e. the MG shall match the SMTC). But it is true it does not necessarily mean each SMTC requires a dedicated separate MG. That should be indeed clarified.

* continue in offline 103

Proposal 10: RAN2 will reuse at least the SMTC agreements made for UE assistance information reporting also in the area of measurement gaps for NTN.

* Agreed

Proposals for discussion:

Proposal 6: RAN2 is asked to consider if UE-based SMTC solution should be supported, at least for IDLE mode.

* continue in offline 103

Agreements via email - from offline 103:

1. RAN2 will decide which option to choose for NTN assistance information for SMTC/MG once SA3 feedback on user consent is received.
2. If propagation delay based UE assistance information for NTN SMTC is agreed, it is defined in the form of propagation delay difference.
3. RAN2 assumes FL delay is known to and compensated by the network. RAN2 also assumes the UE needs to have neighbour cell ephemeris for the propagation delay estimation.
4. In NW-based SMTC solution the UE is not allowed to apply shifts to configured SMTCs.
5. Measurement gap related aspects for Rel-17 NTN will be addressed in Rel-17 NTN WI. Coordination and avoiding overlap with other WIs and WGs is recommended.
6. RAN2 will reuse at least the SMTC agreements made for UE assistance information reporting also in the area of measurement gaps for NTN

[R2-2111353](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111353.zip) [offline-103] SMTC and gaps - second round Nokia discussion Rel-17 NR\_NTN\_solutions-Core

Proposals for agreement:

Proposal 4-1: UE assistance information for NTN SMTC adjustments is event-triggered. Details of the triggering event are FFS (pending the decision on supported assistance information type).

* Agreed

Proposal 4-2: In NW-based solution the UE uses all configured SMTCs in parallel, i.e. there is no switching between or activation/deactivation of configured SMTCs.

- Mediatek still thinks that the UE should not be mandated to search all the set of SMTCs (maximum of 4) in parallel. Either SMTC should only be provided/active for the upcoming satellite or UE should be configured which SMTC should be used in a time window.

* Continue online

- Mediatek thinks the UE should not be mandated to monitor SMTCs all the time. If 4 SMTCs need to be supported, they need to be supported regardless how likely this is. QC understands Mediatek point.

- Huawei thinks for NW based solution the UE should trust the NW configuration

- Mediatek thinks that reducing from 4 to 2 SMTCs would be acceptable

- Ericsson thinks this could be a UE capability.

* Agreed as "In NW-based solution, the network can configure up to 2 SMTCs in parallel and the UE uses all of them, i.e. there is no switching between or activation/deactivation of configured SMTCs. FFS whether this (UE support for 2 SMTCs) requires a UE capability. FFS whether we have a UE capability indicating support for 4 SMTCs (in this case the NW can configure up to 4 SMTCs in parallel)"

Proposal 4-3: RAN2 aims to minimize the number of configurable measurement gaps required for monitoring configured SMTCs in NTN. At least gap length and UE capabilities impact the number of required measurement gaps.

- Huawei suggests to add: "FFS what UE capabilities it refers to."

- Nokia thinks the term ‘’UE capabilities’’ is broad enough and does not restrict any particular direction of interpretation. Thus, it can be decided at the end of the WI which UE capabilities can be considered to decide how many gaps and what kind of length is necessary.

* Agreed

Proposal 4-4: UE-based solution for SMTC adjustments in NTN is supported for IDLE/INACTIVE UEs. FFS how does the UE perform the necessary shifts in SMTC.

* Agreed

Agreements via email - from offline 103 (second round):

1. UE assistance information for NTN SMTC adjustments is event-triggered. Details of the triggering event are FFS (pending the decision on supported assistance information type).
2. RAN2 aims to minimize the number of configurable measurement gaps required for monitoring configured SMTCs in NTN. At least gap length and UE capabilities impact the number of required measurement gaps.
3. UE-based solution for SMTC adjustments in NTN is supported for IDLE/INACTIVE UEs. FFS how does the UE perform the necessary shifts in SMTC.

Agreements online:

1. In NW-based solution, the network can configure up to 2 SMTCs in parallel and the UE uses all of them, i.e. there is no switching between or activation/deactivation of configured SMTCs. FFS whether this (UE support for 2 SMTCs) requires a UE capability. FFS whether we have a UE capability indicating support for 4 SMTCs (in this case the NW can configure up to 4 SMTCs in parallel).

[R2-2109502](file:///C:\Data\3GPP\Extracts\R2-2109502%20NTN%20connected%20mode%20mobility.doc) Discussion on mobility management for connected mode UE in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109634](file:///C:\Data\3GPP\Extracts\R2-2109634%20Efficient%20Configuration%20of%20SMTC%20and%20Measurement%20Gaps%20in%20NR-NTN.....docx) Efficient Configuration of SMTC and Measurement Gaps in NR-NTN MediaTek Inc. discussion [R2-2108326](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2108326.zip)

[R2-2109638](file:///C:\Data\3GPP\Extracts\R2-2109638%20Discussion%20on%20remaining%20issues%20on%20SMTC.docx) Discussion on remaining issues on SMTC Intel Corporation discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109972](file:///C:\Data\3GPP\Extracts\R2-2109972%20SMTC%20and%20MG.doc) SMTC and MG enhancements Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core [R2-2107566](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2107566.zip)

[R2-2110267](file:///C:\Data\3GPP\Extracts\R2-2110267%20Further%20discussion%20on%20SMTC%20and%20measurement%20Gap%20configuration%20for%20NTN.docx) Further discussion on SMTC and measurement Gap configuration for NTN CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110277](file:///C:\Data\3GPP\Extracts\R2-2110277%20Discussion%20on%20SMTC%20and%20measurement%20gap%20configuration.doc) Discussion on SMTC and measurement gap configuration Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110310](file:///C:\Data\3GPP\Extracts\R2-2110310%20UE%20assistance%20for%20measurement%20gap%20and%20SMTC%20configuration%20in%20NTN%20(Revision%20of%20R2-2107911).docx) UE assistance for measurement gap and SMTC configuration in NTN Lenovo, Motorola Mobility discussion Rel-17

[R2-2110340](file:///C:\Data\3GPP\Extracts\R2-2110340%20Connected%20mode%20aspects%20for%20NTN.docx) Connected mode aspects for NTN Ericsson discussion NR\_NTN\_solutions-Core

[R2-2110357](file:///C:\Data\3GPP\Extracts\R2-2110357.docx) SMTC enhancement in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core [R2-2108067](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2108067.zip)

[R2-2110384](file:///C:\Data\3GPP\Extracts\R2-2110384%20SMTC%20and%20measurement%20gap%20enhancements.doc) SMTC and measurement gap enhancements LG Electronics Inc. discussion Rel-17

[R2-2110469](file:///C:\Data\3GPP\Extracts\R2-2110469_Consideration%20on%20CHO%20and%20measurements.docx) Consideration on CHO and measurements ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110613](file:///C:\Data\3GPP\Extracts\R2-2110613_Final%20views%20on%20SMTC%20and%20measurement%20gaps%20for%20Rel-17%20NTN.docx) Final views on SMTC and measurement gaps for Rel-17 NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core [R2-2107521](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2107521.zip)

[R2-2110815](file:///C:\Data\3GPP\Extracts\R2-2110815.docx) Measurements and handover Samsung Research America discussion NR\_NTN\_solutions-Core

[R2-2111166](file:///C:\Data\3GPP\Extracts\R2-2111166%20%20Remaining%20Issues%20on%20SMTC.docx) Remaining Issues on SMTC and measurement Gap configuration for NTN Rakuten Mobile, Inc discussion Rel-17

[R2-2111028](file:///C:\Data\3GPP\Extracts\R2-2111028%20Discussion%20on%20connected%20mode%20aspects%20for%20NTN.docx) Discussion on connected mode aspects for NTN Xiaomi Communications discussion

CHO

[R2-2110229](file:///C:\Data\3GPP\Extracts\R2-2110229%20Remaining%20issues%20in%20NTN%20CHO.DOC) Remaining issues in NTN CHO LG Electronics Inc. discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: RAN2 to discuss how to discard CHO configuration after time period [t1, t2] during which the UE is allowed to perform CHO, based on following three alternatives:

- Discard CHO configuration of the candidate cell after t2.

- Introduce new time point t3 and the CHO candidate cell is discarded at the t3. During [t2, t3], the UE is only allowed to perform CHO to the cell when RLF occurs and the candidate cell is selected.

- Follow the existing CHO mechanism. (CHO candidate cell is discarded by network command). After t2, the UE can perform CHO to the cell when RLF occurs and the cell is selected.

Proposal 2: For NTN CHO, if multiple CHO candidate cells satisfy CHO execution conditions simultaneously, the UE has to select the target cell having the longest remaining serving time among the candidate cells.

Observation 1: If the network wants to configure CHO triggering condition that both time condition and location condition should be satisfied, it should be configured in one CHO triggering condition.

Proposal 3: RAN2 to clarify whether RRM, and time, and location condition can be configured together in a CHO triggering condition.

[R2-2109971](file:///C:\Data\3GPP\Extracts\R2-2109971%20CHO.doc) Open issues in CHO Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1 Time-based and location-based conditions are not configured simultaneously for a candidate cell.

Proposal 2 Time-based/location-based conditions are provided by source in the CHO command.

Proposal 3 Instead of sending normal handover command of a candidate cell to the UE, network can send indication to execute the CHO stored by UE for the same candidate cell.

Proposal 4 In time-based CHO condition, a UE can be indicated whether to store the CHO command of a candidate cell connecting to the same gateway/gNB with future execution time (i.e., the CHO command is executable in future time t1-t2) even after successful CHO procedure.

[R2-2109555](file:///C:\Data\3GPP\Extracts\R2-2109555.docx) Futher discussion on NTN mobility aspect CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2109977](file:///C:\Data\3GPP\Extracts\R2-2109977%20Remaining%20issues%20on%20connected%20mode%20mobility%20for%20NTN.docx) Remaining issues on connected mode mobility for NTN vivo discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110266](file:///C:\Data\3GPP\Extracts\R2-2110266%20Further%20discussion%20on%20intra-NTN%20mobility.docx) Further discussion on intra-NTN mobility CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110276](file:///C:\Data\3GPP\Extracts\R2-2110276%20Discussion%20on%20CHO%20in%20NTN.DOC) Discussion on CHO in NTN Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110283](file:///C:\Data\3GPP\Extracts\R2-2110283_NTN_CHO.doc) Discussion on signaling and data transmission issues of NTN CHO ITRI discussion NR\_NTN\_solutions-Core

[R2-2110312](file:///C:\Data\3GPP\Extracts\R2-2110312%20Remaining%20issues%20for%20CHO%20in%20NTN%20v1.0.doc) Remaining issues for CHO in NTN Lenovo, Motorola Mobility discussion Rel-17

[R2-2110358](file:///C:\Data\3GPP\Extracts\R2-2110358.docx) Signaling storm during HOs Sony discussion Rel-17 NR\_NTN\_solutions-Core [R2-2108065](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2108065.zip)

[R2-2110612](file:///C:\Data\3GPP\Extracts\R2-2110612_More%20thoughts%20on%20mobility%20in%20Rel-17%20NTN.docx) More thoughts on mobility in Rel-17 NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

NTN-TN mobility

[R2-2109635](file:///C:\Data\3GPP\Extracts\R2-2109635%20-%20Mobility%20for%20TN-NTN%20scenarios.docx) Mobility for NTN-TN scenarios MediaTek Inc. discussion [R2-2108329](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2108329.zip)

[R2-2110311](file:///C:\Data\3GPP\Extracts\R2-2110311%20Connected%20mobility%20for%20NT-NTN%20continuity.docx) Connected mobility for NTN/TN continuity Lenovo, Motorola Mobility discussion Rel-17

Reporting in connected mode

[R2-2110860](file:///C:\Data\3GPP\Extracts\R2-2110860%20(R17%20NTN%20WI%20AI%208.10.3.3)%20Location%20Reporting.docx) UE location reporting in NTN InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2110861](file:///C:\Data\3GPP\Extracts\R2-2110861%20(R17%20NTN%20WI%20AI%208.10.3.3)%20TA%20reporting%20in%20CONN.docx) UE-specific TA reporting in connected mode InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

## 8.12 Reduced Capability

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

Time budget: 1 TU

Tdoc Limitation: 4 tdocs

Email max expectation: 4 threads

### 8.12.1 Organizational

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

Including outcome of:

[Post115-e][106][RedCap] Running CRs (Ericsson)

[Post115-e][107][RedCap] Stage 2 Running CR (Nokia)

[Post115-e][108][RedCap] 38.306 Running CR (Intel)

[Post115-e][109][RedCap] MAC running CR (vivo)

Incoming LSs

NCD-SSB

[R2-2110727](file:///C:\Data\3GPP\Extracts\R2-2110727_R1-2110600.docx) LS on use of NCD-SSB instead of CD-SSB for RedCap UE (R1-2110600; contact: Ericsson) RAN1 LS in Rel-17 NR\_redcap-Core To:RAN2, RAN4

* Initially discussed in offline 104

eDRX cycles

[R2-2109305](file:///C:\Data\3GPP\Extracts\R2-2109305_C1-214961.doc) Reply LS on lower bound for eDRX cycle length (C1-214961; contact: Qualcomm) CT1 LS in Rel-17 NR\_redcap-Core To:RAN2 Cc:SA2, RAN3

* Noted

[R2-2109378](file:///C:\Data\3GPP\Extracts\R2-2109378_S2-2106978.docx) Reply LS on introducing extended DRX for RedCap UEs (S2-2106978; contact: Qualcomm) SA2 LS in Rel-17 NR\_redcap-Core To:RAN2, RAN3, CT1

* Also RAN2 will not work on eDRX cycle extension beyond 10.24s for RRC Inactive
* Noted

Other RAN1 input

[R2-2109325](file:///C:\Data\3GPP\Extracts\R2-2109325_R1-2108631.docx) LS on RAN1 agreements on RAN2-led features for RedCap (R1-2108631; contact: NTT DOCOMO) RAN1 LS in Rel-17 NR\_redcap-Core To:RAN2

* Noted

[R2-2111215](file:///C:\Data\3GPP\Extracts\R2-2111215_R1-2110638.docx) Reply LS on L2 buffer size reduction (R1-2110638; contact: Intel) RAN1 LS in Rel-17 NR\_redcap-Core To:RAN2

- Spreadtrum would like to know the reason for not having this and then how to progress: can this be brought back in the next release?

- Intel clarifies that multiple companies in RAN1 think there might be no cost/complexity gain and that this is not part of the WID.

- vivo thinks we should not take decisions for the next release

- Ericsson thinks we should not prioritize this discussion

* RAN2 will not further discuss L2 buffer size reduction for RedCap UEs in Rel-17 (this does not prevent future discussion in future releases)
* Noted

Agreements:

1. RAN2 will not further discuss L2 buffer size reduction for RedCap UEs in Rel-17 (this does not prevent future discussion in future releases)

SA input

[R2-2111233](file:///C:\Data\3GPP\RAN2\Docs\R2-2111233.zip) LS on introducing NR RedCap Indication (S2-2107853; contact: Ericsson) SA2 LS in Rel-17 ARCH\_NR\_REDCAP To:RAN2, RAN3, CT4, SA5 Cc:CT1

- LGE thinks that SA2 also agreed to have RedCap indication during RRC establishment procedure.

* Noted

RAN3 input

[R2-2109342](file:///C:\Data\3GPP\Extracts\R2-2109342_R3-214422.docx) Reply LS on the coordination between gNBs on the supporting of RedCap UEs (R3-214422; contact: Ericsson) RAN3 LS in Rel-17 NR\_redcap-Core To:RAN2

* Continue in AI 8.12.2.1
* Prepare a reply LS
* Noted

[R2-2111102](file:///C:\Data\3GPP\Extracts\R2-2111102%20-%20%5bDraft%5d%20LS%20reply%20on%20the%20coordination%20between%20gNBs%20supporting%20RedCap%20UEs.docx) [Draft] LS reply on the coordination between gNBs supporting RedCap UEs Ericsson LS out NR\_redcap-Core To:RAN3

* Revised in R2-2111349 based on the discussion in offline 113

R2-2111349 [Draft] LS reply on the coordination between gNBs supporting RedCap UEs Ericsson LS out NR\_redcap-Core To:RAN3

Running CRs

[R2-2110821](file:///C:\Data\3GPP\Extracts\R2-2110821%20-%20Running%20RedCap%20CR%20for%2038300.docx) Running 38300 CR for RedCap Nokia, Nokia Shanghai Bell draftCR Rel-17 38.300 16.7.0 B NR\_redcap-Core

- Nokia thinks this is in a good shape and could be endorsed. We need to correct the reference to CPC (instead of CAPC).

* Revised in R2-2111347

R2-2111347 Running 38300 CR for RedCap Nokia, Nokia Shanghai Bell draftCR Rel-17 38.300 16.7.0 B NR\_redcap-Core

* Endorsed (unseen)

[R2-2109666](file:///C:\Data\3GPP\Extracts\R2-2109666_EmailDisc-108-38.306%20Running%20CR%20(Intel)_P2-Summary.docx) Email discussion report on [108][RedCap] 38.306 Running CR (Intel) Intel Corporation discussion Rel-17 NR\_redcap

- Intel thinks the running CR can be endorsed and further comments can be taken in the next round

* Noted

[R2-2109667](file:///C:\Data\3GPP\Extracts\R2-2109667%20-%20108-Running%2038.331%20CR%20on%20Capbilities_v00.docx) Email discussion [108]Running 38.331 CR for the RedCap WI on capablities Intel Corporation draftCR Rel-17 38.331 16.6.0 B NR\_redcap

* Text for 38.331 is endorsed

[R2-2109668](file:///C:\Data\3GPP\Extracts\R2-2109668%20-%20108-Running%2038.306%20CR%20on%20Capbilities_v02_Rapp.docx) Email discussion [108]Running 38.306 CR for the RedCap WI on capablities Intel Corporation draftCR Rel-17 38.306 16.6.0 B NR\_redcap

* Endorsed

[R2-2111095](file:///C:\Data\3GPP\RAN2\Docs\R2-2111095.zip) Running 38.304 CR for the RedCap WI Ericsson draftCR Rel-17 38.304 16.6.0 B NR\_redcap-Core Late

- Ericsson indicates that a few aspects were raised for both 304 and 331 running CRs but can be considered in the next round

* Endorsed

[R2-2111097](file:///C:\Data\3GPP\RAN2\Docs\R2-2111097.zip) Running 38.331 CR for the RedCap WI Ericsson draftCR Rel-17 38.331 16.6.0 B NR\_redcap-Core Late

* Endorsed

[R2-2109740](file:///C:\Data\3GPP\Extracts\R2-2109740_Email%20discussion%20%5b109%5d%20Running%20MAC%20CR%20for%20RedCap.docx) Email discussion [109] Running MAC CR for RedCap vivo (Rapporteur) draftCR Rel-17 38.321 16.6.0 NR\_redcap-Core

- vivo indicates that mainly editor's notes were added and we can endorse it

* Endorsed

### 8.12.2 Framework for reduced capabilities

No contribution is expected to this agenda item but directly to the sub-agenda items.

#### 8.12.2.1 Definition of RedCap UE type and reduced capabilities

Definition of RedCap

[R2-2110771](file:///C:\Data\3GPP\Extracts\R2-2110771%20-%20Definition%20of%20RedCap%20and%20capabilities.docx) Definition of RedCap UE and discussion on capabilities Ericsson discussion

Observation 1 The existing non-RedCap UEs are expected to support 100 MHz channel BW in FR1 and 200 MHz channel BW in FR2.

Observation 2 It is already possible to signal [5, 10, 15, 20] MHz maximum supported channel BW for FR1 and [50, 100] MHz maximum BW for FR2 using the existing fields and IEs.

Observation 3 Using the information of the supported BWs, the network can configure a dedicated BWP not exceeding the supported BW of the UE after the initial access, if needed.

Observation 4 There is no need for RedCap UE to signal support for 20 MHz bandwidth for FR1 bands where 20 MHz channel BW is not supported according to TS 38.101.

Proposal 1 The network identifies RedCap UE based on the early indication and an explicit capability (not a type) indicating the UE is a RedCap UE.

- Apple thinks we already agreed on this

- HW thinks the need to have a RedCap UE type is also discussed in RAN1

- Nokia wonders why an explicit capability if this is conveyed in msg1/msg3

Proposal 2 RedCap UE uses the existing capability signaling to indicate channel bandwidth per band, and per carrier (i.e. in feature set per CC). The field descriptions are updated to clarify that RedCap UEs indicate support for at most 20 MHz in FR1 and 100 MHz in FR2.

Proposal 3 The existing capability maxNumberMIMO-LayersPDSCH is used for indicating both the number of Rx branches and supported number of DL MIMO layers.

Proposal 4 Introduce a new capability for HD-FDD for RedCap UEs, the details can be discussed further.

Proposal 5 NR UEs may indicate optional support for the Rel-17 eDRX enhancement and/or the Rel-17 RRM measurement relaxation. Capture the relevant capabilities in TS 38.306.

Proposal 6 Support relaxation of the product of the maximum number of supported MIMO layers, maximum supported modulation order and the scaling factor as the mean to reduce the size of the L2 buffer.

Proposal 7 RedCap UE is defined by the support of: reduced maximum UE bandwidth (20 MHz for FR1, 100 MHz for FR2), the possibility to support only one MIMO layer and one Rx branch, optional support for 256 QAM in DL for FR1, possibility to support HD-FDD within one carrier, and optional FD-FDD support. RedCap UE does not support CA/DC.

Proposal 8 Capture the following definition of term “RedCap UE” in RAN2 specifications: “RedCap UE: reduced capability UE which supports maximum 20 MHz (FR1) or 100 MHz (FR2) channel bandwidth and as further specified in TS 38.306 [xx]’’.

Fallback operation

[R2-2109446](file:///C:\Data\3GPP\Extracts\R2-2109446%20Support%20for%20fallback%20operation%20for%20RedCap%20UEs.docx) Support for fallback operation by RedCap UEs Qualcomm Incorporated discussion Rel-17 FS\_NR\_redcap

Observation 1. RedCap may not be widely supported across operator’s network in its initial deployment. That could be a big hurdle for the adoption of new RedCap devices.

Observation 2. Some spec-compliant RedCap UEs can operate in legacy cells in certain bands (e.g. under 2.496 GHz) in the same way as non-RedCap UEs.

Observation 3. Allowing a RedCap UE to access legacy cells in which it is capable of operating as a non-RedCap UE in a spec-compliant manner can help improve its service coverage.

Proposal 1. Support fallback operation for RedCap, with which a RedCap UE is allowed to camp on or access a legacy cell as a spec-compliant non-RedCap UE when no RedCap-supporting cells are available.

- Ericsson thinks this could apply to the case where there is no uniform RedCap UE support in the network, but this should not be the typical case. HW agrees. ZTE has similar views and thinks this will lead to a new UE type. Samsung agrees with Ericsson.

- Vodafone thinks it's possible we will not have complete coverage in the network and we should have mechanisms to support this.

- T-mobile supports this proposal

- vivo understands the motivation from QC. LGE also supports p1

- Mediatek wonders if RedCap restrictions would apply for a UE in a legacy cell. QC thinks that a RedCap UE would only access legacy cells they could access with their RedCap capabilities (e.g. depending maximum bandwidth)

* Continue in the next meeting

Proposal 2. RedCap UEs capable of fallback operation always prioritize RedCap-supporting cells over legacy cells in cell re-/selection, irrespective of cell barring status.

Proposal 3. When a cell indicates RedCap UEs being barred, a RedCap UE capable of fallback operation should not attempt access to this cell as a non-RedCap UE.

Proposal 4. When a RedCap UE capable of fallback operation accesses through a legacy cell, it should update CN by NAS signaling that it operates as non-RedCap, to help ensure proper handling in CN procedures such as access restriction, charging, etc.

Proposal 5. UE explicitly indicates whether it supports RedCap only or RedCap with fallback capability during capability signaling. The capability for fallback operation is per-band.

Proposal 6. To support fallback operation with the existing UE signaling framework, apply the following capability reporting rules for all RedCap UEs:

- Capabilities that are mandatory in legacy but optional for RedCap should be reported in the NCE of UE radio capability container;

- Capabilities that are optional for both legacy and RedCap should be reported separately in both the legacy and the NCE part of UE radio capability container.

Proposal 7. UE change its operation mode after a handover, after either receiving an explicit indication in the handover command or checking the target cell’s SIB for availability of RedCap support.

Proposal 8. If a UE changes its operation mode after a handover, it updates the CN by NAS signaling with its new operation mode.

Proposal 9. If the source cell supports RedCap, it should select a target cell for a RedCap UE capable of fallback operation only among RedCap-supporting neighbor cells, unless no such cells are available.

Proposal 10. If a RedCap UE capable of fallback operation is handover to a legacy cell, it is up to UE implementation whether/when to autonomously reselect to a RedCap-supporting cell (e.g. by RRC re-establishment).

L2 buffer size

[R2-2110134](file:///C:\Data\3GPP\Extracts\R2-2110134%20Discussion%20on%20L2%20buffer%20size%20reduction%20for%20Redcap%20UE.doc) Discussion on L2 buffer size reduction for Redcap UE Spreadtrum Communications discussion Rel-17

[R2-2110881](file:///C:\Data\3GPP\Extracts\R2-2110881%20RedCap.docx) Discussion on L2 buffer size reduction Sierra Wireless. S.A. discussion

Number of DRBs

[R2-2110093](file:///C:\Data\3GPP\Extracts\R2-2110093_Redcap-8DRB.docx) Optional support of more than 8 DRB for RedCap Apple, Facebook Inc. discussion Rel-17 NR\_redcap-Core

Observation 1: Some Redcap devices operate with use-cases comparable to the legacy NR devices, the number of DRBs used by these services should also be comparable.

Observation 2: Current RAN2 agreement does not preclude the support of >8DRB for RedCap

Proposal 1: RedCap UE can optionally support 16 DRBs qualified with a capability.

[R2-2109576](file:///C:\Data\3GPP\Extracts\R2-2109576%20Definition%20and%20reduced%20capabilities%20for%20RedCap%20UE,%20and%20NCD-SSB%20related%20LS.doc) Definition and reduced capabilities for RedCap UE, and NCD-SSB related LS Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

[R2-2109669](file:///C:\Data\3GPP\Extracts\R2-2109669%20Open%20issues%20on%20RedCap%20capabilities.docx) Open issues on RedCap capabilities Intel Corporation discussion Rel-17 NR\_redcap

[R2-2110709](file:///C:\Data\3GPP\Extracts\R2-2110709%20Discussion%20on%20reduced%20capabilities.docx) Discussion on reduced capabilities LG Electronics UK discussion Rel-17

#### 8.12.2.2 Identification, access and camping restrictions

Early identification of RedCap UEs (e.g. details of msg3 early identification). Common Aspects related to RACH partitioning (due to msg1 early identification) shall be submitted to 8.18.

System information indication for camping restrictions.

NCD-SSB

[R2-2109448](file:///C:\Data\3GPP\Extracts\R2-2109448%20Draft%20reply%20LS%20on%20use%20of%20NCD-SSB%20instead%20of%20CD-SSB%20for%20RedCap%20UEs.docx) Reply LS on use of NCD-SSB instead of CD-SSB for RedCap UE Qualcomm Incorporated LS out Rel-17 NR\_redcap-Core To:RAN1, RAN4

[R2-2109451](file:///C:\Data\3GPP\Extracts\R2-2109451%20NCD-SSB%20and%20RedCap-specific%20BWPs.docx) NCD-SSB and RedCap-specific BWPs Qualcomm Incorporated discussion Rel-17 FS\_NR\_redcap

[R2-2109741](file:///C:\Data\3GPP\Extracts\R2-2109741_Discussion%20on%20NCD%20SSB%20and%20UE%20type%20for%20RedCap%20UEs.doc) Discussion on NCD SSB and UE type for RedCap UEs vivo, Guangdong Genius discussion Rel-17 NR\_redcap-Core

Moved here from 8.12.2.1

[R2-2110773](file:///C:\Data\3GPP\RAN2\Docs\R2-2110773.zip) Use of NCD-SSB instead of CD-SSB for RedCap UEs Ericsson discussion Late

[R2-2110095](file:///C:\Data\3GPP\RAN2\Docs\R2-2110095.zip) Making ND-SSB work for RedCap in Rel-17 Apple discussion Rel-17 NR\_redcap-Core Late

* [AT116-e][104][RedCap] NCD-SSB (Ericsson)

Initial scope: Discuss incoming LS in [R2-2110727](file:///C:\Data\3GPP\Extracts\R2-2110727_R1-2110600.docx) and related company contributions

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

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

Initial deadline (for companies' feedback): Wednesday 2021-11-03 0500 UTC

Initial deadline (for rapporteur's summary in R2-2111334): Wednesday 2021-11-03 09:00 UTC

Updated scope: Based on [R2-2111334](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111334.zip) continue the discussion and attempt to draft a reply LS to RAN1

Updated intended outcome: Summary of the offline discussion with a possible draft reply LS

Updated deadline (for companies' feedback): Tuesday 2021-11-09 1200 UTC

Updated deadline (for rapporteur's summary in R2-2111348): Tuesday 2021-11-09 1800 UTC

[R2-2111334](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111334.zip) [offline-104] NCD-SSB Ericsson discussion Rel-17 NR\_redcap-Core

Proposal 1 (18/18) For idle and Inactive UEs, the concept of non-cell-defining SSB (NCD-SSB) and the corresponding procedures, i.e., measurements, cell (re-)selection, do not exist in the current RAN2 specifications.

- ZTE thinks this is valid for Idle and Inactive UEs. For Connected UEs it's possible to perform RRM measurements on NDC-SSB

- Huawei wonders if the intention is to draft the reply LS. Ericsson confirms

- Apple thinks this is not needed in the response. HW thinks this is beneficial

* RAN2 confirms this is the understanding of the current situation (we will discuss later whether this can be included in the reply LS)

Proposal 2 (15/18) For idle and Inactive UEs, using NCD-SSB for measurements and cell (re-)selection would still require the UE to re-tune to the CORESET#0 for reading SIBs

- Intel thinks this is true but it might not happen frequently and we should highlight this to RAN1

- ZTE thinks the frequency of updates is based on NW implementation. HW wonders what is "lower"

* RAN2 confirms this is the understanding of the current situation (we will discuss later whether this can be included in the reply LS based on the consideration that the frequency of this requirement is not the clear)

Proposal 3 In connected mode, current RRC signalling allows configuring SSB-based RRM measurements on any (CD- or NCD-) SSB, but it does not allow using an NCD-SSB for RLM, BFD, link recovery, RO selection, mobility (mobility here refers to the frequency indicated in FreqDLInfo in HO commmand), in TCI-states or for any other functionality (other than RRM measurements).

- Apple wonders if the wording is completely correct. Ericsson clarifies that one thing is the current status, another thing what is possible to do. This proposal refers to the current status.

* RAN2 confirms this is the understanding of the current situation (we will discuss later whether this can be included in the reply LS)

Proposal 4 Discuss further whether it should be possible for UEs in idle and inactive to use NCD-SSBs, if introduced, for idle/inactive mode measurements and mobility.

Proposal 5 (18/18) It would be feasible to inform IDLE, INACTIVE and CONNECTED UEs about a NCD-SSB, however it is up to RAN1 and RAN4 to decide whether it is possible to use a NCD-SSB as QCL source.

* RAN2 confirms the understanding that it would be feasible to inform IDLE, INACTIVE and CONNECTED UEs about a NCD-SSB, however it is up to RAN1 and RAN4 to decide whether it is possible to use a NCD-SSB as QCL source

Proposal 6 According to the current RRC specification, PCIs indicated by the NCD-SSB and CD-SSB may be either the same or different if both NCD-SSB and CD-SSB are transmitted on the serving cell.

* RAN2 confirms the understanding that according to the current RRC specification, PCIs indicated by other SSB and CD-SSB may be either the same or different if both other SSB and CD-SSB are transmitted on the serving cell

Proposal 7 (14/18) PCIs indicated by the NCD-SSB and CD-SSB should be configured as same if both NCD-SSB and CD-SSB are transmitted on the serving cell of RedCap UE.

* RAN2 confirms the understanding that PCIs indicated by the NCD-SSB and CD-SSB should be configured as same if both NCD-SSB and CD-SSB are transmitted on the serving cell.

Proposal 8 According to the current RRC specification, periodicities and/or TX power and/or block indexes (provided by ssb-PositionsInBurst in SIB1 or in ServingCellConfigCommon) and/or QCL sources of NCD-SSB may be either the same or different from those of CD-SSB, if both NCD-SSB and CD-SSB are transmitted on the serving cell.

* RAN2 confirms the understanding that according to the current RRC specification, periodicities and/or TX power and/or block indexes (provided by ssb-PositionsInBurst in SIB1 or in ServingCellConfigCommon) and/or QCL sources of other SSB may be either the same or different from those of CD-SSB, if both other SSB and CD-SSB are transmitted on the serving cell.

Proposal 9 Discuss further whether periodicities and/or TX power and/or block indices (provided by ssb-PositionsInBurst in SIB1 or in ServingCellConfigCommon) and/or QCL sources of NCD-SSB should be configured same as those of CD-SSB, if both NCD-SSB and CD-SSB are transmitted on the serving cell of RedCap UE.

Proposal 10 Discuss further whether configuration limitations for NCD-SSB (e.g., regarding frequency locations, periodicity) should be introduced.

Proposal 11 (17/18) use of CSI-RS for cell and beam RLM and measurements is already supported from RAN2 signaling standpoint.

* RAN2 confirms the understanding that use of CSI-RS for cell and beam RLM and measurements is already supported from RAN2 signaling standpoint (we will discuss later whether this can be included in the reply LS)

Proposal 12 Discuss further whether CSI-RS can be used for cell and beam RLM and measurements as an alternative to NCD-SSB.

Proposal 13 (14/18) From RAN2 standpoint it is feasible for a RedCap UE to retune to a CD-SSB rather than use an NCD-SSB of larger periodicity.

* Continue the discussion on possible reply LS to RAN1 in offline 104

RAN2 confirmed understanding of the current situation:

(FFS if any of the following will be included in a reply LS to RAN1

1. For idle/inactive UEs, the concept of non-cell-defining SSB (NCD-SSB) and the corresponding procedures, i.e., measurements, cell (re-)selection, do not exist in the current RAN2 specifications.
2. For idle/inactive UEs, using NCD-SSB for measurements and cell (re-)selection would still require the UE to re-tune to the CORESET#0 for reading SIBs.
3. In connected mode, current RRC signalling allows configuring SSB-based RRM measurements on any (CD- or NCD-) SSB, but it does not allow using an NCD-SSB for RLM, BFD, link recovery, RO selection, mobility (mobility here refers to the frequency indicated in FreqDLInfo in HO command), in TCI-states or for any other functionality (other than RRM measurements).
4. It would be feasible to inform IDLE, INACTIVE and CONNECTED UEs about a NCD-SSB, however it is up to RAN1 and RAN4 to decide whether it is possible to use a NCD-SSB as QCL source.
5. According to the current RRC specification, PCIs indicated by other SSB and CD-SSB may be either the same or different if both other SSB and CD-SSB are transmitted on the serving cell.
6. PCIs indicated by the NCD-SSB and CD-SSB should be configured as same if both NCD-SSB and CD-SSB are transmitted on the serving cell.
7. According to the current RRC specification, periodicities and/or TX power and/or block indexes (provided by ssb-PositionsInBurst in SIB1 or in ServingCellConfigCommon) and/or QCL sources of other SSB may be either the same or different from those of CD-SSB, if both other SSB and CD-SSB are transmitted on the serving cell.
8. Use of CSI-RS for cell and beam RLM and measurements is already supported from RAN2 signaling standpoint.

R2-2111348 [offline-104] NCD-SSB - second round Ericsson discussion Rel-17 NR\_redcap-Core

On coordination between gNBs supporting RedCap UEs

[R2-2111100](file:///C:\Data\3GPP\Extracts\R2-2111100%20%20-%20Discussion%20on%20the%20coordination%20between%20gNBs%20supporting%20RedCap%20UEs.docx) Discussion on the coordination between gNBs supporting RedCap UEs Ericsson discussion NR\_redcap-Core

Observation 1 RedCap UEs should not attempt to camp/access in legacy cells or be handed over to such cells.

Observation 2 A legacy gNB can not detect a RedCap UE via the (RedCap) UE radio capabilities.

Based on the discussion in the previous sections we propose the following:

Proposal 1 Observations 1 and 2 are to be captured in the reply LS to RAN3

- Huawei is ok with a reply LS along the lines suggested by Ericsson. Vivo as well. LGE as well.

* Continue the discussion on possible reply LS to RAN3 in offline 113

[R2-2109447](file:///C:\Data\3GPP\Extracts\R2-2109447%20Reply%20to%20RAN3%20LS%20on%20gNB%20coordination%20for%20RedCap%20UEs.docx) Reply LS to RAN3 on the coordination between gNBs on the supporting RedCap UEs Qualcomm Incorporated LS out Rel-17 NR\_redcap-Core To:RAN3

[R2-2110536](file:///C:\Data\3GPP\Extracts\R2-2110536%20dicussion%20on%20RAN3%20LS.docx) Discussion on RAN3 LS CMCC discussion Rel-17 NR\_redcap-Core

* [AT116-e][113][RedCap] LS on inter-gNB coordination (Ericsson)

Scope: Draft a reply LS for [R2-2109342](file:///C:\Data\3GPP\Extracts\R2-2109342_R3-214422.docx)

Intended outcome: Draft reply LS to RAN3

Initial deadline (for companies' feedback): Tuesday 2021-11-09 1200 UTC

Initial deadline (for draft reply LS in R2-2111349): Tuesday 2021-11-09 1800 UTC

All other aspects

[R2-2109577](file:///C:\Data\3GPP\Extracts\R2-2109577%20Identification%20and%20access%20restriction%20of%20RedCap%20UE.docx) Identification and access restriction of RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

Proposal 1: In MAC perspective, RedCap UE use Msg1 early identification whenever transmitting preamble for CBRA, as long as the Msg1 early identification is configured by NW.

Proposal 2: For Msg1 early identification, RAN2 confirm both dedicated ROs and dedicated PRACH preamble should be supported.

Proposal 3: Msg1 early identification is enabled/disabled implicitly by the presence of dedicate RACH configuration for Msg1 early identification.

Proposal 4: Two reserved LCIDs are used for CCCH and CCCH1 cases respectively for Msg3 early identification.

Proposal 5: In MAC perspective, RedCap UE uses the dedicated LCID for Msg3 early identification, whenever the Msg3 includes the CCCH data.

Proposal 6: At least the dedicated LCID (i.e. the Msg3 early identification solution) can be supported for MsgA early identification. It is up to RAN1 on the need of dedicated preamble and/or dedicated PUSCH resource configuration.

Proposal 7: Introduce two mandatory IEs in SIB1 with {barred, notBarred} values for 1RX and 2RX RedCap UE respectively.

Proposal 8: RAN2 to discuss whether RedCap UE uses the absence of RedCap specific cellBarred or RedCap specific IFRI, to consider the gNB as not supporting RedCap.

Proposal 9: Intra-frequency cell reselection is considered as “allowed” by RedCap UEs, in case the cell is barred due to not supporting RedCap.

Proposal 10a: RAN2 reply RAN3 that RedCap UEs should not attempt to camp/access in legacy cells or be handed over to such cells, and RedCap UEs consider the legacy cell by the absence of RedCap specific cellBarred or IFRI.

Proposal 10b: RAN2 reply RAN3 that legacy gNB can NOT detect via the (RedCap) UE Radio Capabilities (e.g. at Handover preparation) that it cannot configure or serve the RedCap UE.

Proposal 11: Support the RedCap specific cell selection parameters.

Proposal 12: Support the RedCap specific UAC parameters, with consideration of signalling overhead reduction.

* [AT116-e][110][RedCap] Identification and access restriction (Huawei)

Initial scope: Continue the discussion on remaining aspects of RedCap identification (msg1/msg3/msgA) and access restriction (cell barring/UAC), e.g. based on the proposals in [R2-2109577](file:///C:\Data\3GPP\Extracts\R2-2109577%20Identification%20and%20access%20restriction%20of%20RedCap%20UE.docx)

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

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

Initial deadline (for companies' feedback): Friday 2021-11-05 0900 UTC

Initial deadline (for rapporteur's summary in [R2-2111344](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111344.zip)): Friday 2021-11-05 1200 UTC

Updated scope: Continue the discussion on remaining aspects of RedCap identification (msg1/msg3/msgA) and access restriction (cell barring/UAC), based on [R2-2111344](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111344.zip)

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

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

Updated deadline (for companies' feedback): Tuesday 2021-11-09 1400 UTC

Updated deadline (for rapporteur's summary in [R2-2111356](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Tuesday 2021-11-09 1800 UTC

[R2-2111344](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111344.zip) [offline-110] Identification and access restriction Huawei discussion Rel-17 NR\_redcap-Core

Easy proposals for agreement

Proposal 1’: [Easy] In MAC perspective, a RedCap UE uses Msg1 early identification whenever transmitting preamble for CBRA, as long as the Msg1 early identification is configured for RedCap by NW.

* Agreed

Proposal 2: [Easy] For Msg1 early identification, RAN2 confirm both dedicated ROs and dedicated PRACH preamble can be supported.

- Futurewei, Samsung, vivo and ZTE have some comments on the wording. The intention is to say what is possible from signalling point of view. Then the common RACH session will have to decide whether dedicated RO and/or shared RO can be configured, per RACH resource.

* Agreed as "For Msg1 early identification, RAN2 confirm both dedicated ROs and dedicated PRACH preamble can be supported from signalling point of view"

Proposal 3’: [Easy] For RedCap, Msg1 early identification is enabled/disabled implicitly by the presence of dedicate RACH configuration for Msg1 early identification.

* Agreed

Proposal 6: [Easy] At least the dedicated LCID (i.e. the Msg3 early identification solution) can be supported for MsgA early identification. It is up to RAN1 on the need of dedicated preamble and/or dedicated PUSCH resource configuration.

* Agreed

Proposal 12: [Easy] Do not support the RedCap specific UAC parameters.

* Agreed

Proposals for online discussion

Proposal 4: [To discuss] [16 vs. 5] Two reserved LCIDs are used for CCCH and CCCH1 cases respectively for Msg3 early identification.

Proposal 5: [To discuss] In MAC perspective, RedCap UE uses the dedicated LCID for Msg3 early identification:

Option 1: whenever the Msg3 includes the CCCH data [15];

Option 2: whenever the Msg3 includes the CCCH data and Msg1 early identification is not configured [2];

Option 3: whenever the Msg3 includes the CCCH data and Msg3 early identification is enabled by NW [5].

Proposal 7: [To discuss] For the gNB supporting RedCap UE case, introduce below for 1RX and 2RX RedCap UE respectively,

Option 1: two mandatory IEs in SIB1 with {barred, notBarred} present for gNB supporting RedCap [10]

Option 2: two optional IEs in SIB1 with {barred} [6]

Proposal 9: [To discuss] In case the cell is barred due to not supporting RedCap, intra-frequency cell reselection is considered by RedCap UE as:

Option 1: “allowed”; [9]

Option 2: follow the legacy IFRI in MIB; [8]

Option3: Not to specify (i.e. UE implementation) [2]

Option4: “not allowed” [1]

Proposal 13: [To discuss] Discuss whether system information should provide information on which cells accept RedCap UE access, and if, what this information should include (e¸g. support, barring?) and in which form (e.g. NCell, allow-list, exclude-list)

Proposal 11: [To discuss] RAN2 deprioritize/postpone the discussion on the RedCap specific cell selection related parameters.

Agreements via email - from offline 110:

1. In MAC perspective, a RedCap UE uses Msg1 early identification whenever transmitting preamble for CBRA, as long as the Msg1 early identification is configured for RedCap by NW.

2. For Msg1 early identification, RAN2 confirm both dedicated ROs and dedicated PRACH preamble can be supported from signalling point of view

3. For RedCap, Msg1 early identification is enabled/disabled implicitly by the presence of dedicate RACH configuration for Msg1 early identification.

4. At least the dedicated LCID (i.e. the Msg3 early identification solution) can be supported for MsgA early identification. It is up to RAN1 on the need of dedicated preamble and/or dedicated PUSCH resource configuration.

5. Do not support the RedCap specific UAC parameters.

[R2-2111356](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111344.zip) [offline-110] Identification and access restriction - second round Huawei discussion Rel-17 NR\_redcap-Core

[R2-2109494](file:///C:\Data\3GPP\Extracts\R2-2109494%20RedCap%20early%20identfication.doc) Discussion on early identification and access restrictions OPPO discussion Rel-17 NR\_redcap-Core

[R2-2109536](file:///C:\Data\3GPP\Extracts\R2-2109536_Cell%20barring%20aspects%20and%20early%20indication%20in%20Msg3_MsgA.doc) Cell barring aspects and early indication in Msg3\_MsgA Samsung Electronics Co., Ltd discussion Rel-17 NR\_redcap-Core

[R2-2109646](file:///C:\Data\3GPP\Extracts\R2-2109646.docx) Neighbour cell information and cell (re)selection for RedCap UE DENSO CORPORATION discussion Rel-17 NR\_redcap-Core

[R2-2109670](file:///C:\Data\3GPP\Extracts\R2-2109670%20Early%20identification%20and%20camping%20restrictions%20for%20RedCap%20UE.docx) Early identification and camping restrictions for RedCap UE Intel Corporation discussion Rel-17 NR\_redcap

[R2-2109698](file:///C:\Data\3GPP\Extracts\R2-2109698.docx) Discussion on the remaining issues of early identification CATT discussion Rel-17 NR\_redcap-Core

[R2-2109723](file:///C:\Data\3GPP\Extracts\R2-2109723.docx) Discussion on potential interference issues in networks partially supporting RedCap UE cell selection/re-selection NEC Corporation discussion

[R2-2109742](file:///C:\Data\3GPP\Extracts\R2-2109742_Identification%20and%20access%20restrictions%20for%20RedCap%20UEs.docx) Identification and access restrictions for RedCap UEs vivo, Guangdong Genius discussion Rel-17 NR\_redcap-Core

[R2-2109752](file:///C:\Data\3GPP\Extracts\R2-2109752%20Camping%20restrictions%20of%20RedCap%20UE.doc) Camping restrictions of RedCap UE Fujitsu discussion Rel-17 NR\_redcap-Core [R2-2107652](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2107652.zip)

[R2-2109819](file:///C:\Data\3GPP\Extracts\R2-2109819%20%20Discussion%20on%20UE%20access%20restrictions%20for%20Redcap%20devices.doc) Discussion on UE access restrictions for Redcap devices Beijing Xiaomi Mobile Softwar discussion

[R2-2109820](file:///C:\Data\3GPP\Extracts\R2-2109820%20%20Discussion%20on%20early%20Identification%20for%20Redcap%20devices.doc) Discussion on early Identification for Redcap devices Beijing Xiaomi Mobile Softwar discussion

[R2-2109897](file:///C:\Data\3GPP\Extracts\R2-2109897%20Identification,%20access%20and%20camping%20restrictions%20for%20RedCap%20UE.docx) Identification, access and camping restrictions for RedCap UE ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2110094](file:///C:\Data\3GPP\Extracts\R2-2110094_Redcap-RAR.docx) RA-RNTI overlap in RedCap and it’s impact on unified RACH work Apple discussion Rel-17 NR\_redcap-Core

[R2-2110096](file:///C:\Data\3GPP\Extracts\R2-2110096%20System%20information%20indiction%20for%20camping%20restrictions%20of%20Redcap%20UE.docx) System information indication for camping restrictions of RedCap UE China Telecommunications discussion Rel-17

[R2-2110135](file:///C:\Data\3GPP\Extracts\R2-2110135%20Discussion%20on%20the%20open%20issues%20of%20early%20indication%20for%20RedCap%20UE.doc) Discussion on the open issues of early indication for RedCap UE Spreadtrum Communications discussion Rel-17

[R2-2110202](file:///C:\Data\3GPP\Extracts\R2-2110202_Access%20restriction%20for%20RedCap%20UE.docx) Access Restriction for RedCap UE NTT DOCOMO INC. discussion Rel-17

[R2-2110535](file:///C:\Data\3GPP\Extracts\R2-2110535%20Discussion%20on%20access%20restrictions%20and%20early%20identification.docx) Discussion on access restrictions and early identification CMCC discussion Rel-17 NR\_redcap-Core

[R2-2110537](file:///C:\Data\3GPP\Extracts\._R2-2110537%20(R17%20RedCap%20WI%20AI%208.12.2.2)%20Corrections%20for%20cellBarred%20in%20MIB%20handling%20for%20RedCap%20UE.doc) Corrections for cellBarred in MIB handling for RedCap UE InterDigital, Europe, Ltd. discussion Rel-17

[R2-2110585](file:///C:\Data\3GPP\Extracts\R2-2110585%20Discussion%20on%20SI%20indication%20for%20camping%20restrictions%20for%20RedCap%20UEs.docx) Discussion on SI indication for camping restrictions for RedCap UEs LG Electronics UK discussion Rel-17

[R2-2110659](file:///C:\Data\3GPP\Extracts\R2-2110659.docx) Network behaviour for RedCap Msg3 and cell barring BT plc discussion Rel-17

[R2-2110664](file:///C:\Data\3GPP\Extracts\R2-2110664_AC.docx) Access restrictions for RedCap NEC discussion Rel-17 NR\_redcap-Core

[R2-2110793](file:///C:\Data\3GPP\Extracts\R2-2110793%20On%20RedCap%20UE%20behavior%20when%20missing%20essential%20system%20information.docx) On RedCap UE behaviors when missing essential system information Futurewei Technologies discussion Rel-17 NR\_redcap-Core

[R2-2110811](file:///C:\Data\3GPP\Extracts\R2-2110811%20RedCap%20UE%20early%20identification.docx) REDCAP UE early identification Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2110880](file:///C:\Data\3GPP\Extracts\R2-2110880%20RedCap.docx) Early identification and camping restrictions for RedCap UE Sierra Wireless. S.A. discussion

[R2-2111098](file:///C:\Data\3GPP\Extracts\R2-2111098%20-%20Early%20indication%20and%20access%20restriction%20for%20RedCap%20UEs.docx) Early indication & access restriction for RedCap UEs Ericsson discussion NR\_redcap-Core

[R2-2111150](file:///C:\Data\3GPP\Extracts\R2-2111150_KDDI_redcap.docx) System Information and supporting for RedCap UEs KDDI Corporation discussion Rel-17

R2-2110804 On the use of NCD-SSB instead of CD-SSB for RedCap UE MediaTek Inc. discussion Rel-17 NR\_redcap-Core Late

### 8.12.3 UE power saving and battery lifetime enhancement

No contribution is expected to this agenda item but directly to the sub-agenda items.

#### 8.12.3.1 eDRX cycles

Extended DRX enhancements for RRC Inactive and Idle.

* [AT116-e][105][RedCap] eDRX cycles aspects (Apple)

Initial scope: Discuss proposals in AI 8.12.3.1 (skipping those on INACTIVE eDRX >10.24sec and on pure ASN.1 aspects)

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

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

Initial deadline (for companies' feedback): Tuesday 2021-11-02 2000 UTC

Initial deadline (for rapporteur's summary in R2-2111335): Wednesday 2021-11-03 00:00 UTC

Updated scope: continue the discussion based on the proposals in [R2-2111335](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111335.zip)

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

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

Updated deadline (for companies' feedback): Friday 2021-11-05 1000 UTC

Updated deadline (for rapporteur's summary in [R2-2111350](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111350.zip)): Friday 2021-11-05 1800 UTC

Proposals marked "for agreement" in R2-2111350 not challenged until Monday 2021-11-08 1200 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

[R2-2111335](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111335.zip) [offline-105] eDRX cycles Apple discussion Rel-17 NR\_redcap-Core

- Apple indicates that some inputs were unfortunately not included in the report

Proposals for agreement:

Proposal 1 [13/13] : The max eDRX cycle length for RRC Inactive is 10.24s in Rel-17

* Agreed

Proposal 2 [13/13] : Capture in the specification explicitly the below restrictions:

- RAN2 considers the configuration as an invalid case, where INACTIVE eDRX cycle is configured but IDLE eDRX cycle is not configured.

- RAN2 considers the configuration as invalid case, where INACTIVE eDRX cycle is longer than IDLE eDRX cycle.

- Nokia would like to further discuss this, as they don't think we should have restrictions

- Intel thinks we could cover this as a restriction on the UE side.

- Ericsson thinks we already agreed on this and we can discuss later how to capture this. Intel agrees

* Discuss later when working on the actual CRs

Proposal 4 [13/13]: PO determination for non-overlapping CN/RN case is applicable to eDRX

* Agreed

Proposal 5 [13/13]:: When IDLE eDRX and INACTIVE eDRX are configured and both cycles are no longer than 10.24s, PO is determined by IDLE eDRX.

* Agreed

Proposal 6 [13/13]:: When IDLE eDRX is configured and is no longer than 10.24s, INACITVE eDRX cycle is not configured, PO is determined by IDLE eDRX.

* Agreed

Proposal 7 [13/13]:: During CN PTW when IDLE eDRX is configured and longer than 10.24s, and INACTIVE eDRX is configured, PO is determined by the shortest value of default paging cycle and UE specific DRX cycle if configured by upper layer.

* Agreed

Proposal 8 [13/13]:: During CN PTW when IDLE eDRX is configure and is longer than 10.24s, INACTIVE eDRX cycle is not configured, PO is determined by the shortest value of default paging cycle and UE specific DRX cycle if configured by upper layer.

* Agreed

Proposal 9 [13/13]: eDRX supporting UEs are assumed to also support the UE capability on PO determination for non overlapping CN/RN case.

- Ericsson would like to further discuss this

- Apple thinks Ericsson views is aligned to others

- Huawei suggests to remove the last part. Ericsson agrees.

- vivo supports the original proposal

* eDRX supporting UEs are assumed to also support the UE capability on PO determination for non overlapping CN/RN case
* Further discuss on the reporting of eDRX capability

Proposal 11 [13/13]: The below working agreement is now changed to an agreement.

When IDLE eDRX cycle is longer than 10.24s, CN PTW\_start calculation formula defined in LTE is re-used as the baseline, as below. FFS whether CN PTW\_start position could be configurable by network and in case which node decides the N value. Note: this formula would be revisited if INACTIVE eDRX cycle can be above 10.24s

PTW\_start denotes the first radio frame of the PH that is part of the PTW and has SFN satisfying the following equation:

SFN = 1024/N\* ieDRX, where

ieDRX = floor(UE\_ID\_H /TeDRX,H) mod N

FFS N = 4 or 8, FFS if N can take other values

* Agreed

Proposal 13 [13/13]: the same LTE hashed UE\_ID calculation is used for UE\_ID\_H for NR.

* Agreed

To discuss:

Proposal 3 : It is FFS if an explicit table capturing the determination of ‘T’ for different DRX/eDRX configurations, is needed in TS38.304. If the table is agreed to be added, this table can also include the restrictions from P2.

Proposal 10 [To discuss]:: RAN2 to discuss if a eDRX capability is also needed to be reported to gNB.

Proposal 12 [8/13]: The value of N is 8 and it is not configurable..

Proposal 14 [11/13]: For eDRX in NR, the UE\_ID is given by 5G-S-TMSI mod 4096

Proposal 15 [to discuss]: DRX cycle the UE uses for comparing with the modification period to decide if the eDRX acquisition period is to be used:

- [6/13] CN\_eDRX for both RRC\_IDLE and RRC\_INACTIVE (same as LTE)

- [4/13] separate CN eDRX for RRC\_IDLE, and RAN eDRX if configured for RRC\_INACTIVE (use CN eDRX if RAN eDRX is not configured)

Proposal 16 [10/2]: eDRX acquisition period set to the maximum configurable value of the eDRX cycle.

Proposal 17 [7/2]: eDRX acquisition period is the same for RRC\_IDLE and RRC\_INACTIVE (as in LTE).

Proposal 18 [11/2/]: eDRX specific on-demand SI enhancements are not considered for Rel-17.

Proposal 19 [9/4]: Option 2 is agreed for the below two cases:

For RRC\_INACTIVE UE, when IDLE eDRX cycle is no longer than 10.24s and INACTIVE eDRX cycle is not configured, T is determined by the shortest of RAN paging cycle and IDLE eDRX cycle.

For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and INACTIVE eDRX cycle is not configured, outside CN PTW, T is determined by RAN paging cycle.

Agreements via email - from offline 105:

1. The max eDRX cycle length for RRC Inactive is 10.24s in Rel-17
2. PO determination for non-overlapping CN/RN case is applicable to eDRX
3. When IDLE eDRX and INACTIVE eDRX are configured and both cycles are no longer than 10.24s, PO is determined by IDLE eDRX.
4. When IDLE eDRX is configured and is no longer than 10.24s, INACITVE eDRX cycle is not configured, PO is determined by IDLE eDRX.
5. During CN PTW when IDLE eDRX is configured and longer than 10.24s, and INACTIVE eDRX is configured, PO is determined by the shortest value of default paging cycle and UE specific DRX cycle if configured by upper layer.
6. During CN PTW when IDLE eDRX is configure and is longer than 10.24s, INACTIVE eDRX cycle is not configured, PO is determined by the shortest value of default paging cycle and UE specific DRX cycle if configured by upper layer.
7. eDRX supporting UEs are assumed to also support the UE capability on PO determination for non overlapping CN/RN case (Further discuss on the reporting of eDRX capability)
8. The below working agreement is now changed to an agreement.

When IDLE eDRX cycle is longer than 10.24s, CN PTW\_start calculation formula defined in LTE is re-used as the baseline, as below. FFS whether CN PTW\_start position could be configurable by network and in case which node decides the N value. Note: this formula would be revisited if INACTIVE eDRX cycle can be above 10.24s

PTW\_start denotes the first radio frame of the PH that is part of the PTW and has SFN satisfying the following equation:

SFN = 1024/N\* ieDRX, where

ieDRX = floor(UE\_ID\_H /TeDRX,H) mod N

FFS N = 4 or 8, FFS if N can take other values

1. The same LTE hashed UE\_ID calculation is used for UE\_ID\_H for NR.

[R2-2111350](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111350.zip) [offline-105] eDRX cycles - second round Apple discussion Rel-17 NR\_redcap-Core

(For agreement):

Proposal 2.1 : eDRX feature can be supported by non RedCap UEs.

* Agreed

Proposal 2.2 : eDRX feature request by the UE is using the NAS signalling. FFS if additional capability signalling in RAN in the UE capability message, is also needed

- Ericsson suggests to reformulate as: "Proposal 2.2 A UE in idle mode requests eDRX configuration via NAS signalling. FFS if capability signalling in RAN, as part of the UE capability message, is also needed."

* Agreed as: "A UE in idle mode requests eDRX configuration via NAS signalling. FFS if capability signalling in RAN, as part of the UE capability message, is also needed."

Proposal 2.3 : eDRX support is optional for the RedCap UE.

* Agreed

Proposal 2.5: the UE\_ID for eDRX is defined by 5G-S-TMSI mod 4096.

* Agreed

Proposal 2.7: the eDRX acquisition period is the maximum configurable value of the eDRX cycle

* Agreed

Proposal 2.9: No eDRX specific on-demand SI enhancements are considered for Rel-17

* Agreed

(Needs discussion for agreements):

Proposal 2.4 [to discuss, 11 for, 3 against]: For the eDRX PTW start calculation, agree to N=8. No signalling needed to CN.

* Continue online

Below proposals deal with SI update for eDRX devices:

Proposal 2.6 [to discuss]: DRX cycle the UE uses for comparing with the modification period to decide if the eDRX acquisition period is to be used:

- CN\_eDRX for both RRC\_IDLE and RRC\_INACTIVE (same as LTE)

- separate CN eDRX for RRC\_IDLE, and RAN eDRX if configured for RRC\_INACTIVE (use CN eDRX if RAN eDRX is not configured)

* Continue online

Proposal 2.8 [ to discuss, for 11, no 2] : the eDRX acquisition period is the same for IDLE and INACTIVE.

* Continue online

Proposal 2.10: (13 ok, 1 against)

A) For RRC\_INACTIVE UE, when IDLE eDRX cycle is no longer than 10.24s and INACTIVE eDRX cycle is not configured, T is determined by the shortest of RAN paging cycle and IDLE eDRX cycle.

B) For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and INACTIVE eDRX cycle is not configured, outside CN PTW, T is determined by RAN paging cycle.

* Continue online

Agreements via email - from offline 105 (second round):

1. eDRX feature can be supported by non RedCap UEs.
2. A UE in idle mode requests eDRX configuration via NAS signalling. FFS if capability signalling in RAN, as part of the UE capability message, is also needed.
3. eDRX support is optional for the RedCap UE.
4. the UE\_ID for eDRX is defined by 5G-S-TMSI mod 4096.
5. the eDRX acquisition period is the maximum configurable value of the eDRX cycle

6. No eDRX specific on-demand SI enhancements are considered for Rel-17

[R2-2109449](file:///C:\Data\3GPP\Extracts\R2-2109449%20Remaining%20issues%20on%20eDRX.docx) Remaining issues on eDRX Qualcomm Incorporated discussion Rel-17 FS\_NR\_redcap

[R2-2109495](file:///C:\Data\3GPP\Extracts\R2-2109495%20-%20Discussion%20on%20eDRX%20for%20RedCap%20UEs.doc) Discussion on eDRX for RedCap Ues OPPO discussion Rel-17 NR\_redcap-Core

[R2-2109537](file:///C:\Data\3GPP\Extracts\R2-2109537_UE_ID%20for%20extended%20DRX%20cycle%20and%20SI%20update%20aspects.doc) UE\_ID for extended DRX cycle and SI update aspects Samsung Electronics Co., Ltd discussion Rel-17 NR\_redcap-Core

[R2-2109578](file:///C:\Data\3GPP\Extracts\R2-2109578%20eDRX%20for%20RedCap%20UE.docx) eDRX for RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

[R2-2109649](file:///C:\Data\3GPP\Extracts\R2-2109649%20%20Discussion%20on%20e-DRX%20for%20Redcap%20Devices.doc) Discussion on e-DRX for Redcap Devices Beijing Xiaomi Mobile Softwar discussion

[R2-2109671](file:///C:\Data\3GPP\Extracts\R2-2109671_NR-eDRX.docx) Leftover issues for eDRX Intel Corporation discussion Rel-17 NR\_redcap

[R2-2109699](file:///C:\Data\3GPP\Extracts\R2-2109699.doc) Further Discussion on eDRX for NR RRC Inactive and Idle CATT discussion Rel-17 NR\_redcap-Core

[R2-2109743](file:///C:\Data\3GPP\Extracts\R2-2109743_Discussion%20on%20eDRX%20for%20RedCap%20UEs.doc) Discussion on eDRX for RedCap UEs vivo, Guangdong Genius discussion Rel-17 NR\_redcap-Core

[R2-2109898](file:///C:\Data\3GPP\Extracts\R2-2109898%20Discussion%20on%20eDRX%20for%20RedCap%20UEs.docx) Discussion on eDRX for RedCap UE ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2110151](file:///C:\Data\3GPP\Extracts\R2-2110151_PTW_start.docx) Leftover issues on derivation of PTW\_start DENSO CORPORATION discussion Rel-17 NR\_redcap-Core

[R2-2110331](file:///C:\Data\3GPP\Extracts\R2-2110331.docx) Consideration on eDRX for RedCap UE Lenovo, Motorola Mobility discussion Rel-17

[R2-2110584](file:///C:\Data\3GPP\Extracts\R2-2110584%20Discussion%20on%20eDRX%20for%20RRC_INACTIVE.docx) Discussion on eDRX for RRC\_IDLE and RRC\_INACTIVE LG Electronics UK discussion Rel-17

[R2-2110755](file:///C:\Data\3GPP\Extracts\R2-2110755%20Remaining%20issues%20for%20eDRX.DOCX) Remaining issues for eDRX MediaTek Inc. discussion Rel-17 NR\_redcap-Core

[R2-2111099](file:///C:\Data\3GPP\Extracts\R2-2111099%20-%20Extended%20DRX%20for%20Reduced%20Capability%20UEs.docx) Extended DRX for Reduced Capability UEs Ericsson discussion NR\_redcap-Core

[R2-2111129](file:///C:\Data\3GPP\Extracts\R2-2111129.doc) Remaining issues in paging monitoring Samsung discussion Rel-17

#### 8.12.3.2 RRM relaxations

Measurement-based stationarity criterion and related not-at-cell-edge criterion, for RRC Inactive, Idle and Connected.

[R2-2109450](file:///C:\Data\3GPP\Extracts\R2-2109450%20Remaining%20issues%20on%20RRM%20relaxations.docx) Remaining issues on RRM relaxation Qualcomm Incorporated discussion Rel-17 FS\_NR\_redcap

[R2-2109579](file:///C:\Data\3GPP\Extracts\R2-2109579%20RRM%20measurement%20relaxation%20for%20RedCap%20UE.doc) RRM measurement relaxation for RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

[R2-2110564](file:///C:\Data\3GPP\Extracts\R2-2110564%20-%20Details%20on%20RRM%20relaxation.docx) Details on RRM relaxation Ericsson discussion Rel-17 NR\_redcap-Core

[R2-2109893](file:///C:\Data\3GPP\Extracts\R2-2109893%20Further%20discussion%20on%20RRM%20relaxation%20for%20RedCap%20UE.docx) Further discussion on RRM relaxation for RedCap UE ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2109744](file:///C:\Data\3GPP\Extracts\R2-2109744_RRM%20relaxation%20for%20neighboring%20cell%20for%20RedCap%20UEs.docx) RRM relaxation for neighboring cell for RedCap UEs vivo, Guangdong Genius discussion Rel-17 NR\_redcap-Core

* [AT116-e][111][RedCap] RRM relaxation (Qualcomm)

Initial scope: Continue the discussion on remaining aspects of RRM relaxation

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

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

Initial deadline (for companies' feedback): Friday 2021-11-05 0900 UTC

Initial deadline (for rapporteur's summary in [R2-2111345](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111345.zip)): Friday 2021-11-05 1200 UTC

Updated scope: Continue the discussion on remaining aspects of RRM relaxation, based on [R2-2111345](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111345.zip)

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

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

Updated deadline (for companies' feedback): Tuesday 2021-11-09 1800 UTC

Updated deadline (for rapporteur's summary in [R2-2111355](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111338.zip)): Tuesday 2021-11-09 2100 UTC

[R2-2111345](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111345.zip) [offline-111] RRM relaxation Qualcomm discussion Rel-17 NR\_redcap-Core

For agreement by email:

Proposal 1. (20/20) UE is not allowed to relax its RRM measurements if both stationarity criterion and R17 not-at-cell-edge criterion are configured but UE meets only the R17 not-at-cell-edge criterion.

* Agreed

Proposal 4. (20/20) UE reports to network when it no longer meets relaxation criteria.

* Agreed

Proposal 8. (19/20) No additional signaling is introduced for network to tell UE whether and which criteria for RRM relaxation is considered satisfied when leaving RRC\_CONNECTED state.

* Agreed

Proposal 9. (18/20) No need for UE to send UE Assistance Information to request network configuring it with relaxation criteria.

* Agreed

Proposal 7. (16/20) UE does not report its history/state of RRM relaxation when transitioning from RRC Idle/Inactive to RRC Connected.

* Agreed

Proposal 3. (17/19) Relaxation criteria for UEs in RRC Connected are configured by only dedicated signaling.

* Agreed

For possible agreements during online:

Proposal 10. (15/20) For the purpose of continued discussions, RAN2 assume that the existing RRM measurement framework can be used as baseline for enabling and disabling UE’s RRM relaxations in RRC Connected, unless RAN4 introduce different or additional methods.

Proposal 11. (4/20) RAN2 continue to wait for RAN4’s progress before deciding on UE’s behaviors when UE meets both R16 and R17 relaxation criteria.

Proposal 12. (16/20) R17 RRM relaxation can be applied to both RedCap and non-RedCap UEs.

Proposal 2. (11/19) (working assumption) Introduce an indication similar to combineRelaxedMeasCondition-r16, if RAN4 confirm that RRM relaxation level can be different depend on whether only stationary criterion or both criteria are met.

Proposal 6. If measurement reporting framework is used by UE to report its relaxation status, no prohibit timer is needed. If UE Assistance Information is used by UE to report relaxation status, RAN2 discuss further whether prohibit timer is needed.

Proposal 5. (11 vs 8) Continue discussion on whether UAI or measurement reporting framework should be reused for UE to report its relaxation status.

Agreements via email - from offline 111:

1. UE is not allowed to relax its RRM measurements if both stationarity criterion and R17 not-at-cell-edge criterion are configured but UE meets only the R17 not-at-cell-edge criterion.
2. UE reports to network when it no longer meets relaxation criteria.
3. No additional signaling is introduced for network to tell UE whether and which criteria for RRM relaxation is considered satisfied when leaving RRC\_CONNECTED state.
4. No need for UE to send UE Assistance Information to request network configuring it with relaxation criteria.
5. UE does not report its history/state of RRM relaxation when transitioning from RRC Idle/Inactive to RRC Connected.
6. Relaxation criteria for UEs in RRC Connected are configured by only dedicated signaling.

[R2-2111355](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111345.zip) [offline-111] RRM relaxation - second round Qualcomm discussion Rel-17 NR\_redcap-Core

[R2-2109496](file:///C:\Data\3GPP\Extracts\R2-2109496%20-%20Discussion%20on%20RRM%20relax%20%20for%20RRC%20idle.doc) Discussion on RRM relax for RRC idle OPPO discussion Rel-17 NR\_redcap-Core

[R2-2109497](file:///C:\Data\3GPP\Extracts\R2-2109497%20-%20Discussion%20on%20RRM%20relax%20%20for%20RRC%20connected.doc) Discussion on RRM relax for RRC connected OPPO discussion Rel-17 NR\_redcap-Core

[R2-2109575](file:///C:\Data\3GPP\Extracts\R2-2109575.docx) NR-REDCAP stationarity relaxations in case of RRC\_CONNECTED THALES discussion

[R2-2109588](file:///C:\Data\3GPP\Extracts\R2-2109588_On%20the%20efficient%20RRM%20relaxation%20on%20RRC%20Connected%20mode.docx) On the efficient RRM relaxation on RRC connected mode Fraunhofer IIS, Fraunhofer HHI discussion Rel-17 [R2-2107145](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2107145.zip)

[R2-2109672](file:///C:\Data\3GPP\Extracts\R2-2109672%20RRM%20measurement%20relaxation%20for%20RedCap%20UE%20in%20RRC_CONNECTED.docx) RRM measurement relaxation for RedCap UE in RRC\_CONNECTED Intel Corporation discussion Rel-17 NR\_redcap

[R2-2109700](file:///C:\Data\3GPP\Extracts\R2-2109700.doc) Further Discussion on RRM relaxations CATT discussion Rel-17 NR\_redcap-Core

[R2-2110105](file:///C:\Data\3GPP\Extracts\R2-2110105%20RRM%20relaxation%20criterion%20of%20RedCap.docx) RRM relaxation criterion of RedCap UE China Telecommunications discussion Rel-17

[R2-2110193](file:///C:\Data\3GPP\Extracts\R2-2110193%20Discussion%20on%20RRM%20measurement%20relaxation%20for%20redcap.docx) Discussion on RRM measurement relaxation for redcap Xiaomi Communications discussion Rel-17 NR\_redcap-Core

[R2-2110230](file:///C:\Data\3GPP\Extracts\R2-2110230%20Remaining%20issues%20in%20RRM%20relaxation.DOC) Remaining issues in RRM relaxation LG Electronics Inc. discussion Rel-17 NR\_redcap-Core

[R2-2110287](file:///C:\Data\3GPP\Extracts\R2-2110287%20RRM%20relaxation%20for%20RedCap%20UEs.docx) RRM relaxation for RedCap UEs SHARP Corporation discussion [R2-2107873](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2107873.zip)

[R2-2110816](file:///C:\Data\3GPP\Extracts\R2-2110816%20On%20RRM%20relaxation%20for%20REDCAP%20UE.docx) On RRM relaxations for REDCAP Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2110817](file:///C:\Data\3GPP\Extracts\R2-2110817%20On%20RRM%20relaxation%20in%20CONNECTED.docx) On RRM relaxations in CONNECTED Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2111130](file:///C:\Data\3GPP\Extracts\R2-2111130.doc) RRM measurement relaxation in RedCap Samsung discussion Rel-17

## 8.19 Coverage Enhancements

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

Time budget: 0.5

Tdoc Limitation: 1 tdoc

Common aspects related to RACH indication (in MSG1) / RACH partitioning shall be submitted to 8.18

### 8.19.1 Organizational

Rapporteur input, incoming LS etc.

[R2-2111210](file:///C:\Data\3GPP\Extracts\R2-2111210_R1-2110585.docx) Reply LS on Msg3 repetition in coverage enhancement (R1-2110585; contact: ZTE) RAN1 LS in Rel-17 NR\_cov\_enh-Core To:RAN2

- Regarding the answer to Q2, Lenovo thinks the spirit of the response is that this can be up to RAN2 discussion. vivo agrees: we could decide and then confirm with RAN1

* Noted

### 8.19.2 General

RAN2 impact tech proposals.

[R2-2109894](file:///C:\Data\3GPP\Extracts\R2-2109894%20Consideration%20on%20Msg3%20repetition%20in%20CE.docx) Consideration on Msg3 repetition in CE ZTE Corporation, Sanechips discussion Rel-17 NR\_cov\_enh-Core

Proposal 1: Confirm Msg3 repetition is supported on both NUL and SUL, and network can configure different RSRP thresholds for requesting Msg3 repetition on NUL and SUL.

- LGE would like to clarify the intention, what is the scenario when we need to configure repetitions on both SUL and NUL. ZTE thinks the network needs to consider UEs using SUL and NUL. HW supports this and this has been confirmed by RAN1

* Agreed

Proposal 2: Group B preambles with Msg3 repetition is supported, it is up to network to decide whether to configure Group B together with Msg3 repetition.

- LGE is ok with p2 but wonders if this is also related to the discussion on common RACH aspects in the other session. So we could at least say that the decision needs to be confirmed in the other session. HW is ok to leave the final decision to the session on RACH partitioning.

- QC supports

- ZTE thinks this can be made compatible with the discussion on RACH partitioning. Nokia agrees. IDC as well. vivo/Intel also support p2

* Agreed

Proposal 3: If Group B preambles with Msg3 repetition is configured, network can configure separate parameters for requesting Msg3 repetition, including ra-Msg3SizeGroupA, messagePowerOffsetGroupB and numberOfRA-PreamblesGroupA.

- ZTE thinks that we could agree on the first 2 parameters (ra-Msg3SizeGroupA, messagePowerOffsetGroupB ) and leave the discussion on the last ones to the common session

- Samsung supports p3

* Agreed. If Group B preambles with Msg3 repetition is configured, network can configure separate parameters for requesting Msg3 repetition, including ra-Msg3SizeGroupA, messagePowerOffsetGroupB and numberOfRA-PreamblesGroupA (ASN.1 details can be discussed in session on RACH partitioning)

Proposal 4: Agree the following principles, and capture them in stage 3 specification.

• Principle 1: If only 2-step RA configuration is signaled, network is not allowed to enable Msg3 repetition (does not configure RACH resource for requesting Msg3 repetition)

• Principle 2: If both 2-step RA configuration and 4-step RA configuration are signaled, the RSRP threshold used for requesting Msg3 repetition should be configured lower than msgA-RSRP-Threshold-r16.

- Oppo thinks that RAN1 has agreed that msg3 repetition does not apply to fallback case. ZTE thinks this is about the initiation of RACH procedure (with RA type selection). The option suggested here is: first do RA type selection and if 4-step is used then decide to use msg3 repetition or not. Samsung agrees that the UE should do RA type selection first.

- Ericsson/QC might agree with the principle but wonder if anything needs to be covered in the specs

- LGE thinks whether RA type selection is performed first or not should be discussed in the RACH partitioning first.

* Continue in offline 112, also taking into account the outcome of the session on RACH partitioning, when/if available

Proposal 5: Introduce separate rsrp-ThresholdSSB for requesting Msg3 repetition.

Proposal 6: The new rsrp-ThresholdSSB threshold is used (instead of legacy rsrp-ThresholdSSB) when the UE supports Msg3 repetition and the cell enables Msg3 repetition.

Proposal 7: UE first selects SSB (based on Msg3 repetition specific rsrp-ThresholdSSB), and then determines whether Msg3 repetition is needed or not.

Proposal 8: RAN2 to discuss whether UE can switch from CE (i.e. requesting Msg3 Repetition) to non-CE (i.e. not requesting Msg3 repetition), or vice versa upon Msg1 retransmission.

Proposal 9: Once 2-step RA is triggered, the UE ignores the Msg3 repetition configuration. UE cannot change the RA type unless max MsgA retransmission is reached.

Agreements:

1. Confirm Msg3 repetition is supported on both NUL and SUL, and network can configure different RSRP thresholds for requesting Msg3 repetition on NUL and SUL.
2. Group B preambles with Msg3 repetition is supported, it is up to network to decide whether to configure Group B together with Msg3 repetition.
3. If Group B preambles with Msg3 repetition is configured, network can configure separate parameters for requesting Msg3 repetition, including ra-Msg3SizeGroupA, messagePowerOffsetGroupB and numberOfRA-PreamblesGroupA (ASN.1 details can be discussed in session on RACH partitioning)

[R2-2109530](file:///C:\Data\3GPP\Extracts\R2-2109530_MAC%20Aspects%20of%20UL%20Coverage%20Enhancements.doc) MAC Aspects of UL Coverage Enhancements Samsung Electronics Co., Ltd discussion Rel-17 NR\_cov\_enh-Core

Proposal 1: RA type selection is independent of whether RACH configuration for UL coverage is signaled by gNB or not. Legacy principle is applied for RA type selection.

Proposal 1a: For 2 step RA, if criteria to request for Msg3 PUSCH repetition is met and RACH configuration for 4 step RA is provided for UL coverage enhancement, UE apply the 4 step RACH configuration for UL coverage enhancement. Otherwise, UE apply 4 step RACH configuration which is not configured for UL coverage enhancement.

Proposal 2: If the UL grant for Msg3 include repetitions, UE starts the ra-ContentionResolutionTimer in the first symbol after the end of Msg3 transmission in 1st transmission occasion of UL grant with repetition.

[R2-2111026](file:///C:\Data\3GPP\Extracts\R2-2111026%20Further%20discussions%20on%20RAN2%20support%20of%20Msg3%20PUSCH%20repetition.docx) Further discussions on RAN2 support of Msg3 PUSCH repetition Huawei, HiSilicon discussion Rel-17 NR\_cov\_enh-Core

* [AT116-e][112][CovEnh] Coverage enhancements aspects (ZTE)

Initial scope: Continue the discussion on proposals in [R2-2109894](file:///C:\Data\3GPP\Extracts\R2-2109894%20Consideration%20on%20Msg3%20repetition%20in%20CE.docx) and on CFRA/CBRA issues raised in other contributions, also taking into account the outcome of the session on RACH partitioning (when/if available), where applicable. For any proposal that might not require to be checked in the common session on RACH partitioning, also attempt email agreements.

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

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

Initial deadline (for companies' feedback): Friday 2021-11-05 0900 UTC

Initial deadline (for rapporteur's summary in [R2-2111346](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111346.zip)): Friday 2021-11-05 1200 UTC

Proposals marked "for agreement" in [R2-2111346](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111346.zip) not challenged until Monday 2021-11-08 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue during the CB session in Week2).

[R2-2111346](file:///C:\Data\3GPP\RAN2\Inbox\R2-2111346.zip) [offline-112] Coverage Enhancements aspects ZTE discussion Rel-17 NR\_cov\_enh-Core

[Easy proposals for agreement]

Proposal 1 [12/15]ra-ContentionResolutionTimer is started or restarted in the first symbol after all Msg3 repetitions

* Agreed

Proposal 2 [12/15] In shared RO case, it is not supported to configure a separate set of RACH parameters (preambleReceivedTargetPower, powerRampingStep, preambleTransMax) for requesting Msg3 repetition.

* Agreed

Proposal 3 [15/15] In shared RO case, it is not supported to separately configure following parameters for requesting Msg3 repetition.

* prach-ConfigurationIndex
* msg1-FDM
* msg1-FrequencyStart
* zeroCorrelationZoneConfig
* totalNumberOfRA-Preambles
* ssb-perRACH-OccasionAndCB-PreamblesPerSSB
* rsrp-ThresholdSSB-SUL
* prach-RootSequenceIndex
* msg1-SubcarrierSpacing
* restrictedSetConfig
* msg3-transformPrecoder
* Agreed

Proposal 4 [15/15] In shared RO case, it is up to the common RACH session to decide how to configure the number of preamble per SSB per RO, and how to indicate the start of preamble index for requesting Msg3 repetition.

* Agreed

Proposal 5 [15/15] A separate rsrp-ThresholdSSB threshold is introduced for requesting Msg3 repetition.

* Agreed

Proposal 6 [15/15] From CE perspective, carrier selection and BWP selection are performed ahead of CE selection during RACH procedure.

* Agreed as Working Assumption to be confirmed in the common RACH session

Proposal 7.1: [12/15]From CE perspective, UE compares the RSRP of DL path-loss reference with the Msg3 repetition threshold [rsrp-Threshold-Msg3Rep] during the RACH initialization procedure and decides whether to use CE or non-CE RA.

* Agreed as Working Assumption to be confirmed in the common RACH session

Proposal 7.2: [11/15]From CE perspective, if CE RA is selected, then the decision doesn’t change during the entire RACH procedure (i.e. until RACH failure).

* Agreed as Working Assumption to be confirmed in the common RACH session

[proposals for online discussion]

Proposal 7.3: From CE perspective, if non-CE RA is selected, then the UE is allowed to switch from non-CE to CE after “N” transmission attempts (similar to 2-step RA to 4-step RA switch). This switch is enabled if network configures something like “msg1-TransMax-CE”.

* Continue online

Proposal 8: From CE perspective, if 2-step RA is selected during the RACH initialization procedure , the UE does not perform CE selection during entire RACH procedure (i.e. until RACH failure).

* Continue online

Agreements via email - from offline 112:

1. ra-ContentionResolutionTimer is started or restarted in the first symbol after all Msg3 repetitions
2. In shared RO case, it is not supported to configure a separate set of RACH parameters (preambleReceivedTargetPower, powerRampingStep, preambleTransMax) for requesting Msg3 repetition.
3. In shared RO case, it is not supported to separately configure following parameters for requesting Msg3 repetition:

prach-ConfigurationIndex

msg1-FDM

msg1-FrequencyStart

zeroCorrelationZoneConfig

totalNumberOfRA-Preambles

ssb-perRACH-OccasionAndCB-PreamblesPerSSB

rsrp-ThresholdSSB-SUL

prach-RootSequenceIndex

msg1-SubcarrierSpacing

restrictedSetConfig

msg3-transformPrecoder

1. In shared RO case, it is up to the common RACH session to decide how to configure the number of preamble per SSB per RO, and how to indicate the start of preamble index for requesting Msg3 repetition.
2. A separate rsrp-ThresholdSSB threshold is introduced for requesting Msg3 repetition.

Further agreements (previous Working Assumptions confirmed in the common RACH session):

1. From CE perspective, carrier selection and BWP selection are performed ahead of CE selection during RACH procedure.
2. From CE perspective, UE compares the RSRP of DL path-loss reference with the Msg3 repetition threshold [rsrp-Threshold-Msg3Rep] during the RACH initialization procedure and decides whether to use CE or non-CE RA.
3. From CE perspective, if CE RA is selected, then the decision doesn’t change during the entire RACH procedure (i.e. until RACH failure).

[R2-2109443](file:///C:\Data\3GPP\Extracts\R2-2109443%20Further%20Discussion%20on%20RAN2%20Impacts%20of%20Msg3%20Repetition.docx) Further Discussion on RAN2 Impacts of Msg3 Repetition vivo discussion Rel-17 NR\_cov\_enh-Core

[R2-2109456](file:///C:\Data\3GPP\Extracts\R2-2109456%20RAN2%20aspects%20of%20coverage%20enhancements.docx) RAN2 aspects of coverage enhancements Qualcomm Incorporated discussion Rel-17 NR\_cov\_enh-Core

[R2-2109503](file:///C:\Data\3GPP\Extracts\R2-2109503%20CR%20timer_CE.doc) Discussion on CE’s impact on the start of ra-ContentionResolutionTimer OPPO discussion Rel-17 NR\_cov\_enh-Core

[R2-2109877](file:///C:\Data\3GPP\Extracts\R2-2109877.docx) RAN2 aspects of Msg3 PUSCH repetition Intel Corporation discussion Rel-17 NR\_cov\_enh-Core

[R2-2110038](file:///C:\Data\3GPP\Extracts\R2-2110038_%20RAN2%20impacts%20RAN2%20impact%20of%20coverage%20enhancements.doc) RAN2 impact of coverage enhancements Apple discussion Rel-17 NR\_cov\_enh-Core

[R2-2110192](file:///C:\Data\3GPP\Extracts\R2-2110192.docx) Considerations on requesting Msg3 repetition NEC Corporation discussion Rel-17 NR\_cov\_enh-Core

[R2-2110440](file:///C:\Data\3GPP\Extracts\R2-2110440%20Analysis%20on%20Type%20A%20PUSCH%20repetitions%20for%20Msg3.docx) Analysis on Type A PUSCH repetitions for Msg3 CATT discussion Rel-17 NR\_cov\_enh-Core

[R2-2110814](file:///C:\Data\3GPP\Extracts\R2-2110814%20RAN2%20aspects%20for%20Coverage%20Enhancement.docx) RAN2 aspects for Coverage Enhancement Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_cov\_enh-Core

[R2-2110833](file:///C:\Data\3GPP\Extracts\R2-2110833%20On%20Type%20A%20PUSCH%20msg3%20repetitions.docx) On Type A PUSCH repetitions for Msg3 Ericsson discussion Rel-17 NR\_cov\_enh

[R2-2111160](file:///C:\Data\3GPP\Extracts\R2-2111160%20Discussion%20on%20Msg3%20PUSCH%20repetion.docx) Discussion on Msg3 PUSCH repetion LG Electronics Inc. discussion Rel-17 NR\_cov\_enh-Core

## Summary

Agreed CRs

TBD

Approved LSs out

TBD

[POST115-e] Email discussions

Short

TBD

Long

TBD