3GPP TSG-RAN WG2 Meeting #114 electronic R2-2106472

Online, May 19th - 27th, 2021

**Agenda item: 10.2**

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

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

**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 [AT114-e][000]

Organizational

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

* [AT114-e][100] ****Organizational - NTN & REDCAP session (RAN2 VC)****

Scope:

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

Schedule/Plan

|  |  |  |  |
| --- | --- | --- | --- |
| **Time Zone UTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Wednesday May 19** | | | |
| 12:15-13:05 | NR17 eMIMO (Johan) | NR16 Pos (Nathan) | **NR17 NTN (Sergio)**  **[8.10.1]**  **[8.10.2.1]**  **[8.10.2.2]**  **- [Pre114-e][103] Summary**  **[8.10.2.3]** |
| 13:05-14:25 | NR15 NR16 NR17 Main session early items (Johan) | NR17 SL Relay (Nathan) | **NR17 NTN (Sergio)**  **[8.10.3.1]**  **[8.10.3.2]**  **- [Post113bis-e][101] Summary**  **[8.10.3.3]**  **- [Pre114-e][104] Summary**  **[8.10.3.4]** |
| 14:25-15:45 | NR17 Multicast (Johan) | NR16 DCCA (Tero)  NRLTE16 MOB (Tero)  LTE16e (Tero) | LTE17 IoT (Brian) |
| **Thursday May 20** | | | |
| 12:15-13:05 | NR17 IoT NTN SI (Johan) | 12:15 – 13:25 NR17 eURLLC (Diana)  13:25-14:25 NR17 Small Data Enh (Diana) | NR17 RAN Slicing (Tero) |
| 13:05-14:25 | NR17 eIAB | NR17 Multi-SIM (Tero), *end early*  NR17 SL enh (Kyeongin) |
| 14:25-15:45 | R17 Other (Johan) | **NR17 RedCap (Sergio)**  **[8.12.1]**  **[8.12.2.1]**  **- [Pre114-e][105] Summary**  **[8.12.2.2]**  **- [Pre114-e][106] Summary**  **[8.12.3.1]**  **[8.12.3.2]**  **- [Post113bis-e][102] Summary** | NR17 SL enh (Kyeongin) |
| **Friday May 21** | | | |
| 04:00-05:00 | NR17 Multicast (Johan) | NR17 SONMDT (HuNan) | NR17 Pos (Nathan) |

|  |  |  |  |
| --- | --- | --- | --- |
| **Time Zone UTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Monday May 24** | | | |
| 12:15-13:05 | NR17 QoE (Johan) | NR17 DCCA (Tero) | NR16 V2X (Kyeongin) |
| 13:05-14:25 | R17 Other Cont.(Johan) if needed | LTE17 (Tero)  NR16 DCCA (Tero)  NRLTE16 MOB (Tero) | NR16 V2X (Kyeongin) |
| 14:25-15:45 | R15 R16 (Johan) | **NR17 NTN CB**  **[8.10.2.2]**  **- [103] Summary**  **[8.10.2.3]**  **- [109] Summary**  **[8.10.3.1]**  **- [107] Summary**  **[8.10.3.2]**  **- [Post113bis-e][101] Summary**  **[8.10.3.3]**  **- [104] Summary**  **[8.10.3.4]**  **- [108] Summary** | NR17 Pos (Nathan) |
| **Tuesday May 25** | | | |
| 12:15-13:05 | CB Johan (IoT NTN if needed) | NR16 SONMDT (HuNan) | CB Kyeongin |
| 13:05-14:25 | NR17 eNPN (Johan)  CB Johan | NR17 Pos (Nathan)  CB Nathan | LTE16e IoT (Brian, Emre) |
| 14:25-15:45 | CB Johan | CB Diana | CB Brian Emre |
| **Wednesday May 26** | | | |
| 04:00-05:00 | CB TBD | **RedCap CB**  **[8.12.2.1]**  **- [105] Summary**  **[8.12.2.2]**  **- [106] Summary**  **[8.12.3.1]**  **- [110] Summary**  **[8.12.3.2]**  **- [111] Summary** | CB Kyeongin |
| **Thursday May 27** | | | |
| 04:00-05:00 | CB Johan | CB Tero | CB Nathan |

List and status of offline email discussions

NOTE: No offline email discussions will be kicked off before Wednesday May 19th, 07:00 UTC

* [AT114-e][103][NTN] Other MAC aspects (Interdigital)

Final scope: Continue the discussion to check whether a possible rewording of p4 is agreeable via email this week

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

* + - List of proposals for agreement (if any)
    - List of proposals to be postponed to the next meeting

Final deadline (for companies' feedback): Wednesday 2021-05-26 1000 UTC

Final deadline (for rapporteur's summary in [R2-2106532](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106532.zip)): Wednesday 2021-05-26 1400

Proposals marked "for agreement" in [R2-2106532](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106532.zip) not challenged until Thursday 2021-05-27 0600 will be declared as agreed via email by the session chair (for the rest the discussion will continue in the next meeting).

Status: Closed

* [AT114-e][104][NTN] CHO aspects and service continuity (Ericsson)

Final scope: Continue the discussion on p5 (to see whether the proposal to consider a time range can be agreed), p9, p10 and p12

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

* + - List of proposals for agreement (if any)
    - List of proposals to be postponed to the next meeting

Final deadline (for companies' feedback): Wednesday 2021-05-26 1000 UTC

Final deadline (for rapporteur's summary in [R2-2106534](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106534.zip)): Wednesday 2021-05-26 1400

Proposals marked "for agreement" in [R2-2106534](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106534.zip) not challenged until Thursday 2021-05-27 0600 will be declared as agreed via email by the session chair (for the rest the discussion will continue in the next meeting).

Status: Ongoing

* [AT114-e][105][RedCap] Definition of RedCap UE and reduced capabilities (Intel)

Updated scope: Continue the discussion on proposals from [R2-2106521](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106521.zip) marked as "continue offline"

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 2021-05-25 08:00 UTC

Updated deadline (for rapporteur's summary in R2-2106528): Tuesday 2021-05-25 12:00 UTC

Proposals marked "for agreement" in R2-2106528 not challenged until Tuesday 2021-05-25 22:00 UTC will be declared as agreed via email by the session chair.

For the rest the discussion will continue online in the Wednesday CB session.

Status: Closed

* [AT114-e][106][RedCap] Identification and access restrictions (Huawei)

Final scope: Draft an LS to RAN3 asking RAN3 to consider the coordination between gNBs on whether a neighbour/target gNB supports RedCap UEs, if needed, to avoid handover RedCap to a target cell that it can’t access

Final intended outcome: LS to RAN3 in R2-2106536

Updated deadline (for companies' feedback): Wednesday 2021-05-26 22:00 UTC

Updated deadline (for LS in R2-2106536): Thursday 2021-05-27 06:00 UTC

Status: Ongoing

* [AT114-e][107][NTN] TAC update (Qualcomm)

Initial scope: Discuss mechanism for TAC update

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 2021-05-21 10:00 UTC

Initial deadline (for rapporteur's summary in [R2-2106525](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106525.zip)): Friday 2021-05-21 18:00

Proposals marked "for agreement" in [R2-2106525](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106525.zip) not challenged until Monday 2021-05-24 10:00 UTC will be declared as agreed via email by the session chair.

For the rest the discussion will continue online in the Monday CB session.

Status: Closed

* [AT114-e][108][NTN] UE location aspects (CATT)

Final scope: Continue the discussion on the expected granularity of the coarse UE location information and, depending on the outcome, on the need of an LS to other groups

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

* + - List of proposals for agreement (if any)
    - List of proposals to be postponed to the next meeting

Final deadline (for companies' feedback): Wednesday 2021-05-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2106535): Wednesday 2021-05-26 1400

Proposals marked "for agreement" in R2-2106535 not challenged until Thursday 2021-05-27 0600 will be declared as agreed via email by the session chair (for the rest the discussion will continue in the next meeting).

Status: Ongoing

* [AT114-e][109][NTN] LS to SA2 on 5QI (Ericsson)

Initial scope: Discuss a reply LS to SA2, taking meeting comments into account

Initial intended outcome: Draft reply LS

Initial deadline (for companies' feedback): Monday 2021-05-24 0600 UTC

Initial deadline (for draft reply LS in [R2-2106524](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106524.zip)): Monday 2021-05-24 1000 UTC

Status: Closed

* [AT114-e][110][RedCap] eDRX aspects (Ericsson)

Final scope: Draft an LS to SA2/CT1 to check if they have any concerns on RAN2 decision to have a lower bound for eDRX configuration in RRC\_IDLE and RRC\_INACTIVE of 2.56 seconds

Final intended outcome: LS to SA2/CT1 in R2-2106537

Updated deadline (for companies' feedback): Wednesday 2021-05-26 22:00 UTC

Updated deadline (for LS in R2-2106537): Thursday 2021-05-27 06:00 UTC

Status: Ongoing

* [AT114-e][111][RedCap] RRM relaxation criteria in idle/inactive (Samsung)

Initial scope: Discuss RSRP/RSRQ based stationarity criterion + not-at-cell-edge criterion + coexistence with R16 configuration, e.g. based on proposals in [R2-2106403](file:///C:\Data\3GPP\Extracts\R2-2106403.doc) and [R2-2105637](file:///C:\Data\3GPP\Extracts\R2-2105637%20RRM%20measurement%20relaxation%20for%20RedCap%20UE-V3.doc)

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 2021-05-25 08:00 UTC

Initial deadline (for rapporteur's summary in R2-2106531): Tuesday 2021-05-25 12:00 UTC

Proposals marked "for agreement" in R2-2106531 not challenged until Tuesday 2021-05-25 22:00 UTC will be declared as agreed via email by the session chair.

For the rest the discussion will continue online in the Wednesday CB session.

Status: Closed

## 8.10 NR Non-Terrestrial Networks (NTN)

(NR\_NTN\_solutions-Core; leading WG: RAN2; REL-17; WID: [RP-210908](file:///C:\Data\3GPP\archive\RAN\RAN%2391\Tdocs\RP-210908.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.

incoming LSs

[R2-2104703](file:///C:\Data\3GPP\Extracts\R2-2104703_C1-212539.doc) LS to ITU-T on extraterritorial use of MCC+MNC for satellite networks (C1-212539; contact: Qualcomm) CT1 LS in Rel-17 5GSAT\_ARCH-CT To:ITU-T SG 2 Cc:CT, SA, SA1, SA2, RAN2, SA3LI

* Noted (no action for RAN2)

Workplan

[R2-2104963](file:///C:\Data\3GPP\Extracts\R2-2104963-Rel17%20NR-NTN%20workplan%20updated%20v28.docx) NR-NTN-solutions work plan THALES Work Plan Rel-17 NR\_NTN\_solutions

* Noted

running CRs

[R2-2104962](file:///C:\Data\3GPP\Extracts\R2-2104962_Stg%202%20Running%20CR_38.300_NR-NTN_v15.docx) NTN Stage2 running CR 38.300 THALES draftCR Rel-17 38.300 16.5.0 NR\_NTN\_solutions [R2-2102049](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113\Tdocs\R2-2102049.zip)

* Revised in R2-2106539

R2-2106539 NTN Stage2 running CR 38.300 THALES draftCR Rel-17 38.300 16.5.0 NR\_NTN\_solutions

* Discussed in [Post114-e][101]

[R2-2104806](file:///C:\Data\3GPP\Extracts\R2-2104806_Stage-3%20running%20304%20CR%20for%20NTN.docx) Stage-3 running 304 CR for NTN ZTE corporation, Sanechips draftCR Rel-17 38.304 16.4.0 NR\_NTN\_solutions-Core

* Revised in R2-2106540

R2-2106540 Stage-3 running 304 CR for NTN ZTE corporation, Sanechips draftCR Rel-17 38.304 16.4.0 NR\_NTN\_solutions-Core

* Discussed in [Post114-e][102]

[R2-2105953](file:///C:\Data\3GPP\Extracts\38331_runningCR_R2-2105953_Stage3%20NTN.docx) Stage-3 running RRC CR for NTN Rel-17 Ericsson draftCR Rel-16 38.331 16.4.1 NR\_NTN\_solutions-Core

* Thales notes this should be a R17 CR
* Revised in R2-2106541

R2-2106541 Stage-3 running RRC CR for NTN Rel-17 Ericsson draftCR Rel-17 38.331 16.4.1 NR\_NTN\_solutions-Core

* Discussed in [Post114-e][103]

[R2-2106049](file:///C:\Data\3GPP\Extracts\R2-2106049%20(R17%20NTN%20WI%20AI%208.10.1)%20NTN%2038.321%20running%20CR.docx) Stage 3 NTN running CR for 38.321 - RAN2#114 InterDigital discussion Rel-17 NR\_NTN\_solutions-Core Late

* Revised in R2-2106542

R2-2106542 Stage 3 NTN running CR for 38.321 - RAN2#114 InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

* Discussed in [Post114-e][104]
* [Post114-e][101][NTN] Stage 2 running CR (Thales)

Scope: Update the Stage 2 running CR with agreements from the past 2 meetings

Intended outcome: Endorsed Stage 2 running CR in R2-2106539

Deadline: Short

* [Post114-e][102][NTN] 304 running CR (ZTE)

Scope: Update the 38.304 running CR with agreements from the past 2 meetings

Intended outcome: Endorsed 38.304 running CR in R2-2106540

Deadline: Short

* [Post114-e][103][NTN] RRC running CR (Ericsson)

Scope: Update the RRC running CR with agreements from the past 2 meetings

Intended outcome: Endorsed RRC running CR in R2-2106541

Deadline: Short

* [Post114-e][104][NTN] MAC running CR (Interdigital)

Scope: Update the MAC running CR with agreements from the past 2 meetings

Intended outcome: Endorsed MAC running CR in R2-2106542

Deadline: Short

### 8.10.2 User Plane

[R2-2106048](file:///C:\Data\3GPP\Extracts\R2-2106048%20(R17%20NTN%20WI%20AI%208.10.2)%20MAC%20Open%20Issues.docx) MAC open issues in NTN - RAN2#114 InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

#### 8.10.2.1 RACH aspects

This agenda item will be deprioritized during this meeting. The only discussion will be on resolving the first FFS (and in case the last) in: "[Post113bis-e][000]: It is FFS whether the UE reports the UE specific TA pre-compensation at the RACH procedure (MSG3 or MSG5) using a MAC CE. Actual content is FFS and also depends on further RAN1 input. Configurability is FFS"

[R2-2106362](file:///C:\Data\3GPP\Extracts\R2-2106362%20%20Discussion%20on%20TA%20Report%20-%20V3.doc) Discussion On TA report Xiaomi, Saumsung, Qualcomm Incorporated, Asia Pacific Telecom, Huawei, HiSilicon, OPPO, Lenovo, Motorola Mobility discussion Rel-17

Proposal 1 The UE reports the UE specific TA pre-compensation during RACH procedure in MsgA and, Msg3/ Msg5 using MAC CE

* Proponents indicate that it's ok to have this mechanism configured or not by the network
* Proponents think there would be no privacy concern to send such information as it would provide only a coarse UE information
* Ericsson thinks that reporting this during RACH would delay other information like PHR. Would like to wait for RAN1 feedback to our previous LS, as they could indicate that the location needs to be sent
* Samsung thinks there is no security concern
* QC thinks that sending this info in RACH is in RAN2 scope and using MAC CE for this is the normal approach for this kind of information. Xiaomi agrees
* Nokia think the proposal needs to be revised to clarify that this is under network control.
* Huawei support the proposal
* Apple would like to wait for RAN1. IDC also thinks we should wait
* VC suggests: "If enabled by the network, the UE reports information about UE specific TA pre-compensation at the RACH procedure (MSGA/MSG3 or MSG5) using a MAC CE. Actual content is FFS and also depends on further RAN1 input (we can revise this if RAN1 come to a different conclusion in terms of what needs to be conveyed to the NW)"
* QC/Huawei/Xiaomi/Samsung/IDC are fine.
* Ericsson, Apple and LG would like to wait for RAN1 but can finally accept this

Agreement:

1. If enabled by the network, the UE reports information about UE specific TA pre-compensation at the random access procedure (MSGA/MSG3 or MSG5) using a MAC CE. Actual content is FFS and also depends on further RAN1 input (we can revise this whole agreement if RAN1 come to a different conclusion in terms of what needs to be conveyed to the NW)

[R2-2106090](file:///C:\Data\3GPP\Extracts\R2-2106090%20-%20Reporting%20information%20about%20UE%20specific%20TA%20pre-compensation.docx) Reporting information about UE specific TA pre-compensation Ericsson. Apple discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1 Koffset affects both UL and DL scheduling.

Observation 2 For UL where a UE is not experiencing the maximum propagation RTT, the UE reporting the TA/position enables the gNB to adapt Koffset+k2 to match the TA and decrease the delay for all dynamic UL grants and the UL HARQ RTT.

Observation 3 For DL where a UE is not experiencing the maximum propagation RTT, the UE reporting the TA/position enables the gNB to adapt Koffset+k1 to match the TA and decrease the DL HARQ RTT when DL HARQ feedback is enabled.

Observation 4 A UE may experience different UL delay and UL/DL HARQ RTT as the satellite moves.

Observation 5 Only UEs not experiencing the maximum propagation RTT have a potential gain from adapting Koffset.

Observation 6 To minimize the UL scheduling delay and the UL/DL HARQ RTT in a GEO cell with 1 ms slots, up to 21 different Koffset values are needed and up to 7 different Koffset values in a LEO cell. For Higher SCSs the number of Koffset values needed will be even larger.

Observation 7 Not all UEs in a cell and not all cells of a satellite will have a gain by adapting Koffset compared to all UEs in a cell using the same Koffset.

Observation 8 The UE reported TA can be used to accurately estimate the UE position.

Observation 9 Reporting TA and TA drift will give faster estimation of UE position.

Observation 10 Reporting TA or UE position in a MAC CE will enable any entity to estimate the UE position.

Proposal 1 If the UE shall report during random access, then the UE reporting of information about UE specific TA pre-compensation uses MAC CE signalling.

Proposal 2 If the UE shall report after random access, then the UE reporting of information about UE specific TA pre-compensation uses RRC signalling after security has been activated.

Observation 11 With the UE position and the satellite ephemeris, the gNB can predict TA variations with less signalling than the UE reporting TA or TA+TA drift.

Observation 12 If MAC CE is used for Koffset signalling there will be a delay, of about one HARQ RTT plus 3 slots, before a new Koffset takes effect.

Observation 13 If RRC is used for Koffset signalling there will be a delay, longer than if MAC CE is used, before a new Koffset takes effect.

Observation 14 In connected mode, for cases where the UE has very little data to transmit or receive, the UE may finish the transmission/reception before an updated Koffset takes effect.

Observation 15 For both Msg3 and Msg5, coverage is an issue. Adding to the TB size may require increased frequency resources, and for Msg5 to increased delay as the gNB may need to segment the transmission.

Proposal 3 The UE shall not report information about UE specific TA pre-compensation during random access.

Observation 16 With earth moving cells, each cell can broadcast a Koffset that will not need to be changed.

Observation 17 With earth fixed cells, the maximum propagation RTT in the cell and the differential delay within the cell will change when the satellite moves.

Observation 18 With earth fixed cells, updating the broadcasted Koffset is difficult as gNB may not know when each UE reads the system information, or it causes increased signalling and UE power consumption.

Observation 19 With earth fixed cells, the Koffset broadcasted in a cell can match the maximum propagation RTT that will be experienced by any UE in the cell during the total time that the satellite coverage the cell.

Observation 20 The network impact from handling UE specific Koffset will lead to spectral efficiency loss and lower QoS fulfilment.

Proposal 4 The UE shall not report information about UE specific TA pre-compensation to the gNB.

Proposal 5 If Proposal 4 is not agreed, then the UE reporting of information about UE specific TA pre-compensation shall be under network control.

Proposal 6 If Proposal 4 nor Proposal 3 is agreed, then reporting TA during random access shall be under network control.

[R2-2104812](file:///C:\Data\3GPP\Extracts\R2-2104812%20-%20Discussion%20on%20RACH%20in%20NTN.doc) Discussion on RACH in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2104966](file:///C:\Data\3GPP\Extracts\._R2-2104966%20Discussion%20on%20UE-specific%20TA%20report_final.docx) Discussion on UE-specific TA report Asia Pacific Telecom, FGI discussion

[R2-2105118](file:///C:\Data\3GPP\Extracts\._R2-2105118%20On%20reporting%20UE%20specific%20TA%20pre-compensation%20during%20RACH%20in%20NTN.docx) On reporting UE specific TA pre-compensation during RACH in NTN Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105199](file:///C:\Data\3GPP\Extracts\R2-2105199%20Discussion%20of%20RACH%20in%20NTN.doc) Discussion of RACH in NTN China Telecommunication discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105381](file:///C:\Data\3GPP\Extracts\R2-2105381%20Discussion%20on%20LCH-based%20RA%20type%20selection.docx) Discussion on LCH-based RA type selection ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105382](file:///C:\Data\3GPP\Extracts\R2-2105382%20BSR%20over%202-step%20RA.doc) BSR over 2-step RA ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105412](file:///C:\Data\3GPP\Extracts\R2-2105412%20On%20RACH%20Aspects%20for%20NTN.docx) On RACH aspects for NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105817](file:///C:\Data\3GPP\Extracts\R2-2105817%20Considerations%20on%20new%20criteria%20for%20RA%20type%20selection%20(Revision%20of%20R2-2103407).docx) Considerations on new criteria for RA type selection Lenovo, Motorola Mobility discussion Rel-17

[R2-2106015](file:///C:\Data\3GPP\Extracts\R2-2106015_NTN%20Remaining%20RACH%20issues.docx) NTN Remaining RACH issues NEC Telecom MODUS Ltd. discussion

[R2-2106197](file:///C:\Data\3GPP\Extracts\R2-2106197_Discussion%20on%20RACH%20and%20TA%20report%20aspects.docx) Discussion on RACH and TA report aspects LG Electronics Inc. discussion NR\_NTN\_solutions-Core

[R2-2106385](file:///C:\Data\3GPP\Extracts\R2-2106385%20NTN%20MAC%20enhancements.docx) NTN MAC enhancements Convida Wireless discussion

#### 8.10.2.2 Other MAC aspects

The discussion will focus on possible different behaviours per UL HARQ process, including possible LCP restrictions.

[R2-2106488](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106488.zip) [Pre114-e][103][NTN] Summary 8.10.2.2 - Other MAC aspects InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: The following configurations are supported for drx-HARQ-RTT-TimerUL in NTN per HARQ process: 1) Timer length is extended by offset; 2) Timer set to zero; and 3) Timer disabled (i.e. not started).

* QC wonders whether we need both option 2 and 3. IDC thinks there are minor differences
* Samsung wants to clarify that this is not related to enabling/disabling HARQ feedback
* Huawei agrees there is a difference between 2 and 3 and both should be kept. Nokia agrees
* The following options are supported for drx-HARQ-RTT-TimerUL in NTN per HARQ process: 1) Timer length is extended by offset; 2) Timer set to zero and/or 3) Timer disabled (i.e. not started). FFS if this is based on explicit configuration or not. We can also come back to see whether both 2 and 3 are needed.

Proposal 2: RAN2 working assumption: offset for drx-HARQ-RTT-TimerUL is equal to UE-gNB RTT (if RAN1 decides something that requires to change this we can revisit it as in DL).

* Ericsson sees some issues with this as the UE would have to update it every time. The concern is the same as for the DL
* QC is fine. Oppo thinks we should align with DL
* Continue offline

Proposal 3: RAN2 to discuss whether value of drx-HARQ-RTT-TimerUL is connected to UL HARQ retransmission scheme (e.g. as in DL for HARQ feedback enabled/disabled).

* Continue offline

Proposal 4: Which drx-HARQ-RTT-TimerUL value is applied for each HARQ process is up to network implementation (e.g. to support NW scheduling strategy to avoid HARQ stalling).

* Xiaomi cannot agree on this as this imply explicit configuration
* Continue offline

Proposal 5: RAN2 to discuss whether indication of HARQ retransmission scheme is: 1) via semi-static RRC configuration; 2) determined implicitly, e.g. via current HARQ RTT Timer behaviour; 3) via DCI; or 4) not needed.

* Continue offline

Proposal 6: If RAN2 agrees to indication of HARQ retransmission scheme, granularity of indication is per HARQ process

* Continue offline

Proposal 7: No new CG-specific LCP restriction is introduced for NTN.

* Continue offline

Proposal 8: Discuss the following options for LCP in NTN:

1. allowedPHY-PriorityIndex is re-used;

2. allowedPHY-PriorityIndex is re-used and extended;

3. A new LCP restriction is introduced to map LCH to one or more HARQ process(es). HARQ processes can be classified as having retransmission “enabled” or “disabled”;

4. A new LCP restriction is introduced to map LCH to one or more HARQ process(es). HARQ processes can be classified as having retransmission “enabled based on PUSCH decoding result”, “enabled based on blind retransmission” or “disabled”.

5. A new LCP restriction is introduced to map LCH to one or more HARQ process(es) . And NW can still configure UE with one or more transmission schemes for each HARQ process based on it's implementation.

Proposal 9: RAN2 to discuss if new LCP restriction also applies to MAC CEs.

* Continue offline

Agreements:

1. The following options are supported for drx-HARQ-RTT-TimerUL in NTN per HARQ process: 1) Timer length is extended by offset; 2) Timer set to zero and/or 3) Timer disabled (i.e. not started). FFS if this is based on explicit configuration or not. We can also come back to see whether both 2 and 3 are needed.

[R2-2106089](file:///C:\Data\3GPP\Extracts\R2-2106089%20-%20On%20DRX%20LCP%20timing%20HARQ%20SR%20BSR%20and%20CG%20and%20SPS.docx) On DRX, LCP, timing, HARQ, SR/BSR, and CG and SPS Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

drx-RetransmissionTimerDL

Proposal 4 For HARQ processes with disabled HARQ feedback, there is no need to change the start of drx-RetransmissionTimerDL.

Proposal 5 There is no need to extend the drx-RetransmissionTimerDL.

Alternative proposals from [R2-2104851](file:///C:\Data\3GPP\Extracts\R2-2104851%20Discussion%20on%20HARQ%20Aspects%20and%20UL%20Scheduling%20Enhancement%20in%20NTN.docx):

Proposal 6: The modified trigger condition of drx-RetransmissionTimerDL can be a MAC PDU is received in a configured downlink assignment or the PDCCH indicates a DL transmission when a DRX group is in Active Time.

Proposal 7: The start of the drx-RetransmissionTimerUL(DL) can be offset by UE-specific RTD (UE-gNB delay) in LEO/GEO adding the value of drx-HARQ-RTT-TimerUL(DL) only when HARQ feedback is disabled and the blind retransmission is configured.

Additional proposal from [R2-2105490](file:///C:\Data\3GPP\Extracts\R2-2105490%20DRX%20impact%20of%20disabling%20HARQ%20feedback.docx):

Proposal 1: To minimize specification impact, UE would rely on drx-InactivityTimer to support blind retransmission when DL HARQ feedback is disabled and not start drx-RetrasnmissionTimerDL.

* Continue offline

sr-ProhibitTimer

Proposal 20 The values added to sr-ProhibitTimer in NTN shall include values lower than the round-trip time.

Alternative proposals from [R2-2104851](file:///C:\Data\3GPP\Extracts\R2-2104851%20Discussion%20on%20HARQ%20Aspects%20and%20UL%20Scheduling%20Enhancement%20in%20NTN.docx):

Proposal 1: Extend SR-prohibitTimer by UE derived RTD.

* Continue offline

[R2-2104851](file:///C:\Data\3GPP\Extracts\R2-2104851%20Discussion%20on%20HARQ%20Aspects%20and%20UL%20Scheduling%20Enhancement%20in%20NTN.docx) Discussion on HARQ Aspects and UL Scheduling Enhancement in NTN CATT discussion Rel-17 NR\_NTN\_solutions-Core

* Discussed jointly with [R2-2106089](file:///C:\Data\3GPP\Extracts\R2-2106089%20-%20On%20DRX%20LCP%20timing%20HARQ%20SR%20BSR%20and%20CG%20and%20SPS.docx)

[R2-2105490](file:///C:\Data\3GPP\Extracts\R2-2105490%20DRX%20impact%20of%20disabling%20HARQ%20feedback.docx) DRX impact of disabling HARQ feedback PANASONIC R&D Center Germany discussion [R2-2103446](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103446.zip)

* Discussed jointly with [R2-2106089](file:///C:\Data\3GPP\Extracts\R2-2106089%20-%20On%20DRX%20LCP%20timing%20HARQ%20SR%20BSR%20and%20CG%20and%20SPS.docx)

[R2-2105529](file:///C:\Data\3GPP\Extracts\R2-2105529%20Discussion%20on%20extending%20of%20SR-prohibitTimer.doc) Discussion on extending of SR-prohibitTimer Spreadtrum Communications discussion Rel-17 NR\_NTN\_solutions-Core

* Discussed jointly with [R2-2106089](file:///C:\Data\3GPP\Extracts\R2-2106089%20-%20On%20DRX%20LCP%20timing%20HARQ%20SR%20BSR%20and%20CG%20and%20SPS.docx)

[R2-2105249](file:///C:\Data\3GPP\Extracts\R2-2105249%20Round%20trip%20delay%20offset%20for%20configured%20grant%20timer.docx) Round trip delay offset for configured grant timers MediaTek Inc. discussion [R2-2102823](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2102823.zip)

Proposal: UE specific pre-compensation offset for round trip delay (RTD) is applied to CGT and CGRT (if configured), i.e. the configured CGT/CGRT value is extended by UE-specific RTD.

* Continue offline
* [AT114-e][103][NTN] Other MAC aspects (Interdigital)

Initial scope: Continue the discussion on proposals from [R2-2106488](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106488.zip) as well as those on drx-RetransmissionTimerDL, sr-ProhibitTimer and CGT/CGRT

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 2021-05-21 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2106523](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106523.zip)): Friday 2021-05-21 1800 UTC

Final scope: Continue the discussion to check whether a possible rewording of p4 is agreeable via email this week

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

* + - List of proposals for agreement (if any)
    - List of proposals to be postponed to the next meeting

Final deadline (for companies' feedback): Wednesday 2021-05-26 1000 UTC

Final deadline (for rapporteur's summary in [R2-2106532](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106532.zip)): Wednesday 2021-05-26 1400

Proposals marked "for agreement" in [R2-2106532](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106532.zip) not challenged until Thursday 2021-05-27 0600 will be declared as agreed via email by the session chair (for the rest the discussion will continue in the next meeting).

[R2-2106523](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106523.zip) [Offline 103] Other MAC aspects InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

Proposals for agreement

Proposal 1: RAN2 working assumption: Offset for drx-HARQ-RTT-TimerUL is equal to UE-gNB RTT (if RAN1 decides something that requires to change this we can revisit it). (21/22)

* Agreed

Proposal 2: The drx-HARQ-RTT-TimerUL value applied for each HARQ process is up to network implementation (e.g. to support NW scheduling strategy to avoid HARQ stalling) (18/22).

* QC suggests to reword as "What value of drx-HARQ-RTT-TimerUL is configured or indicated to UE for each HARQ process is up to network implementation (e.g. to support NW scheduling strategy to avoid HARQ stalling)"
* IDC suggests to stick to "The value of drx-HARQ-RTT-TimerUL configured for each HARQ process is up to network implementation (e.g. to support NW scheduling strategy to avoid HARQ stalling)"
* Oppo wonders wonders whether drx-HARQ-RTT-TimerUL should be per UE DRX group
* Nokia thinks that it seems not clear by using the “value” can be configured for each HARQ process, since it does not include agreed options of Timer disabled (i.e. not started). RAN2 agreed the “behaviour” of drx-HARQ-RTT-TimerUL can be configured per HARQ process in last meeting, so Nokia suggests reusing the wording to avoid confusion
* Ericsson agrees with Nokia and Oppo and suggests to reword as "The drx-HARQ-RTT-TimerUL behaviour applied for each HARQ process is up to network implementation (e.g. to support NW scheduling strategy to avoid HARQ stalling)". IDC agrees with this suggestion
* Continue online

Updated Proposal 2: The drx-HARQ-RTT-TimerUL behaviour applied for each HARQ process is up to the network (e.g. to support NW scheduling strategy to avoid HARQ stalling).

* Agreed

Proposal 6: No new CG-specific LCP restriction is introduced for NTN (18/22)

* Mediatek suggests to reword as "RAN2 working assumption: No new CG-specific LCP restriction will be is introduced for NTN. This can be revisited depending on the progress for the dynamic grant case". IDC thinks p6 does not eliminate the possibility an LCP restriction can be introduced for configured grant if one is also introduced for dynamic grant. Mediatek would like to change p6 into a Working Assumption
* Nokia is fine with p6, with the addition that "if a new LCP restriction is agreed for dynamic grant, the proposal does not preclude future discussion on whether it may also apply to configured grant"
* Continue online

Updated Proposal 6: RAN2 Working Assumption: No new CG-specific LCP restriction is introduced for NTN. If a new LCP restriction is agreed for dynamic grant, the proposal does not preclude future discussion on whether it may also apply to configured grant

* Agreed

Proposal 9: drx-RetransmissionTimerDL timer length is not extended in NTN (19/21).

* Agreed

Agreements via email (from offline 103):

1. RAN2 working assumption: Offset for drx-HARQ-RTT-TimerUL is equal to UE-gNB RTT (if RAN1 decides something that requires to change this we can revisit it).
2. drx-RetransmissionTimerDL timer length is not extended in NTN

Proposals requiring online discussion

First priority:

Proposal 4: The HARQ retransmission scheme is semi-statically configured per HARQ process via RRC (18/22). “Not indicated” is a possible configuration, where network can schedule according to any retransmission scheme.

* Samsung suggests to add " FFS If DCI-based dynamic indication of HARQ enabled/disabled can be supported by RAN1 (e.g., by repurposing a DCI bit).". IDC thinks this is a further enhancement on top of the RRC based solution which has a lot of support (in any case this is also non-precluded an could be re-discussed at later stage if there is support)
* Samsung thinks we could still have a separate proposal x " FFS If DCI-based dynamic indication of HARQ enabled/disabled (in addition to the semi-static RRC signaling based HARQ process configuration) can be supported by RAN1 (e.g., by repurposing a DCI bit)."
* ZTE would like to clarify what HARQ retransmission schemes are we talking about here? Now we have the following four HARQ retransmission schemes:
  + Scheme 1: No HARQ retransmission at all
  + Scheme 2: HARQ retransmission triggered by repetition transmission (scheduled by a single DCI)
  + Scheme 3: HARQ retransmission triggered by blind scheduling (i.e. scheduled before the decoding of PUSCH)
  + Scheme 4: Normal HARQ retransmission (scheduled by NW after the decoding of PUSCH)

Does this proposal means we will have separate indication for each scheme (indication for scheme 2 may be not needed if proposal 5 can be agreed)? Or we simply want to distinguish the scheme 4 from the others?

In addition, ZTE also want to clarify the expected behaviour in case the HARQ retransmission scheme is received by UE. We cannot agree a new IE without knowing the expected behaviour on UE side for such IE. Will the UE ignore the NDI field in the UL grant or the UE will ignore the UL grant if the NDI received cannot match the HARQ retransmission scheme configured or what else?

* Ericsson agrees with ZTE and since this is related to the LCP discussion think we could discuss this after discussing LCP enhancements
* IDC suggests suggests to take into account ZTE and Ericsson concerns regarding p4 as follows: "RAN2 working assumption: The HARQ retransmission scheme is semi-statically configured per HARQ process via RRC (18/22). “Not indicated” is a possible configuration, where network can schedule according to any retransmission scheme. FFS the number of retransmission scheme options (i.e. whether to distinguish between disabled/blind retransmission/retransmissions based on PUSCH decoding result vs. only enabled/disabled) and expected UE behaviour for each retransmission scheme. We may revisit this pending outcome of LCP discussion (if new LCP restriction is not needed, this may not be needed either)."

Updated Proposal 4: RAN2 working assumption: If HARQ retransmission scheme based LCP enhancement is needed, the HARQ retransmission scheme is semi-statically configured per HARQ process via RRC. “Not indicated” is a possible configuration, where network can schedule according to any retransmission scheme. FFS the number of retransmission scheme options (i.e. whether to distinguish between disabled/blind retransmission/retransmissions based on PUSCH decoding result vs. only enabled/disabled) and expected UE behaviour for each retransmission scheme. We may revisit this pending outcome of LCP discussion (if HARQ retransmission scheme based LCP enhancement is not needed, this may not be needed either)."

* VC encourages to agree on this and continue the discussion, already this week via a followup offline discussion. In the offline discussion, the VC also suggests to consider the following alternative, if further progress on the LCP discussion will not be possible this week; "It shall be possible to completely disable NDI-toggling-based UL HARQ retransmission per HARQ process via RRC. If HARQ retransmission is "not disabled", the network can schedule according to any retransmission scheme (legacy behaviour). FFS if other indications of retransmission scheme options (i.e. whether to distinguish between disabled/blind retransmission/retransmissions based on PUSCH decoding result vs. only enabled/disabled) are needed, based on the progress of the LCP discussion)"
* Ericsson thinks we have not agreed to the need for this
* Samsung still would like to add a FFS for the DCI-based
* Apple thinks we can wait for the LCP discussion
* Huawei, LGE are fine with VC proposal
* Continue in a followup offline discussion to check whether a rewording of p4 is agreeable via email this week

Proposal 5: Repetition transmission based HARQ retransmission is always allowed and is explicitly indicated per HARQ process via DCI (as in legacy).

* Agreed

If time allows:

Proposal 7: At least the following options for LCP in NTN are further studied: 1) allowedPHY-PriorityIndex is re-used; and 2) A new LCP restriction is introduced to map LCH to one or more HARQ process(es). FFS if HARQ processes can be classified as having retransmission “enabled” or “disabled” in this case. (21/22)

* QC thinks we should discuss (not postpone) this as well. Huawei agrees
* Mediatek suggests to consider p7.1 as well: "FFS: New LCP restriction is introduced for MAC CEs." For Samsung it could be "FFS RAN2 to discuss new LCP restriction and related prioritization of MAC CEs.". IDC thinks that there is nothing precluding this and we don't need to capture anything now
* Ericsson would like to understand why we need to link this to having retransmission “enabled” or “disabled” in this case. ZTE agrees
* Agreed

Proposal 10: Length of SR-prohibitTimer is increased by offset (i.e. existing values within value range increased by offset). RAN2 working assumption: offset is equal to UE-gNB RTT (if RAN1 decides something that requires to change this we can revisit it). (15/22)

Postpone to next meeting

Proposal 3: The value of drx-HARQ-RTT-TimerUL is connected to an UL HARQ retransmission scheme (18/22).

Proposal 8: There is no need to change start of drx-RetransmissionTimerDL for HARQ processes with HARQ feedback disabled (13/22).

Proposal 11: sr-ProhibitTimer shall not include values lower than the round-trip time in NTN. (12/21)

Proposal 12: FFS: whether length of CGT is increased by offset and details of offset. FFS if this also applies to CGRT

Agreements online:

1. The drx-HARQ-RTT-TimerUL behaviour applied for each HARQ process is up to the network (e.g. to support NW scheduling strategy to avoid HARQ stalling).
2. RAN2 Working Assumption: No new CG-specific LCP restriction is introduced for NTN. If a new LCP restriction is agreed for dynamic grant, the proposal does not preclude future discussion on whether it may also apply to configured grant
3. Repetition transmission based HARQ retransmission is always allowed and is explicitly indicated per HARQ process via DCI (as in legacy).
4. At least the following options for LCP in NTN are further studied: 1) allowedPHY-PriorityIndex is re-used; and 2) A new LCP restriction is introduced to map LCH to one or more HARQ process(es). FFS if HARQ processes can be classified as having retransmission “enabled” or “disabled” in this case.

[R2-2106532](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106532.zip) [Offline 103] Other MAC aspects - second round InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

No proposals are made at this time, however companies are encouraged to address the following aspects via contribution to RAN2#115e:

- Motivation for semi-statically configuring UL HARQ retransmission state per HARQ process;

- Confirmation that regardless of method of indication/configuration, there will always be an option for network to schedule according to any retransmission scheme (i.e. legacy behaviour);

- The number of retransmission scheme options (i.e. whether to distinguish between disabled/blind retransmission/retransmissions based on PUSCH decoding result vs. only enabled/disabled);

- The expected UE behaviour for each retransmission scheme.

* Continue at RAN2#115e, where a final decision on semi-statically configuring UL HARQ retransmission state per HARQ process is expected

[R2-2104813](file:///C:\Data\3GPP\Extracts\R2-2104813%20-%20Discussion%20on%20UL%20HARQ%20operation%20in%20NTN.doc) Discussion on UL HARQ operation in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2104850](file:///C:\Data\3GPP\Extracts\R2-2104850-about%20HARQ%20for%20NTN.docx) About HARQ for NTN THALES discussion Rel-17

[R2-2104967](file:///C:\Data\3GPP\Extracts\._R2-2104967%20HARQ%20retransmission%20schemes%20in%20NTN_final.docx) HARQ retransmission schemes in NTN Asia Pacific Telecom, FGI discussion

[R2-2105119](file:///C:\Data\3GPP\Extracts\._R2-2105119%20Other%20MAC%20Aspects%20of%20NR%20NTN.docx) Other MAC aspects for NR NTN Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105250](file:///C:\Data\3GPP\Extracts\R2-2105250%20On%20Disabling%20uplink%20HARQ%20retransmission%20and%20Associated%20LCP%20Impacts_v1.docx) On disabling uplink HARQ retransmission and associated LCP impacts MediaTek Inc. discussion [R2-2102824](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2102824.zip)

[R2-2105413](file:///C:\Data\3GPP\Extracts\R2-2105413%20On%20LCP%20and%20DRX%20impact%20for%20NTN.docx) On LCP and DRX impact for NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105414](file:///C:\Data\3GPP\Extracts\R2-2105414%20Discussion%20on%20UL%20scheduling%20enhancements%20for%20NTN.docx) Discussion on UL scheduling enhancements for NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core [R2-2103232](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103232.zip)

[R2-2105431](file:///C:\Data\3GPP\Extracts\R2-2105431%20LCP%20in%20UL%20HARQ.doc) LCP restriction for an UL HARQ process Qualcomm Incorporated, Xiaomi, Huawei, HiSilicon, Samsung discussion Rel-17 NR\_NTN\_solutions-Core

R2-2105488 DRX impact of disabling HARQ feedback PANASONIC R&D Center Germany discussion [R2-2103446](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103446.zip) Withdrawn

R2-2105489 DRX impact of disabling HARQ feedback PANASONIC R&D Center Germany discussion [R2-2103446](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103446.zip) Withdrawn

[R2-2105498](file:///C:\Data\3GPP\Extracts\R2-2105498%20Discussion%20on%20Co-existence%20issue%20of%20BSR%20over%20CG%20and%20BSR%20over%202-step%20RACH.docx) Co-existence issue of BSR over CG and BSR over 2-step RACH PANASONIC R&D Center Germany discussion [R2-2103445](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103445.zip)

[R2-2105528](file:///C:\Data\3GPP\Extracts\R2-2105528%20LCP%20enhancement%20for%20NTN.doc) LCP enhancement for NTN Spreadtrum Communications discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105612](file:///C:\Data\3GPP\Extracts\R2-2105612%20Discussion%20on%20remaining%20MAC%20issues%20in%20NTN.DOC) Discussion on remaining MAC issues in NTN Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105698](file:///C:\Data\3GPP\Extracts\R2-2105698.doc) Other MAC enhancements in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105836](file:///C:\Data\3GPP\Extracts\R2-2105836%20Consideration%20on%20LCP%20in%20NTN.doc) Considerations on LCP in NTN ZTE Corporation, Sanechips discussion Rel-17

[R2-2106047](file:///C:\Data\3GPP\Extracts\R2-2106047%20(R17%20NTN%20WI%20AI%208.10.2.2)%20UL%20HARQ%20RTT%20Timer.docx) UL HARQ RTT timer in NTN InterDigital, MediaTek, Samsung discussion Rel-17 NR\_NTN\_solutions-Core

* Revised in [R2-2106444](file:///C:\Data\3GPP\Extracts\R2-2106444%20(R17%20NTN%20WI%20AI%208.10.2.2)%20UL%20HARQ%20RTT%20Timer.docx)

[R2-2106444](file:///C:\Data\3GPP\Extracts\R2-2106444%20(R17%20NTN%20WI%20AI%208.10.2.2)%20UL%20HARQ%20RTT%20Timer.docx) UL HARQ RTT timer in NTN InterDigital, MediaTek, Samsung, ZTE discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2106068](file:///C:\Data\3GPP\Extracts\R2-2106068_For8.10.2.2_HARQStalling_RNTI_ULScheduling_LCP_UL_HARQ_Behaviors_Samsung.doc) Remaining Issues on HARQ Stalling, RNTI Capacity, UL Scheduling, LCP, and UL HARQ Behaviors for an NTN Samsung Research America discussion

[R2-2106201](file:///C:\Data\3GPP\Extracts\R2-2106201_Discussion%20on%20other%20MAC%20aspects_r1.DOCX) Discussion on other MAC aspects LG Electronics Inc. discussion NR\_NTN\_solutions-Core

[R2-2106245](file:///C:\Data\3GPP\Extracts\R2-2106245%20Left%20Issues%20for%20HARQ%20operation%20in%20NTN.docx) Left Issues for HARQ operation in NTN CMCC discussion Rel-17 NR\_NTN\_solutions-Core

#### 8.10.2.3 RLC and PDCP aspects

Including discussion on the SA2 LS on PDB for new 5QI.

Incoming LS (moved here from 8.10.1)

[R2-2104731](file:///C:\Data\3GPP\Extracts\R2-2104731_S2-2103552.doc) LS on PDB for new 5QI (S2-2103552; contact: Ericsson) SA2 LS in Rel-17 5GSAT\_ARCH To:RAN1, RAN2 Cc:RAN3

* Noted (already seen at RAN2#113bis-e)

Draft reply LSs

[R2-2106091](file:///C:\Data\3GPP\Extracts\R2-2106091%20-%20DRAFT%20Reply%20LS%20on%20PDB%20for%20new%205QI.docx) DRAFT Reply LS on PDB for new 5QI Ericsson LS out Rel-17 5GSAT\_ARCH, NR\_NTN\_solutions-Core To:SA2 Cc:RAN1, RAN3

Draft reply LS text:

"RAN2 would like to thank SA2 for sending their LS on PDB for new 5QI.

According to TR 38.821, the max round trip delay (propagation delay only) for GEO satellite access with transparent payload is 541.46 ms. Thus, the AN PDB of 812 ms is about 1.5 RTT of the maximum round trip delay. 1.5 RTT can only cover one transmission with HARQ acknowledgement, it will not be possible with RLC retransmissions.

Further the PER of 10-6 while meeting a PDB of about 1.5 RTT will be challenging and may require excess resources and thus lead to low spectral efficiency."

* Samsung is fine with the observations and would like to suggest to adopt a more flexible QoS for NTN
* Thales highlights that at least for GEO satellites HARQ is not used so does not understand last observation in the draft LS.
* QC/Xiaomi/ZTE/LG/Huawei would like to let RAN1 to answer this
* Thales thinks we can provide a response but modifying the sentence on HARQ in the GEO case. Oppo thinks we should provide some views from RAN2.
* Revised in [R2-2106524](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106524.zip)
* [AT114-e][109][NTN] LS to SA2 on 5QI (Ericsson)

Initial scope: Discuss a reply LS to SA2, taking meeting comments into account

Initial intended outcome: Draft reply LS in

Initial deadline (for companies' feedback): Monday 2021-05-24 0600 UTC

Initial deadline (for draft reply LS in [R2-2106524](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106524.zip)): Monday 2021-05-24 1000 UTC

[R2-2106524](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106524.zip) DRAFT Reply LS on PDB for new 5QI Ericsson LS out Rel-17 5GSAT\_ARCH, NR\_NTN\_solutions-Core To:SA2 Cc:RAN1, RAN3

* Thales would like to change "excessive" into "more". QC/Samsung agree.
* Change "excessive" into "more"
* Fix the date of the next RAN2 meetings
* Revised with changes above in [R2-2106533](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106533.zip)

[R2-2106533](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106533.zip) Reply LS on PDB for new 5QI Ericsson LS out Rel-17 5GSAT\_ARCH, NR\_NTN\_solutions-Core To:SA2 Cc:RAN1, RAN3

* Approved unseen

[R2-2104814](file:///C:\Data\3GPP\Extracts\R2-2104814%20PDB%20for%20new%205QI.doc) Discussion on PDB for new 5QI OPPO discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1 Send reply LS to SA2 and ask SA2 to consider the following two options for the new 5QI:

Option 1: Increasing the AN-PDB to accommodate more re-transmissions while keeping the PER target of 10-6 unchanged;

Option 2: Loosening the PER target while keeping the AN-PDB of 812ms unchanged.

[R2-2106016](file:///C:\Data\3GPP\Extracts\R2-2106016_RLC%20and%20PDCP%20timers%20extension.docx) RLC and PDCP timers extension NEC Telecom MODUS Ltd. discussion

Regarding RLC t-Reassembly timer

Proposal 1: Introduce a new t-ReassemblyExt-r17 IE, which is optional present for NTN network scenario.

Observation 1: For GEO case, HARQ retransmission based on HARQ feedback is likely disabled and hence 1 or 2 retransmissions can be assumed just to determine the maximum timer value.

Observation 2: it is better to support smaller granularity for gNB implementation to consider various processing delay and various RTD due to e.g., UE position.

Observation 3: To sum up the value of legacy t-Reassembly and new t-ReassemblyExt-r17 if present can increase the granularity and reduce the number of added values.

Proposal 2: The new IE t-ReassemblyExt-r17 could include these values {ms210, ms420, ms630, ms840, ms1050, ms1260, ms1470, spare}, and if it presents, UE applies the sum of legacy t-Reassembly and new t-ReassemblyExt-r17 if present.

Regarding PDCP discardTimer:

Proposal 3: Introduce a new discardTimerExt-r17 IE with a new value ms2000 and several spare bits for future extension.

Regarding PDCP t-Reordering timer:

Observation 4: we do not see strong need to extend the PDCP t-Reordering timer. If necessary, one or more spare bits of existing t-Reordering IE can be used to add several possible values up to 4400ms

Proposal 4: RAN2 consider not to extend PDCP t-Reordering timer or use several spare bits in legacy IE to add several greater values up to 4400ms.

[R2-2105837](file:///C:\Data\3GPP\Extracts\R2-2105837%20Considerations%20on%20RLC%20and%20PDCP%20aspects.doc) Considerations on RLC/PDCP aspects ZTE Corporation, Sanechips discussion Rel-17

[R2-2106055](file:///C:\Data\3GPP\Extracts\R2-2106055_On%20RLC%20t-Reassembly%20for%20NTN.docx) On RLC t-Reassembly for NTN Sequans Communications discussion Rel-17 NR\_NTN\_solutions-Core [R2-2103964](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103964.zip)

[R2-2106088](file:///C:\Data\3GPP\Extracts\R2-2106088%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

#### 8.10.3.1 Earth fixed/moving beams related issues

Including TAC update aspects

[R2-2105432](file:///C:\Data\3GPP\Extracts\R2-2105432%20TAC%20update.doc) Hard and soft TAC update timing Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1. SI update procedure to notify UE of the change in TAC is very inefficient. The SI change notification should not be triggered just for the purpose of updating TAC.

Observation 2. In SIB, time for the next TAC update can be broadcast. Based on time information, UE will read SIB and get updated on TAC.

Observation 3. In soft TAC update, next update time nextUpdateTime-r17 can be broadcast per cell or per TAC so that UE becomes aware when cell is going to stop broadcasting old TAC(s).

Observation 4. Additional 8 bits signalling in a SIB to indicate next TAC update time should be more efficient than paging all UEs during a SI modification period.

Proposal 1 To reduce signalling overhead due to TAC update in SIB, a reference time is specified (e.g., SFN = 0) and length of remaining time for the next TAC update is signalled in SIB.

Proposal 2 The remaining time information is provided in terms of number of remaining SFN wrap arounds plus number of remaining SI modification periods.

Proposal 3 Define a default remaining time if remaining time information is not signalled in SIB.

Proposal 4 RAN2 discuss whether to signal the remaining time per TAC or per cell and whether to signal in SIB1 or NTN specific SIB.

* Continue in offline 107

[R2-2105611](file:///C:\Data\3GPP\Extracts\R2-2105611%20Discussion%20on%20remaining%20issues%20on%20soft%20TAU.DOC) Discussion on remaining issues on soft TAU Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1: Paging frequency caused by TAC change in SI depends on TAC list planning, cell size and moving speed of LEO satellite.

Observation 2: in order to avoid unreachable UEs, network can continue broadcasting some TACs which are not covered by current cell.

Observation 3: it will lead to large signalling overhead to provide valid timer related to each TAC.

Observation 4: UE cannot determine which TAC should be reported to NAS only by TAC valid timer.

And we propose:

Proposal 1: short message is used as legacy when network stops broadcasting a TAC in NTN.

* Samsung suggests to broadcast current plus future TACs
* Mediatek supports using legacy behaviour
* Nokia thinks there is no need for what QC is proposing and supports the proposal in Huawei's paper
* QC thinks there would be a huge impact on the use of network resources and thinks we cannot simply rely on existing mechanism
* CATT thinks legacy procedure is sufficient
* Ericsson agrees with Qualcomm that there would be a huge impact on the network.
* Continue in offline 107
* [AT114-e][107][NTN] TAC update (Qualcomm)

Initial scope: Discuss mechanism for TAC update

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 2021-05-21 10:00 UTC

Initial deadline (for rapporteur's summary in [R2-2106525](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106525.zip)): Friday 2021-05-21 18:00

Proposals marked "for agreement" in [R2-2106525](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106525.zip) not challenged until Monday 2021-05-24 10:00 UTC will be declared as agreed via email by the session chair.

For the rest the discussion will continue online in the Monday CB session.

[R2-2106525](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106525.zip) [Offline 107] TAC update Qualcomm discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1. (14/24 for hard and 17/24 for soft) if the UE does not map it’s geographical location to TAC, the UE registered with TAC1 might be physically present in (or moved into) in the earth fixed tracking area logically belonging to TAC2 without triggering registration (where the UE may not be registered with TAC2).

Observation 2. (17/24) paging for SI update notification triggered by the stop of a TAC does not indicate which TAC is stopped broadcasting in a cell in soft TAC update procedure.

Observation 3. (13/24) paging for SI update notification triggered by the stop of a TAC is inefficient in terms of paging resource consumption.

Observation 4. (17/24) paging for SI update notification triggered by the stop of a TAC does NOT impact (or delay) delivery of paging for MT call

Observation 5. (9/23) UTC time does not need to be broadcast to provide (hard or soft) TAC update time information to UE to reduce signalling overhead (i.e., simply count since SFN = 0 can be broadcast)

Observation 6. (14/21) time information on when a TAC broadcasting is stopped is not signalled to UE via NTN specific SIB that carries ephemeris.

Observation 7. (18/22) providing cell specific time information for the next TAC update is not considered as an option for network to notify UE in addition to legacy SI update procedure.

Observation 8. (19/21) RAN2 does not consider the concept of a Virtual Tracking Area (VTA) as a candidate option for the Tracking Area management in Rel-17 in addition to (and not as a replacement of) the soft TAC update approach.

Observation 9. (Rapporteur) additional network power consumption issue due to frequent SI update notification procedure was not discussed. It can be discussed later if needed as gateway/gNB will have power supply but satellite (e.g., Satellite powered by battery/solar energy).

Proposal 1 Change in TAC in SIB1 triggers SI update notification procedure as legacy behaviour.

* Continue online

Proposal 2 In rel-17, other enhancements like broadcasting TAC update time or virtual tracking area concept are not considered.

* Samsung suggests to split this into two proposals:
  + Proposal 3. In rel-17, other enhancements like broadcasting TAC update time are not considered.
  + Proposal 4. RAN2 would continue to prioritize the soft TAC update approach compared to the VTA approach. RAN2 to discuss benefits and drawbacks of the VTA approach relative to the soft TAC update approach from various perspectives (e.g., at least the following aspects: the gNB implementation, SIB overhead, UE processing, paging impact, NGAP impact, and NAS impact) for the Earth-moving beams. RAN2 to send LS to SA2 to check if the VTA approach would be acceptable to SA2 if it is suggested by RAN2 as a candidate approach in addition to the soft TAC update approach.
* QC suggests to revise both p1 and p2
  + Proposal 1 It is up to network whether to trigger SI update notification procedure as legacy behaviour (no time information provided) or indicate time information in SIB to notify UE on when the TAC(s) ceases being broadcast in the cell.
  + Proposal 2. RAN2 would continue to prioritize the soft TAC update approach compared to the VTA approach. RAN2 to discuss benefits and drawbacks of the VTA approach relative to the soft TAC update approach from various perspectives (e.g., at least the following aspects: the gNB implementation, SIB overhead, UE processing, paging impact, NGAP impact, and NAS impact) for the Earth-moving beams. RAN2 to send LS to SA2 to check if the VTA approach would be acceptable to SA2 if it is suggested by RAN2 as a candidate approach in addition to the soft TAC update approach.
* Oppo, LG, Nokia, Xiaomi, CATT, Huawei suggests to stick to original p1 and p2
* Ericsson still needs to challenge the proposals as they wants to see complexity calculation comparison for the tradeoff of constantly paging for SI change versus giving the timing info in system information.
* Continue online

Updated Proposal 1 Change in TAC in SIB1 triggers SI update notification procedure as legacy behaviour. It is FFS whether broadcasting TAC update time can also be considered

* Nokia wonders what is the relevance of the RACH capacity raised by Ericsson. In case this should be discussed in RAN1.
* VC thinks we can keep the FFS open for one more meeting and take a final decision in August
* Agreed

Updated Proposal 2 In rel-17, other enhancements like ~~broadcasting TAC update time or~~ virtual tracking area concept might be considered with low priority at the end of the WI.

* Samsung thinks VTA would simplify gNB work and 3 companies would like it and there is no technical argument against.
* Agreed

Agreements online:

1. Change in TAC in SIB1 triggers SI update notification procedure as legacy behaviour. It is FFS whether broadcasting TAC update time can also be considered
2. In rel-17, other enhancements like virtual tracking area concept might be considered with low priority at the end of the WI.

[R2-2105610](file:///C:\Data\3GPP\Extracts\R2-2105610%20Discussion%20on%20decoupled%20cell%20ID.doc) Discussion on decoupled cell ID Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: RAN2 to discuss whether to apply V2X-like zone ID to enable approach b).

* Samsung agrees something for this, but not specifically this solution
* Apple agrees something like this is needed
* ZTE think it's not clear whether anything is needed in RAN2
* Huawei clarify this is related to the decision to decouple cell ID on Uu and towards the CN
* Continue in offline 108

[R2-2104826](file:///C:\Data\3GPP\Extracts\R2-2104826.docx) Signalling Solution for Feeder Link Switching of NTN VODAFONE Group Plc discussion

[R2-2104852](file:///C:\Data\3GPP\Extracts\R2-2104852%20Discussion%20on%20TAC%20update.docx) Discussion on TAC update in NTN CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105117](file:///C:\Data\3GPP\Extracts\._R2-2105117%20Satellite%20Cell%20ID%20Mapping%20to%20Earth%20Fixed%20Locations.docx) Satellite cell ID mapping to earth fixed locations for efficient cell selection and cell reselection in NTN Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105252](file:///C:\Data\3GPP\Extracts\R2-2105252_TAU_NR-NTN_v3.0.DOCX) On Soft-switch based Tracking Area Updates in NR-NTN MediaTek Inc. discussion [R2-2102826](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2102826.zip)

[R2-2105530](file:///C:\Data\3GPP\Extracts\R2-2105530%20Discussion%20on%20TAC%20updating%20in%20NTN.doc) Discussion on TAC updating in NTN Spreadtrum Communications discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105571](file:///C:\Data\3GPP\Extracts\R2-2105571%20Discussion%20on%20TAC%20aspects%20for%20NTN.doc) Discussion on TAC aspects for NTN Beijing Xiaomi Electronics discussion

[R2-2106069](file:///C:\Data\3GPP\Extracts\R2-2106069_For8.10.3.1_VTA_SamsungAppleRakutenMobile.doc) Tracking Area Management using Virtual Tracking Areas in an NTN Samsung Research America, Apple, Rakuten Mobile discussion

[R2-2106070](file:///C:\Data\3GPP\Extracts\R2-2106070_For8.10.3.1_SoftTACUpdate_Samsung.doc) Enhancements for the Soft TAC Update for Earth-moving Beams in an NTN Samsung Research America discussion

#### 8.10.3.2 Idle/Inactive mode

Idle/inactive mode specific issues.

Including the outcome of [POST113bis-e][101][NTN] cell reselection (ZTE). No company inputs expected on aspects covered by [POST113bis-e][101]. It's possible to contribute on other aspects, but the discussion will likely be depriorited during this meeting.

[R2-2104805](file:///C:\Data\3GPP\Extracts\R2-2104805_Report%20of%20%5bPOST113bis-e%5d%5b101%5d%5bNTN%5d%20cell%20reselection.docx) Report of [POST113bis-e][101][NTN] cell reselection ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

Timing info assisted cell reselection

Proposal 1: [20/23] At least in the quasi-earth fixed case (FFS for moving case), the timing information on when a cell is going to stop serving the area is needed to assist cell reselection in NTN for earth fixed scenario.

* Agreed

Proposal 2: [17/23] At least in the quasi-earth fixed case (FFS for moving case), the timing information on when a cell is going to stop serving the area is used to decide when to perform measurement on neighbor cells.

* Huawei wonders if this for earth fixed or moving
* QC wonders whether this is also for the moving case.
* Agreed

Proposal 3: [21/23] At least in the quasi-earth fixed case (FFS for moving case), the timing information on when a cell is going to stop serving the area for earth fixed scenario is broadcast to UE via system information.

* Apple/QC are worried about the broadcast part but can accept the majority view
* Agreed

Agreements:

1. At least in the quasi-earth fixed case (FFS for moving case), the timing information on when a cell is going to stop serving the area is needed to assist cell reselection in NTN for earth fixed scenario.
2. At least in the quasi-earth fixed case (FFS for moving case), the timing information on when a cell is going to stop serving the area is used to decide when to perform measurement on neighbor cells.
3. At least in the quasi-earth fixed case (FFS for moving case), the timing information on when a cell is going to stop serving the area for earth fixed scenario is broadcast to UE via system information.

Ephemeris/Location assisted cell reselection

Proposal 4: [13/23] Location assisted cell reselection should be introduced in NTN.

* Postponed to the next meeting

Proposal 5: [11/21] In location assisted cell reselection in NTN, the distance between the UE and the reference location of the cell (serving cell and/or neighbor cell) should be considered.

* Postponed to the next meeting

[R2-2104815](file:///C:\Data\3GPP\Extracts\R2-2104815%20NTN%20Idle%20inactive%20mode%20procedures.doc) Discussion on idle/inactive mode procedures in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2104857](file:///C:\Data\3GPP\Extracts\R2-2104857_Leftover%20issues%20on%20IDLE%20and%20inactive%20mode.docx) Leftover issues on IDLE and inactive mode CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105251](file:///C:\Data\3GPP\Extracts\R2-2105251_Cell-Reselection_NR-NTN_v3.0.docx) On Cell-Reselection in NR-NTN MediaTek Inc. discussion [R2-2102825](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2102825.zip)

[R2-2105487](file:///C:\Data\3GPP\Extracts\R2-2105487%20Discussion%20on%20IDLE%20issues.doc) Discussion on IDLE issues Xiaomi communications discussion

[R2-2105531](file:///C:\Data\3GPP\Extracts\R2-2105531%20Issue%20on%20cell%20selection%20and%20reselection%20in%20NTN.doc) Issue on cell selection and reselection in NTN Spreadtrum Communications discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105699](file:///C:\Data\3GPP\Extracts\R2-2105699.doc) Idle mode enhancement in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105786](file:///C:\Data\3GPP\Extracts\R2-2105786%20Cell%20reselection%20based%20on%20time%20and%20location%20condition.doc) Cell reselection based on time and location condition LG Electronics Inc. discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105818](file:///C:\Data\3GPP\Extracts\R2-2105818%20Considerations%20on%20ephemeris%20provision%20for%20NTN.docx) Considerations on ephemeris provision for NTN Lenovo, Motorola Mobility discussion Rel-17

[R2-2106171](file:///C:\Data\3GPP\Extracts\R2-2106171.docx) NTN Idle/Inactive mode cell re-selection ITL discussion Rel-17

[R2-2106231](file:///C:\Data\3GPP\Extracts\R2-2106231%20Discussion%20on%20GNSS%20tracking%20for%20cell%20(re)selection%20and%20ephemeris%20division&provision%20.docx) Discussion on GNSS tracking for cell (re)selection and ephemeris division&provision CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2106387](file:///C:\Data\3GPP\Extracts\R2-2106387%20NTN%20Indication.docx) NTN type and scenario indication Convida Wireless discussion

[R2-2106392](file:///C:\Data\3GPP\Extracts\R2-2106392%20NTN%20cell%20(re)selection%20enhancements.docx) NTN Cell (re)selection enhancements Convida Wireless discussion

moved here from 8.10.2

[R2-2105116](file:///C:\Data\3GPP\RAN2\Docs\R2-2105116.zip) Way forward for NTN Ephemeris Discussions for pre-compensation, idle mode and connected mode procedures Apple discussion Rel-17 NR\_NTN\_solutions-Core

#### 8.10.3.3 Connected mode

Connected mode specific issues.

[R2-2106489](file:///C:\Data\3GPP\Extracts\R2-2106489%20%20%5bPre114-e%5d%5b104%5d%5bNTN%5d%20Summary%208.10.3.3%20-%20CHO%20and%20service%20continuity%20(Ericsson).docx) Feature summary for 8.10.3.3 - CHO and service continuity Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

Proposals to be discussed first:

* CHO

Proposal 1B (VC rewording of P1): Discuss whether the location based execution triggering for NTN is defined based on:

a) The distance between UE and the serving cell reference location

b) The distance between UE and the candidate target cell reference location

c) A combination of a) and b)

(P1 was:

Proposal 1 Discuss whether shape of CHO trigger area is

a. Circle/ellipse with serving cell related reference point

b. Circle/ellipse with candidate cell related reference point

c. Polygon

d. Either as per configuration)

Proposal 3 Discuss whether the reference location is

a. Center of a cell

b. Center of a beam or beams

Proposal 9 RAN2 to discuss whether information related to when candidate target cell becomes available is a timer, UTC, or a time range.

Proposal 10 RAN2 to understand joint configuration of location and RSRP as well as time and RSRP triggers are supported.

Proposal 11 RAN2 to discuss whether RAN2 allows the options that the network configures location or time CHO trigger without measurement trigger.

Proposal 12 RAN2 not to consider further joint location and timer based trigger

* Continue in offline 104
* Service continuity

Proposal 16 NTN capable UE shall support NTN -TN mobility

Proposal 17 No limitations are specified for NTN -TN mobility thus same trigger conditions can be used within NTN and NTN -NT mobility

Proposal 18 NTN UE prioritises TN over NTN

Proposal 19 Discuss whether and what kind of idle mode enhanacements are needed in order to realise the TN priorization

* Continue in offline 104

Other proposals:

Proposal 2 Discuss whether RRM location reporting event is defined as CHO event or UE ’s reference location could be considered, as a configurable option or as an alternative(only one is supprted )

Proposal 4 Discuss whether measurement reports can be configured to be piggybacked when location based event triggers

Proposal 5 Discuss the format of the location report

a. Follow the existing format for location information

b. Discuss if a less granular and lighter location information suitable for NTN is defined.

Proposal 6 RAN2 to discuss whether periodic or request/response type of location reporting should be supported for NTN .

Proposal 7 RAN2 to discuss how the time based CHO should work and what is the relevant information UE needs for efficient operation.

Proposal 8 RAN2 to discuss how to address the issue of RACH congestion in a target cell.

Proposal 13 RAN2 to discuss whether it is feasible that UE keeps part of another gNB/cell configuration after accessing the target cell.

Proposal 14 RAN2 to discuss how to enhance the efficiency of the potential need to concatenate HOs in NTN . E.g. by UE not to discard filtered measurements after successful HO.

Proposal 15 RAN2 to discuss whether there is a need to optimize signalling overhead for HO/CHO .

* Continue in offline 104
* [AT114-e][104][NTN] CHO aspects and service continuity (Ericsson)

Initial scope: Discuss the proposals from [R2-2106489](file:///C:\Data\3GPP\Extracts\R2-2106489%20%20%5bPre114-e%5d%5b104%5d%5bNTN%5d%20Summary%208.10.3.3%20-%20CHO%20and%20service%20continuity%20(Ericsson).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 2021-05-21 10:00 UTC

Initial deadline (for rapporteur's summary in [R2-2106526](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106526.zip)): Friday 2021-05-21 14:00 UTC

Final scope: Continue the discussion on p5 (to see whether the proposal to consider a time range can be agreed), p9, p10 and p12

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

* + - List of proposals for agreement (if any)
    - List of proposals to be postponed to the next meeting

Final deadline (for companies' feedback): Wednesday 2021-05-26 1000 UTC

Final deadline (for rapporteur's summary in [R2-2106534](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106534.zip)): Wednesday 2021-05-26 1400

Proposals marked "for agreement" in [R2-2106534](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106534.zip) not challenged until Thursday 2021-05-27 0600 will be declared as agreed via email by the session chair (for the rest the discussion will continue in the next meeting).

[R2-2106526](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106526.zip) [Offline 104] CHO aspects and service continuity Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

For agreement:

Proposal Conc1 Support CHO location trigger as the distance between UE and a reference location which may be configured as the serving cell reference location or the candidate target cell reference location. FFS if combination can be allowed.

* Agreed

Proposal Conc2 Reference location for the event description is defined as cell center.

* Agreed

Proposal Conc5 The CHO configuration includes time left to be served in serving cell as well as information when candidate target cell becomes available and when candidate target cell stops serving the area (FFS time range, two timers)

- Oppo suggests to reword as: "The CHO configuration includes time left to be served in serving cell as well as information when candidate target cell becomes available."

- Nokia thinks this does not move us forward, but instead we take several steps backwards, compared to what was already agreed at RAN2#113bis. With this Proposal we again have all options on the table (or even all options already supported and the time-based trigger becomes super complex, requiring at least three timers?). Why can’t we try to keep it simple?

- LGE thinks we should say it is "FFS whether the CHO configuration includes timing information when the candidate cell stops serving the area"

* Continue online

Note: R2#113bis-e agreement: "Timing information in CHO execution triggering for NTN describes the time after which the UE is allowed to execute CHO to the candidate target cell"

- VC wonders if we can extend the R2#113bis-e agreement saying that the "Timing information in CHO execution triggering for NTN describes the time range ~~after~~ during which the UE is allowed to execute CHO to the candidate target cell".

- Apple/Nokia support the time range proposal and we can link this to entry or leave conditions

- Ericsson thinks the end time in this case would have two meanings.

* Continue offline to see whether the proposal to consider a time range can be agreed

Proposal Conc8 Joint configuration of location and RSRP as well as time and RSRP triggers are supported

- Nokia thinks the issue to be resolved should have been if they need to be configured always with RSRP/RSRQ event.

- Ericsson suggests to revise as "For CHO, Joint configuration of location and RSRP as well as time and RSRP triggers are supported"

* Continue online

Updated Proposal Conc8 For CHO, joint configuration of location and RSRP as well as time and RSRP triggers are supported

* Agreed

Proposal Conc10 RAN2 does not discuss further support of joint time and location trigger

- CATT disagrees as location based would be applicable for UE-moving switch and time based for satellite moving switch.

- Samsung disagrees

* Continue online
* Continue the discussion offline

Proposal Conc11 NTN capable UE shall support NTN-TN mobility

- QC suggests to revises as "NTN capable UE supports NTN-TN handover with capability reporting." Ericsson is fine with this. BT disagrees

* Continue online

Updated Proposal Conc11 NTN capable UE may support NTN-TN mobility

* Postpone the discussion on capabilities at the end of the WI

Proposal Conc12 No limitations are specified for NTN-TN mobility thus same trigger conditions can be used within NTN and NTN-TN mobility. FFS for enhancements.

- Xiaomi thinks it is not clear whether “NTN-TN” means “from NTN to TN (hand-in)”or “from NTN to TN (hand-in) and from TN to NTN (hand-out)”.

* Continue offline

Proposal Conc13 Based on configuration NTN UE can prioritise TN over NTN

- Oppo thinks it is not clear what configuration is referred to here. Is it the existing configuration, e.g. cell reselection priority? Or new configuration?

- Nokia wonders what does it concern? Idle mode reselections or?

- Ericsson suggests to revise as "For idle mode reselection based on configuration NTN UE can prioritise TN over NTN. Configuration details FFS"

* Continue online

Updated proposal Conc13 For idle mode reselection, based on configuration NTN UE can prioritise TN over NTN. Configuration details FFS

* Agreed

Agreements via email (from offline 104):

1. Support CHO location trigger as the distance between UE and a reference location which may be configured as the serving cell reference location or the candidate target cell reference location. FFS if combination can be allowed.
2. The reference location for the event description is defined as cell center.

Agreements online:

1. For CHO, joint configuration of location and RSRP as well as time and RSRP triggers are supported.
2. For idle mode reselection, based on configuration NTN UE can prioritise TN over NTN. Configuration details FFS

For online discussion:

Question here is about this RRM location based location reporting whether UE could be optionally configured to report also RSRP reports. As the earlier agreements and the context of the question was differently understood we propose to discuss the original proposal online.

Proposal Conc3 Discuss whether measurement reports can be configured to be piggybacked when location based event triggers

Proposal Conc4 Discuss the format of the location report

• a. Follow the existing format for location information

• b. Discuss if a less granular and lighter location information suitable for NTN is defined.

Proposal Conc6 RAN2 to discuss whether timing the CHO can solve RACH congestion or additional methods are needed.

Proposal Conc7 RAN2 to discuss whether information related to when candidate target cell becomes available is a timer, UTC, or a time range

Proposal Conc9 RAN2 to discuss whether RAN2 declines the options that the network configures location or time CHO trigger without measurement trigger

* Continue offline

[R2-2106534](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106534.zip) [Offline 104] CHO aspects and service continuity - second round Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

Proposal conc1: CHO time trigger event is defined as time duration [t1, t2] associated for each CHO candidate cell. During the time duration, the UE shall execute CHO to that candidate cell.

- VC suggests to change "shall" into "may"

Updated Proposal conc1: CHO time trigger event is defined as time duration [t1, t2] associated for each CHO candidate cell. The UE may execute CHO to that candidate cell during the time duration.

Proposal conc2: Same CHO trigger conditions and RRM events can be used within NTN and NTN-TN mobility provided these are supported by the UE. NTN-TN means both “from NTN to TN (hand-in)”or “from NTN to TN (hand-in) and from TN to NTN (hand-out). FFS for enhancements.

CHO related aspects

[R2-2104816](file:///C:\Data\3GPP\Extracts\R2-2104816%20NTN%20connected%20mode%20mobility.doc) Discussion on mobility management for connected mode UE in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2104853](file:///C:\Data\3GPP\Extracts\R2-2104853%20Discussion%20on%20connected%20mode%20in%20NTN.docx) Discussion on connected mode in NTN CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2104999](file:///C:\Data\3GPP\Extracts\R2-2104999%20Further%20thoughts%20on%20connected%20mode%20mobility%20in%20NTN.docx) Further thoughts on connected mode mobility in NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105120](file:///C:\Data\3GPP\Extracts\._R2-2105120%20On%20Connected%20Mode%20Issues%20for%20NR%20NTN.docx) On connected mode issues for NR NTN Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105383](file:///C:\Data\3GPP\Extracts\R2-2105383%20Location-based%20measurement%20report.doc) Location-based measurement report ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105384](file:///C:\Data\3GPP\Extracts\R2-2105384%20Discussion%20on%20measurement%20event%20triggering%20in%20NTN.docx) Discussion on measurement event triggering in NTN ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105433](file:///C:\Data\3GPP\Extracts\R2-2105433%20CHO.doc) Open issues in CHO Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105460](file:///C:\Data\3GPP\Extracts\R2-2105460%20Discussion%20on%20connected%20mode%20aspects%20for%20NTN.docx) Discussion on connected mode aspects for NTN Xiaomi Communications discussion

[R2-2105613](file:///C:\Data\3GPP\Extracts\R2-2105613%20Discussion%20on%20remaining%20issues%20for%20CHO%20in%20NTN.doc) Discussion on remaining issues for CHO in NTN Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105700](file:///C:\Data\3GPP\Extracts\R2-2105700.docx) Signaling storm during HOs and Timer based trigger details Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105787](file:///C:\Data\3GPP\Extracts\R2-2105787%20Further%20considerations%20on%20NTN%20CHO.DOC) Further considerations on NTN CHO LG Electronics Inc. discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105820](file:///C:\Data\3GPP\Extracts\R2-2105820%20NTN%20specific%20CHO%20trigger%20condition%20v1.1.doc) NTN specific CHO trigger condition Lenovo, Motorola Mobility discussion Rel-17

[R2-2105923](file:///C:\Data\3GPP\Extracts\R2-2105923_Further%20consideration%20on%20CHO%20in%20NTN.docx) Further consideration on CHO in NTN ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105936](file:///C:\Data\3GPP\Extracts\R2-2105936%20Connected%20mode%20aspects%20for%20NTN.docx) Connected mode aspects for NTN Ericsson discussion NR\_NTN\_solutions-Core

[R2-2106024](file:///C:\Data\3GPP\Extracts\R2-2106024_%20Further%20discussion%20on%20CHO%20in%20NTN.docx) Further discussion on CHO in NTN NEC Telecom MODUS Ltd. discussion

[R2-2106045](file:///C:\Data\3GPP\Extracts\R2-2106045%20(R17%20NTN%20WI%20AI%208.10.3.3)%20Location-based%20CHO.docx) Location-based CHO in NTN InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2106046](file:///C:\Data\3GPP\Extracts\R2-2106046%20(R17%20NTN%20WI%20AI%208.10.3.3)%20Time-based%20CHO.docx) Time-based CHO for soft feeder-link switch InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

Service continuity

[R2-2105006](file:///C:\Data\3GPP\Extracts\R2-2105006%20%20-%20A%20resubmission%20of%20R2-2103976%20and%20R2-2101298%20on%20Service%20Continuity%20between%20NTN%20and%20TN.docx) Service continuity between NTN and TN Hughes/EchoStar, Thales, BT Plc, Turkcell, Vodafone, ESA, Inmarsat discussion Rel-17

[R2-2105253](file:///C:\Data\3GPP\Extracts\R2-2105253%20-%20Mobility%20for%20TN-NTN%20scenarios.docx) Mobility for NTN-TN scenarios MediaTek Inc. discussion [R2-2102827](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2102827.zip)

[R2-2105614](file:///C:\Data\3GPP\Extracts\R2-2105614%20Discussion%20on%20Service%20continuity%20between%20NTN%20and%20TN.doc) Discussion on service continuity between NTN and TN Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2106234](file:///C:\Data\3GPP\Extracts\R2-2106234%20Discussion%20on%20NTN-TN%20mobility%20.docx) Discussion on NTN-TN mobility CMCC discussion Rel-17 NR\_NTN\_solutions-Core

SMTC and gaps

[R2-2105000](file:///C:\Data\3GPP\Extracts\R2-2105000%20Further%20views%20on%20SMTC%20configurations%20for%20NTN.docx) Further views on SMTC configurations for NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105389](file:///C:\Data\3GPP\Extracts\R2-2105389%20Method%20for%20SMTC%20and%20GAP%20measurement.doc) Discussion on UE feedback based SMTC and GAPS measurement configuration Rakuten Mobile, Inc discussion Rel-17

[R2-2105434](file:///C:\Data\3GPP\Extracts\R2-2105434%20SMTC%20and%20MG.doc) SMTC and MG enhancements Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105702](file:///C:\Data\3GPP\Extracts\R2-2105702.docx) SMTC enhancement in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105819](file:///C:\Data\3GPP\Extracts\R2-2105819%20UE%20assistance%20for%20measurement%20gap%20and%20SMTC%20configuration%20in%20NTN.docx) UE assistance for measurement gap and SMTC configuration in NTN Lenovo, Motorola Mobility discussion Rel-17

[R2-2106232](file:///C:\Data\3GPP\Extracts\R2-2106232%20SMTC%20and%20measurement%20Gap%20configuration%20for%20NTN%20.docx) SMTC and measurement Gap configuration for NTN CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2106347](file:///C:\Data\3GPP\Extracts\R2-2106347%20Measurement%20window%20enhancements%20for%20NTN%20cell.doc) Measurement window enhancements for NTN cell LG Electronics Inc. discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2106386](file:///C:\Data\3GPP\Extracts\R2-2106386%20SMTC%20and%20MG%20configuration%20for%20NTN.docx) SMTC and MG configuration for NTN Convida Wireless discussion

Misc

[R2-2105701](file:///C:\Data\3GPP\Extracts\R2-2105701.doc) Cell coverage spillage over multiple countries issue in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2106071](file:///C:\Data\3GPP\Extracts\R2-2106071_For8.10.3.3_HandoverEnhancements_Samsung.doc) Handover Enhancements and Power-saving Neighbor Search for an NTN Samsung Research America discussion

[R2-2106233](file:///C:\Data\3GPP\Extracts\R2-2106233%20Signaling%20issues%20resolution%20for%20connected%20mobility%20.docx) Signaling issues resolution for connected mobility CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2106388](file:///C:\Data\3GPP\Extracts\R2-2106388%20NTN%20ANR%20enhancements.docx) NTN ANR enhancements Convida Wireless discussion

#### 8.10.3.4 LCS aspects

Potential issues associated to the use of the existing Location Services (LCS) application protocols to locate UE in the context of NTN.

Including discussion on reply LSs on UE location aspects in NTN.

Incoming LS (moved here from 8.10.1)

[R2-2104730](file:///C:\Data\3GPP\Extracts\R2-2104730_S2-2103550.docx) Reply to LS on UE location aspects in NTN (S2-2103550; contact: Thales) SA2 LS in Rel-17 5GSAT\_ARCH To:RAN2 Cc:SA3-LI, RAN3, SA3, CT1

- Thales thinks the SA3-LI has the strongest requirements and we should take them into account: we need the same granularity as in TN and the UE location should be trustable

- QC thinks that, as the SA2 LS says, we could use existing procedures to determine and verify the UE location after registration. UE should not be required to map its location to e.g. a zone ID or anything like that. RAN2 might not need to do anything.

- Samsung thinks the UE should register to the right core network, e.g. in the right country. So RAN2 needs to do something.

- ZTE thinks that SA2 has already indicated that UE location can be derived after registration: nothing to do for RAN2

- Apple agrees with Samsung.

- Nokia thinks that the procedure described in the LS is more applicable in the case the cell size is comparable to the TN cell size. Agree with Thales that something more is needed.

- Thales think there are 2 issues: 1. whether UE location is trustable and UE based GNSS position is not trustable. 2. issue for emergency calls. Something needs to be done in RAN2.

- Sony thinks RAN2 needs to do something on this as RAN3 is also waiting for feedback from us.

- Ericsson thinks this is a RAN3 issue.

* Continue in offline 108

* [AT114-e][108][NTN] UE location aspects (CATT)

Initial scope: Based on the received LSs, discuss:

1. discuss the need and possible mechanism to ensure (for both the earth-fixed and earth-moving cell cases) that the CGI constructed by NG-RAN corresponds to a fixed geographical area with a size comparable with a cell for TN (e.g. for registration to the correct core network in case of NTN cells crossing country borders)
2. whether RAN2 needs to do anything (and in case what) to ensure that that final UE location information at the core network is trustable

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 2021-05-21 10:00 UTC

Initial deadline (for rapporteur's summary in [R2-2106527](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106527.zip)): Friday 2021-05-21 16:00 UTC

Final scope: Continue the discussion on the expected granularity of the coarse UE location information and, depending on the outcome, on the need of an LS to other groups

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

* + - List of proposals for agreement (if any)
    - List of proposals to be postponed to the next meeting

Final deadline (for companies' feedback): Wednesday 2021-05-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2106535): Wednesday 2021-05-26 1400

Proposals marked "for agreement" in R2-2106535 not challenged until Thursday 2021-05-27 0600 will be declared as agreed via email by the session chair (for the rest the discussion will continue in the next meeting).

[R2-2106527](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106527.zip) [Offline 108] UE locacation aspects CATT discussion Rel-17 NR\_NTN\_solutions-Core

Proposals for easy agreements:

Proposal 1: RAN2 will work on a solution to ensure that the CGI constructed by NG-RAN corresponds to a fixed geographical area with a size comparable with a cell for TN including connected mode and initial access.

* Agreed

Agreements via email - from offline 108:

1. RAN2 will work on a solution to ensure that the CGI constructed by NG-RAN corresponds to a fixed geographical area with a size comparable with a cell for TN including connected mode and initial access.

Proposals for further discussion:

Proposal 2: The possible mechanism can be options for further discussion, if there is the need to ensure (for both the earth-fixed and earth-moving cell cases) that the CGI constructed by NG-RAN corresponds to a fixed geographical area with a size comparable with a cell for TN:

 gNB finalizes CGI mapping by retrieving the UE’s coarse location info directly from UE

 gNB reports Earth-Fixed Virtual Cells

 Earth-Fixed Hierarchical Regions

 gNB finalizes CGI mapping by using V2X-like zone ID provided by UE

 UE report the CGI of detected TN cell as assistance information

 Earth fixed cell IDs (a group of TN cells) as virtual cell IDs

Proposal 2a: RAN2 to discuss if there is a need to send LS to SA3 to check what granularity of UE location (i.e., 500m, 1 km, 5 km, 10 km etc) can be exposed to gNB.

- Thales does not think this is necessary to send this LS. Typical cell size as in rural area would be sufficient. ZTE agrees. Huawei also agrees

* Discuss offline the expected granularity of the coarse UE location information. Based on the outcome we might re-discuss the need of an LS to other groups

Proposal 3: RAN2 Working Assumption: RAN2 doesn’t need to do anything to ensure that final UE location information at the core network is trustable so far (it's other WGs business to define solutions to verify the UE location)

- Samsung thinks the network needs to check this

- VC thinks this is not in RAN2 scope

* Agreed

Agreements online:

1. RAN2 Working Assumption: RAN2 doesn’t need to do anything to ensure that final UE location information at the core network is trustable so far (it's other WGs business to define solutions to verify the UE location)

R2-2106535 [Offline 108] UE locacation aspects - second round CATT discussion Rel-17 NR\_NTN\_solutions-Core

R2-2106538 New LS on UE location aspects in NTN CATT LS out Rel-17 NR\_NTN\_solutions-Core To: RAN3, SA2, SA3, SA3-LI, CT1

[R2-2104854](file:///C:\Data\3GPP\Extracts\R2-2104854%20Discussion%20on%20reply%20LSs%20on%20UE%20location%20aspects%20in%20NTN.docx) Discussion on reply LSs on UE location aspects in NTN CATT discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1: any solution based on UE-generated location information for network selection purposes without verification by network is not trusted according to SA3LI.

Observation 2: Open issue 1: How to ensure that the UE is using a correct core network of the country in which the UE is physically located should be faced by network in Rel-17 NTN.

Observation 3: It is feasible that network(LMF) is able to verify UE’s location by UE’s report of GNSS-SignalMeasurementInformation via existing LPP protocol.

Proposal 1: RAN2 to discuss if there is open issue in RAN2: how to ensure that the UE is using a correct core network of the country in which the UE is physically located should be faced by network in Rel-17 NTN.

Proposal 2: AMF may initiate UE location procedure as specified in TS 23.273 to get the sufficient accuracy of UE location from LMF after finishing the registration procedure in NTN Rel-17 as SA3LI reply LS specified.

Observation 4: Open issue 2: The requirement from SA2 on NG-RAN providing an accurate CGI to 5GC after UE has entered CONNECTED state is not feasible in NG-RAN because the UE’s geographical area info reported from UE should be verified by network at first according to the reply LS SA3-LI.

Proposal 3: RAN2 to discuss if there is open issue 2: The requirement from SA2 on NG-RAN providing an accurate CGI to 5GC after UE has entered CONNECTED state is not feasible in NG-RAN because the UE’s geographical area info reported from UE should be verified by network at first according to the reply LS SA3-LI.

Proposal 4: If AMF wants any UE’s location info for an emergency services call in CONNECTED mode, the best way is invocation of LCS procedures via LMF, instead of asking for the accurate CGI from NG-RAN.

Proposal 5: RAN2 to disccus if we send an LS to SA3/SA3LI to further check:

1. If NG-RAN is permitted to retrieve the UE’s location info from LMF which is verified by LMF and what the granularity is;

2. If NG-RAN is permitted to retrieve the UE’s location info directly from UE which is UE-negnerated location info, but not for network selection purpose, and what the granularity is.

Proposal 5bis: RAN2 to disccus if we send an reply LS to SA2 on the accurate CGI requirement.

Observation 5: A-GNSS method including UE-based and UE-assisted, LMF-based meets the LCS request in NTN because of the outdoor coverage.

Proposal 6: RAN2 to discuss A-GNSS is the mandatory positioning method in NTN. And other RAT-Dependent positioning methods should be postponed in NTN Rel-17.

[R2-2105924](file:///C:\Data\3GPP\Extracts\R2-2105924_Understanding%20on%20the%20UE%20location%20aspects%20in%20NTN.docx) Understanding on the UE location aspects in NTN ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1: UE location with comparable levels of assurance and granularity to TN cells are needed to support services provided in 5GC.

Observation 2: The core network would be aware of the UE location with sufficient accuracy based either on the Cell ID in ULI or the CN initiated UE location procedure.

Observation 3: The requirement for UE location with finer granularity than a NTN cell mainly comes from the core network and there has been ongoing discussion in SA2 on CN initiated UE location procedure to meet such requirements.

Proposal 1: RAN2 to discuss if AS layer solution is needed for UE location acquisition with finer granularity than a NTN cell.

Proposal 2: If AS layer solution is needed, UE served by a NTN cell should acquire system information from a detected TN cell and report the Cell identity information of the TN cell to the serving NTN cell as assistance information.

[R2-2105435](file:///C:\Data\3GPP\Extracts\R2-2105435%20UE%20positioning.docx) UE positioning methods for NTN Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2105558](file:///C:\Data\3GPP\Extracts\R2-2105558%20Discussion%20on%20location%20service%20for%20NTN.doc) Discussion on location service for NTN Xiaomi discussion

[R2-2105935](file:///C:\Data\3GPP\Extracts\R2-2105935%20Discussion%20on%20LS%20response%20onNTN%20location.docx) NTN location reporting aspects Ericsson discussion NR\_NTN\_solutions-Core

[R2-2106072](file:///C:\Data\3GPP\Extracts\R2-2106072_For8.10.3.4_AreaManagement_SamsungThales.doc) Area Management in an NTN Samsung Research America and Thales discussion

## 8.12 Reduced Capability

(NR\_redcap-Core; leading WG: RAN1; REL-17; WID: [RP-210918](file:///C:\Data\3GPP\archive\RAN\RAN%2391\Tdocs\RP-210918.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.

[R2-2104702](file:///C:\Data\3GPP\Extracts\R2-2104702_C1-212395.doc) Reply LS on Unified Access Control (UAC) for RedCap (C1-212395; contact: vivo) CT1 LS in Rel-17 NR\_redcap-Core To:RAN, RAN2 Cc:SA1

* Noted. We will wait for SA1 feedback

[R2-2105233](file:///C:\Data\3GPP\Extracts\R2-2105233%20Revised%20WI%20work%20plan%20for%20RedCap.docx) Revised WI work plan for RedCap Ericsson discussion NR\_redcap-Core

* Noted

### 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 one RedCap UE type and related UE capability design.

How to constrain the use of RedCap capabilities only for RedCap UEs and prevent RedCap UEs from using capabilities not intended for RedCap UEs.

[R2-2106462](file:///C:\Data\3GPP\Extracts\R2-2106462_Summary%20AI%208.12.2.1%20v01.docx) Summary 8.12.2.1 - Definition of RedCap UE and reduced capabilities (Intel) Intel discussion Rel-17 NR\_redcap-Core

* [AT114-e][105][RedCap] Definition of RedCap UE and reduced capabilities (Intel)

Initial scope: Discuss the proposals from [R2-2106462](file:///C:\Data\3GPP\Extracts\R2-2106462_Summary%20AI%208.12.2.1%20v01.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): Thursday 2021-05-20 07:00 UTC

Initial deadline (for rapporteur's summary in [R2-2106521](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106521.zip)): Thursday 2021-05-20 09:00 UTC

Updated scope: Continue the discussion on proposals from [R2-2106521](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106521.zip) marked as "continue offline"

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 2021-05-25 08:00 UTC

Updated deadline (for rapporteur's summary in R2-2106528): Tuesday 2021-05-25 12:00 UTC

Proposals marked "for agreement" in R2-2106528 not challenged until Tuesday 2021-05-25 22:00 UTC will be declared as agreed via email by the session chair.

For the rest the discussion will continue online in the Wednesday CB session.

[R2-2106521](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106521.zip) [offline 105] Definition of RedCap UE and reduced capabilities (Intel) Intel discussion Rel-17 NR\_redcap-Core

Proposals for potential agreement

Proposal 1. [To agree] [15/20] working assumption Option 1 (to extend UE-NR-Capability using NCE to capture RedCap capabilities).

- ZTE can accept to compromise and go for option 1 but would like to understand when we start discussing which capabilities apply to each type

- Intel thinks this is related to the next proposals. Think we can discuss the capability design first and the specific capabilities. ZTE is not sure all the capabilities are applicable to RedCap UEs

- Ericsson is not sure we need to go through all the features one by one

- Apple is not sure we need to agree on capability design principle at this stage

* Working assumption: extend UE-NR-Capability using NCE to capture RedCap capabilities
* We will continue the discussion on which capability are applicable to RedCap UE (FFS if we need to have an exhaustive check)

Proposal 7. [To agree] [15/19] only one RedCap UE type is defined for both FR1 and FR2 (i.e. not define separate RedCap UE types for FR1 and FR2).

- QC wonders whether this is for initial access (in this case it's fine) or for a definition in terms of capabilities (in this case needs more time to check). Oppo shares the same view

* At least for early identification there will be only one RedCap UE (no need to define separate RedCap UE types for FR1 and FR2)

Proposal 8. [To agree] [14/20] To prevent RedCap UEs from using capabilities not intended for RedCap UE, Network might perform capability match between UE’s reported radio capabilities and the set of capability criteria associated with RedCap UE. [18/20] If the reported capabilities do not match the RedCap UE, how network prevents its usage is left up to network implementation, e.g. the network may reject UE. (no specification impact is foreseen.)

- T-mobile does not think this is necessary

- Ericsson thinks we don’t need to specify any network behaviour

- Apple thinks this is not needed. Sequans agrees

- QC thinks there might not be RAN2 impact but maybe SA2/CT1 impact. We could send an LS to SA2/CT1. BT agrees. LGE thinks we should not send an LS.

- Mediatek thinks the capability matching is a RAN matter, no need to involve SA2/CT1

- Sequans thinks we should also discuss the case of non RedCap UEs using RedCap capabilities. Intel thinks this can be discussed, but separately

* It is up to the network how to prevent RedCap UEs from using radio capabilities not intended for RedCap UEs (no specification impact is foreseen at least in RAN2. FFS whether something is needed from SA2/CT1)

Working assumption:

1. Extend UE-NR-Capability using NCE to capture RedCap capabilities

Agreements:

1. We will continue the discussion on which capability are applicable to RedCap UE (FFS if we need to have an exhaustive check)
2. At least for early identification there will be only one RedCap UE (no need to define separate RedCap UE types for FR1 and FR2)
3. It is up to the network how to prevent RedCap UEs from using radio capabilities not intended for RedCap UEs (no specification impact is foreseen at least in RAN2. FFS whether something is needed from SA2/CT1)

Proposals for potential discussion online

Proposal 5. [To discuss] [12/19] introduce an explicit capability bit to indicate RedCap UE in the UE capability when the UE is a RedCap UE (as per option 1).

- QC wonders why this explicit capability bit is needed.

- Ericsson thinks we can come back to this later

* continue in offline 105

Proposal 9. [To discuss] [11] Send LS to SA2/CT1 to check subscription solution, whether core network should know the UE is a RedCap UE.

Proposals for potential discussion in future meetings

Proposal 2. [FFS] Continue the offline discussion on capability design principle:

Proposal 2.1. [FFS] [13/20] For RedCap UE’s mandatory without signaling features, which are optional or mandatory with capability signaling or mandatory without capability signaling but with different value(s) for non-RedCap UE or newly introduced in R17 (if any), clarify in TS 38.306 in the new section for RedCap Ues; FFS on the need of new section;

Proposal 2.2. [FFS] [15/20] For RedCap UE’s optional features, which are mandatory without capability ignaling for non-RedCap Ues (if any), or newly introduced in R17 for RedCap, add new UE capability ignaling in TS 38.331 and capture them in the new section for RedCap Ues in TS 38.306; FFS on the need of new section;

Proposal 2.3. [FFS] [12/20] For RedCap UE’s optional features, which are optional for non-RedCap UE but with different value (if any), either add new capability signaling or extend the legacy capability ignaling, and also capture them in TS 38.306 in the new section for RedCap Ues ; FFS on the need of new section;

Proposal 2.5. [FFS] [16/20] For the features not applicable to RedCap UE but mandatory without capability signaling supported by non-RedCap UE, clarify in TS 38.306 in the new section for RedCap Ues. FFS on the need of new section;

* continue in offline 105

Proposal 3. [FFS] Postpone the discussion on the handling of RedCap specific capabilities (e.g. Maximum BW, Max Rx, MIMO-Layer, 256QAM, CA/DC, HD-FDD, etc) until RAN2 has conclusion on capability design principle.

Proposal 4. [FFS] Discuss under capability design principle whether we should reuse existing capability signaling with clarifications in 38.306 when it is possible:

* continue in offline 105

Proposal 6. [FFS] postpone the discussion on the definition of RedCap UE type although [16/20] companies support “Option 4: The corresponding minimum set of the reduced capabilities that one RedCap UE type shall mandatorily support.”

* continue in offline 105

[R2-2106528](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106528.zip) [offline 105] Definition of RedCap UE and reduced capabilities - second round Intel discussion Rel-17 NR\_redcap-Core

Proposals for potential agreement

Proposal 2. [To agree] [23/25] by default, all non-RedCap UE capabilities are applicable for RedCap UE, and therefore only for non-RedCap capabilities that are not appliable for RedCap UE, we clarify in the definitions for parameters in TS38.306, the value or feature is not applicable for RedCap UE;

- QC thinks the design principles to be adopted at this meeting could be adopted only as working assumptions for now.

- Ericsson has similar comments as QC and would also support working directly with the capabilities rather than agreeing the principles

- T-Mobile agrees with QC comment: until RAN2 determines all of the features that need to be modified it is hard to determine the optimal signaling capabilities.

* Continue online to see whether p2 (and possibly other proposals) can be agreed as a Working Assumption or if the whole discussion on the capability design principles should be postponed

- Intel thinks this is about whether we need to check every single capability or not, so we could have it at least as a Working Assumption.

- Apple thinks we can go either way but are fine to have it as a Working Assumption. Spreadtrum is fine to have it as a WA and notes that the actual values/parameters for the capabilities can be different for RedCap UEs than other UEs.

- Intel thinks we could start from 38.306 and if needed consider changes also for 331. Thinks we could also discuss how to capture p8

- QC wonders if this email discussion is premature, also considering that this is also discussed in RAN1. Should we wait for a RAN1 spreadsheet? Vivo agrees or at least we could consider focussing on higher layer capabilities. ZTE thinks that RAN1 has no plan to discuss this so we have to do it. Huawei agrees with QC

* Agreed as a Working Assumption.
* We will have an email discussion until the next meeting to discuss which higher layer capabilities are not applicable for RedCap UEs (it could result in a draft 38.306 CR) and how to reflect p8.

Proposal 4. [To agree] [22/25] The network needs to know if the UE is a RedCap UE or not in order to at least correctly identify the set of mandatory features (i.e. baseline capabilities) that the UE supports, including Handover case;

- Referring to “including Handover case”, Ericsson wonders whether that refers to target gNB needing to know whether the UE is a RedCap UE, i.e. whether it can be supported or not? If this is the intention, P4 is fine

* Agreed

Proposals for potential discussion online

Proposal 1. [To discuss] [12/24] For existing capabilities, where RedCap UEs support different values or should not use some of the existing values, we should reuse related existing capability signalling with necessary clarification in TS38.306 (e.g. clarify the restriction that some values are not applied for RedCap or not applied for non-RedCap UE). FFS on whether new section is used for RedCap only capabilities.

Proposal 5. [To discuss] [16/25] The network needs to unambiguously know whether the UE is a RedCap or a non-RedCap UE from its reported UE capability information.

* Agreed

Proposal 3.1. [To discuss] [15/25]

Revised Principle 1: For RedCap UE’s mandatory without signaling features:

which are optional or mandatory with capability signaling for non-RedCap UE, clarify in TS 38.306 in the definitions for existing parameters; Note “existing” is related to proposal1.

which are mandatory without capability signaling but with different value(s) for non-RedCap UE, clarify in TS 38.306 in the definition for new RedCap UE (FFS on new RedCap capability, type, etc); FFS on the need of new section

Proposal 3.2. [To discuss] [19/25] Principle 2.For RedCap UE’s optional features, which are mandatory without capability signaling for non-RedCap Ues (if any), or newly introduced in R17 for RedCap, add new UE capability signaling in TS 38.331 and capture the new definition in TS 38.306; FFS on the need of new section;

Proposal 3.3. [To discuss] [16/25] Revised Principle 3. For RedCap UE’s optional features, which are optional for non-RedCap UE but with different value (if any), extend the legacy capability signaling, and also capture the restriction in the definitions for existing parameters in TS 38.306; Note “existing” is related to proposal1.

Proposal 3.5. [To discuss] [16/25] Revised Principle 5. For the features not applicable to RedCap UE but mandatory without capability signaling supported by non-RedCap UE, clarify in TS 38.306 in the definition for new RedCap UE (FFS on new RedCap capability, type, etc). FFS on the need of new section;

Proposals for potential discussion in future meetings

Proposal 6. [FFS] postpone the discussion on the definition of RedCap UE type although [16/20] companies support “Option 4: The corresponding minimum set of the reduced capabilities that one RedCap UE type shall mandatorily support.”

Proposal 7. [FFS] postpone the discussion on [11] Send LS to SA2/CT1 to check subscription solution, whether core network should know the UE is a RedCap UE.

Proposal 8. [FFS] Postpone the discussion on the handling of RedCap specific capabilities (e.g. Maximum BW, Max Rx, MIMO-Layer, 256QAM, CA/DC, HD-FDD, etc) until RAN2 has conclusion on capability design principle.

Agreements online:

1. RAN2 Working Assumption: by default, all non-RedCap UE capabilities are applicable for RedCap UE, and therefore only for non-RedCap capabilities that are not appliable for RedCap UE, we clarify in the definitions for parameters in TS38.306, the value or feature is not applicable for RedCap UE
2. We will have an email discussion until the next meeting to discuss which higher layer capabilities are not applicable for RedCap UEs (it could result in a draft 38.306 CR) and how to reflect the handling of RedCap specific capabilities (e.g. Maximum BW, Max Rx, MIMO-Layer, 256QAM, CA/DC, HD-FDD, etc)
3. The network needs to know if the UE is a RedCap UE or not in order to at least correctly identify the set of mandatory features (i.e. baseline capabilities) that the UE supports, including Handover case
4. The network needs to unambiguously know whether the UE is a RedCap or a non-RedCap UE from its reported UE capability information.

* [Post114-e][105][RedCap] Capabilities (Intel)

Scope: Discuss which higher layer capabilities are not applicable for RedCap UEs and how to reflect the handling of RedCap specific capabilities (e.g. Maximum BW, Max Rx, MIMO-Layer, 256QAM, CA/DC, HD-FDD, etc.)

Intended outcome: email discussion summary (it could also result in a draft 38.306 CR)

Deadline: Long

[R2-2104774](file:///C:\Data\3GPP\Extracts\R2-2104774_Definition%20and%20constrained%20use%20of%20RedCap%20UEs.docx) Definition and constrained use of RedCap UEs Qualcomm Incorporated discussion Rel-17 FS\_NR\_redcap

[R2-2104808](file:///C:\Data\3GPP\Extracts\R2-2104808%20constraining%20of%20RedCap.doc) Discussion on constraining of reduced capabilities OPPO discussion Rel-17 NR\_redcap-Core

[R2-2104910](file:///C:\Data\3GPP\Extracts\R2-2104910_UE%20type%20definition%20and%20constraining%20for%20RedCap%20UEs.doc) UE type definition and constraining for RedCap UEs vivo, Guangdong Genius discussion Rel-17 FS\_NR\_redcap

[R2-2104927](file:///C:\Data\3GPP\Extracts\R2-2104927%20RedCap%20UE%20capability%20and%20constraining%20of%20reduced%20capabilities.docx) RedCap UE capability and constraining of reduced capabilities Intel Corporation discussion Rel-17 NR\_redcap

[R2-2105136](file:///C:\Data\3GPP\Extracts\._R2-2105136-redcap-basic-capability.docx) Resolution on some basic mandatory capabilities for RedCap UEs for faster product development Apple Inc discussion Rel-17 NR\_redcap-Core

[R2-2105160](file:///C:\Data\3GPP\Extracts\R2-2105160%20Define%20and%20Constrain%20Reduced%20Capability%20for%20RedCap.docx) Define and Constrain Reduced Capability for RedCap ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2105234](file:///C:\Data\3GPP\Extracts\R2-2105234%20-%20Definition%20of%20RedCap%20UEs.docx) Definition of RedCap UE and first look on capability signaling Ericsson discussion NR\_redcap-Core

[R2-2105319](file:///C:\Data\3GPP\Extracts\R2-2105319.doc) On Redcap UE capabilities and type CATT discussion Rel-17 NR\_redcap-Core

[R2-2105471](file:///C:\Data\3GPP\Extracts\R2-2105471.docx) Capability for RedCap UEs and its early indication Samsung discussion Rel-17 FS\_NR\_redcap

[R2-2105539](file:///C:\Data\3GPP\Extracts\R2-2105539%20Discussion%20on%20L2%20buffer%20size%20reduction%20for%20Redcap%20UE-updated2.doc) Discussion on L2 buffer size reduction for Redcap UE Spreadtrum Communications discussion Rel-17 NR\_redcap-Core

[R2-2105634](file:///C:\Data\3GPP\Extracts\R2-2105634%20Definition%20of%20RedCap%20UE%20type%20and%20reduced%20capabilities.doc) Definition of RedCap UE type and reduced capabilities Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

[R2-2105882](file:///C:\Data\3GPP\Extracts\R2-2105882%20How%20to%20prevent%20RedCap%20UEs%20from%20using%20capabilities%20not%20intended%20for%20RedCap%20UE.docx) How to prevent RedCap UEs from using capabilities not intended for RedCap Ues LG Electronics UK discussion Rel-17

[R2-2105910](file:///C:\Data\3GPP\Extracts\R2-2105910%20On%20REDCAP%20UE%20capabilities.docx) On RedCap UE capabilities Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2106053](file:///C:\Data\3GPP\Extracts\R2-2106053%20(R17%20RedCap%20WI%20AI%208.12.2.1)%20Constrained%20capabilities.docx) Constraint of RedCap UE to intended use cases InterDigital discussion Rel-17 NR\_redcap-Core

R2-2106098 RedCap UE capability and constraining of reduced capabilities Intel Corporation discussion Rel-17 NR\_redcap Withdrawn

[R2-2106230](file:///C:\Data\3GPP\Extracts\R2-2106230.docx) Discussion on the definition and constraining of reduced capabilities CMCC discussion Rel-17 NR\_redcap

[R2-2106276](file:///C:\Data\3GPP\Extracts\R2-2106276%20The%20capability%20and%20the%20constrain%20of%20RedCap%20UE.docx) The capability and the constrain of RedCap UE China Telecommunications discussion

#### 8.12.2.2 Identification, access and camping restrictions

Early identification of RedCap UEs (e.g. msg1/msgA vs msg3).

System information indication for camping restrictions.

[R2-2106487](file:///C:\Data\3GPP\Extracts\R2-2106487%20Summary%208.12.2.2%20-%20Identification%20and%20access%20restrictions%20(Huawei)_v3.doc) [Pre114-e][106][RedCap] Summary 8.12.2.2 - Identification and access restrictions (Huawei) Huawei discussion Rel-17 FS\_NR\_redcap

* [AT114-e][106][RedCap] Identification and access restrictions (Huawei)

Initial scope: Discuss the proposals from [R2-2106487](file:///C:\Data\3GPP\Extracts\R2-2106487%20Summary%208.12.2.2%20-%20Identification%20and%20access%20restrictions%20(Huawei)_v3.doc)

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 2021-05-20 07:00 UTC

Initial deadline (for rapporteur's summary in [R2-2106522](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106522.zip)): Thursday 2021-05-20 09:00 UTC

Updated scope: Continue the discussion on proposals from [R2-2106522](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106522.zip) marked as "continue offline"

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)

Updated deadline (for companies' feedback): Tuesday 2021-05-25 08:00 UTC

Updated deadline (for rapporteur's summary in [R2-2106529](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106529.zip)): Tuesday 2021-05-25 12:00 UTC

Final scope: Draft an LS to RAN3 asking RAN3 to consider the coordination between gNBs on whether a neighbour/target gNB supports RedCap UEs, if needed, to avoid handover RedCap to a target cell that it can’t access

Final intended outcome: LS to RAN3 in R2-2106536

Updated deadline (for companies' feedback): Wednesday 2021-05-26 22:00 UTC

Updated deadline (for LS in R2-2106536): Thursday 2021-05-27 06:00 UTC

[R2-2106522](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106522.zip) [Offline 106] Identification and access restrictions (Huawei) Huawei discussion Rel-17 FS\_NR\_redcap

Easy Proposals for Agreement

Proposal 1 [Easy][21/24]: It is up to RAN1 on the need of Msg1/MsgA early identification.

- QC thinks there are several issues related to the need of early identification in msg1, not all of them related to RAN1. CATT shares the same view. Nokia agrees, this is also a RAN2

- vivo supports the proposal

* Come back in the Wednesday CB session
* RAN2 notes that RAN1 has agreed to have early identification in at least in msg1

- ZTE thinks RAN1 has also agreed to support the 2-step RACH case

- Apple suggest to discuss the need for msg3 identification as well

Proposal 4 [Easy][22/24]: SIB1 indicates cell barring for 1 Rx branch and 2 Rx branches separately for RedCap UEs.

- T-mobile wonders what value this has.

- ZTE is generally fine with the principle but the technical solution is still under discussion in RAN1

- Samsung agrees with T-mobile. The barring should not be related to the support of 1 RX or 2 RX branch

* SIB1 (not MIB) indicates cell barring for 1 Rx branch and 2 Rx branches separately for RedCap UEs. Further details of the solution are FFS

Proposal 5 [Easy][21/23]: The cell barring for RedCap UE is per cell (not per PLMN).

* Agreed

Proposal 7a [Easy][23/23]: RedCap UE supports the Intra Frequency Reselection Indicator.

* Agreed

Proposals for Online discussion

Proposal 2 [To discuss]: It is FFS on the need of Msg3 early identification, in case Msg1 early identification is optionally configured or not supported. (RAN2 postpone the discussion until RAN1 conclude the Msg1 early identification).

- Vivo thinks we should not agree on this.

* Either Msg1 and/or Msg3 early identification will be supported

Proposal 3[To discuss] [14 vs. 2]: There is no need to support Rx branches specific early identification from RAN2 perceptive (final decision up to RAN1).

* continue in offline 106

Proposal 6 [To discuss][16 vs. 5]: RedCap UE ignores the cellBarred in MIB.

* continue in offline 106

Proposal 7b [To discuss] [8 vs. 13]: RAN2 to discuss whether RedCap UEs reuse the legacy IFRI in MIB or use new RedCap specific IFRI in SIB1.

* continue in offline 106

Proposal 9 [To discuss]: Send LS to ask RAN3 to support the coordination between gNBs on whether a neighbour/target gNB supports RedCap UEs, if needed, to avoid handover RedCap to a target cell that it can’t access.

* continue in offline 106

Proposals to be postponed

Proposal 8 [To postpone]: It is FFS on the need for an indication in system information on whether a neighbor cell accepts access by RedCap UEs.

Proposal 10 [To postpone]: It is FFS on whether to support RedCap specific Cell (re)selection parameters. (FFS only for 1 RX branches RedCap UE or all RedCap UEs; FFS on which parameters e.g. cell reselection priorities, cell reselection parameters and cell selection parameters).

Agreements:

1. SIB1 (not MIB) indicates cell barring for 1 Rx branch and 2 Rx branches separately for RedCap UEs. Further details of the solution are FFS
2. The cell barring for RedCap UE is per cell (not per PLMN).
3. RedCap UE supports the Intra Frequency Reselection Indicator.
4. Either Msg1 and/or Msg3 early identification will be supported

[R2-2106529](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106529.zip) [Offline 106] Identification and access restrictions - second round Huawei discussion Rel-17 FS\_NR\_redcap

For agreement

Proposal 1: [Easy] There is no need to support Rx branches specific early identification from RAN2 perceptive (final decision up to RAN1).

* Agreed

Proposal 4 [Easy]: Send LS to ask RAN3 to consider the coordination between gNBs on whether a neighbour/target gNB supports RedCap UEs, if needed, to avoid handover RedCap to a target cell that it can’t access.

* Agreed

- Apple wonders whether we can add considerations on access restrictions in the LS. ZTE wonders why additional information is needed. LG does not support this. Apple would like to cover the case where the target cell supports e.g. only 2RX UEs (it's about which "kind" of RedCap UEs is supported). QC supports this. vivo thinks we can further discuss this but not now in this LS to RAN3

* Send an LS to RAN3 to cover p4 above (from R2-2106529)
* We can come back in the next meeting with discussions on other restrictions, e.g. related to number of RX

Agreements via email - from offline 106:

1. There is no need to support Rx branches specific early identification from RAN2 perceptive (final decision up to RAN1).
2. Send LS to ask RAN3 to consider the coordination between gNBs on whether a neighbour/target gNB supports RedCap UEs, if needed, to avoid handover RedCap to a target cell that it can’t access. We can come back in the next meeting with discussions on other restrictions, e.g. related to number of RX

For discussion

Proposal 2 [To discuss] [16/22] RedCap UE ignores the cellBarred in MIB. (This does not imply RAN2 supports RedCap only cell in R17 or not.)

- VC thinks that no matter what this implies the definition of RedCap UE only cells so it's difficult to agree on this.

- Oppo thinks this is also for Connected UEs. vivo thinks there is no problem but fine to postpone

* Postponed

Proposal 3 [To discuss] [14/22] RAN2 to discuss whether to introduce RedCap specific IFRI in SIB1

- Nokia and Mediatek support this from a power perspective for idle mode UEs. LG also supports.

- ZTE and Intel are fine to postpone

* Postponed

R2-2106536 LS on the coordination between gNBs on the supporting of RedCap UEs Huawei LS out Rel-17 NR\_redcap-Core To: RAN3

[R2-2104775](file:///C:\Data\3GPP\Extracts\R2-2104775_Access%20and%20camping%20restriction%20for%20RedCap%20UEs.docx) Access and camping restrictions for RedCap UEs Qualcomm Incorporated discussion Rel-17 FS\_NR\_redcap

[R2-2104777](file:///C:\Data\3GPP\Extracts\R2-2104777.docx) Discussion on early identification and SI indication CAICT discussion Rel-17

[R2-2104790](file:///C:\Data\3GPP\Extracts\R2-2104790.docx) NR-REDCAP identification and SI indication THALES discussion

[R2-2104809](file:///C:\Data\3GPP\Extracts\R2-2104809%20RedCap%20access%20control.doc) Discussion on RedCap UE’s access control OPPO discussion Rel-17 NR\_redcap-Core

[R2-2104911](file:///C:\Data\3GPP\Extracts\R2-2104911_Identification%20and%20access%20restrictions%20for%20RedCap%20UEs.docx) Identification and access restrictions for RedCap UEs vivo, Guangdong Genius discussion Rel-17 FS\_NR\_redcap [R2-2102859](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2102859.zip)

[R2-2104928](file:///C:\Data\3GPP\Extracts\R2-2104928%20Early%20identification%20and%20camping%20restrictions%20%20for%20RedCap%20UE.docx) Early identification and camping restrictions for RedCap UE Intel Corporation discussion Rel-17 NR\_redcap

[R2-2105014](file:///C:\Data\3GPP\Extracts\R2-2105014%20RedCap_2.docx) Methods for barring and for capability reporting Sierra Wireless, S.A. discussion

[R2-2105071](file:///C:\Data\3GPP\Extracts\R2-2105071%20Discussion%20on%20UAC%20for%20Redcap%20devices.doc) Discussion on UAC for Redcap devices Xiaomi Communications discussion

[R2-2105072](file:///C:\Data\3GPP\Extracts\R2-2105072%20Discussion%20on%20Identification%20and%20UE%20access%20restrictions%20for%20Redcap%20devices.doc) Discussion on Identification and UE access restrictions for Redcap devices Xiaomi Communications discussion

[R2-2105137](file:///C:\Data\3GPP\Extracts\._R2-2105137-Cell-Access.docx) Power-saving aspects from cell access and camping of RedCap UEs Apple Inc discussion Rel-17 NR\_redcap-Core

[R2-2105161](file:///C:\Data\3GPP\Extracts\R2-2105161%20Identification%20and%20Access%20Restriction%20for%20RedCap.docx) Identification and Access Restriction for RedCap ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2105235](file:///C:\Data\3GPP\Extracts\R2-2105235%20-Early%20indication%20and%20access%20restriction%20for%20RedCap%20UEs.docx) Early indication & access restriction for RedCap UEs Ericsson discussion NR\_redcap-Core

[R2-2105320](file:///C:\Data\3GPP\Extracts\R2-2105320.doc) Early Identification and camping restrictions for Redcap UEs CATT discussion Rel-17 NR\_redcap-Core

[R2-2105399](file:///C:\Data\3GPP\Extracts\R2-2105399%20Camping%20restrictions%20of%20RedCap%20UE.doc) Camping restrictions of RedCap UE Fujitsu discussion Rel-17 NR\_redcap-Core

[R2-2105443](file:///C:\Data\3GPP\Extracts\R2-2105443.docx) Camping restriction and cell selection criterion DENSO CORPORATION discussion Rel-17 NR\_redcap-Core [R2-2102947](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2102947.zip)

[R2-2105472](file:///C:\Data\3GPP\Extracts\R2-2105472.docx) Access control for RedCap UEs Samsung discussion Rel-17 FS\_NR\_redcap

[R2-2105540](file:///C:\Data\3GPP\Extracts\R2-2105540%20Discussion%20on%20early%20indication%20design%20for%20RedCap%20UE.docx) Discussion on early indication design for Redcap UE Spreadtrum Communications discussion Rel-17 NR\_redcap-Core

[R2-2105635](file:///C:\Data\3GPP\Extracts\R2-2105635%20Identification%20and%20access%20restriction%20of%20RedCap%20UE-v2.docx) Identification and access restriction of RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

[R2-2105793](file:///C:\Data\3GPP\Extracts\R2-2105793_early%20ind.docx) Early identification and SI indication NEC discussion Rel-17 NR\_redcap-Core [R2-2103506](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103506.zip)

[R2-2105814](file:///C:\Data\3GPP\Extracts\R2-2105814.docx) Cell barring for REDCAP UEs Lenovo, Motorola Mobility discussion Rel-17

[R2-2105879](file:///C:\Data\3GPP\Extracts\R2-2105879%20Access%20for%20REDCAP%20UE.docx) Access for REDCAP UE Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2105883](file:///C:\Data\3GPP\Extracts\R2-2105883%20Identification%20and%20access%20restrictions%20of%20RedCap%20UEs.docx) Identification and access restrictions of RedCap Ues LG Electronics UK discussion Rel-17

[R2-2105957](file:///C:\Data\3GPP\Extracts\R2-2105957%20Discussion%20on%20access%20and%20camping%20restrictions%20for%20RedCap%20UEs.docx) Discussion on access and camping restrictions for RedCap UEs Futurewei Technologies discussion Rel-17 NR\_redcap-Core

[R2-2106052](file:///C:\Data\3GPP\Extracts\R2-2106052%20(R17%20RedCap%20WI%20AI%208.12.2.2)%20Identification%20and%20Restriction%20of%20RedCap%20UE.docx) Identification and restriction of RedCap UE InterDigital discussion Rel-17 NR\_redcap-Core [R2-2103973](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103973.zip)

R2-2106099 Early identification and camping restrictions for RedCap UE Intel Corporation discussion Rel-17 NR\_redcap Withdrawn

[R2-2106243](file:///C:\Data\3GPP\Extracts\R2-2106243.docx) Access control for RedCap UEs cmcc discussion Rel-17 NR\_redcap-Core

[R2-2106244](file:///C:\Data\3GPP\Extracts\R2-2106244.docx) Discussion on early identification cmcc discussion Rel-17 NR\_redcap-Core

[R2-2106274](file:///C:\Data\3GPP\Extracts\R2-2106274%20Early%20identification%20and%20camping%20restrictions%20of%20RedCap%20UE.docx) Early identification and camping restrictions of RedCap UE China Telecommunications discussion

### 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

Specification of extended DRX enhancements for RRC Inactive and Idle, according to the WI objectives

This agenda item may be deprioritized during this meeting. Company contributions are possible but, if there will be time, the discussion will likely focus only on:

* Resolving the FFS in: "At least for eDRX cycle, the configurations of the eDRX for RRC\_IDLE and RRC\_INACTIVE can be different (FFS for PTW, e.g. length and starting point, when eDRX cycles are longer than 10.24s)"
* Discussing the minimum value allowed for the eDRX cycle

[R2-2105236](file:///C:\Data\3GPP\Extracts\R2-2105236%20-%20PTW%20and%20min%20eDRX%20cycle.docx) PTW configuration and minimum cycle length for eDRX Ericsson discussion NR\_redcap-Core

Observation 1 Common PTW refers to the case where the PTW length and starting location are the same between RAN and CN paging whenever RAN and CN paging coincide.

Observation 2 For UEs in RRC\_INACTIVE, RAN may want to configure the UE with a shorter eDRX cycle for RAN paging compared to the CN paging.

Observation 3 Restricting configuration of RAN PTW to equal the length of CN PTW can result in additional UE power consumption.

Observation 4 A common eDRX cycle and PTW where UE monitors both RAN and CN paging may be desirable in some cases. It is up to RAN configuration whether the cycle lengths are the same, and whether the PTW length and starting locations are the same.

Proposal 1 For UEs in RRC\_INACTIVE, RAN can configure different PTW length for RAN paging compared to the PTW configured for monitoring CN paging.

Proposal 2 As baseline, existing functionality from LTE and LTE-M connected to 5GC is used and updated for calculating PTW for RRC\_IDLE, and PTW starting location for RAN paging should follow RAN paging frame calculation, resulting in overlapping PTWs.

Proposal 3 The lower bound for eDRX cycle configuration is 5.12 s.

Proposal 4 From RAN2 perspective it is beneficial if the data is buffered in CN when the UE is unreachable, e.g. when the UE is in eDRX in RRC\_INACTIVE.

Proposal 5 To support CN buffering during RRC\_INACTIVE with eDRX, it should be possible to send a data pending indication from CN to RAN when the UE is unreachable. RAN should provide CN with information when and for how long the UE is unreachable.

[R2-2105135](file:///C:\Data\3GPP\RAN2\Docs\R2-2105135.zip) RedCap UE power-saving with 2.56 DRX cycle Apple Inc, FaceBook Inc, MediaTek Inc discussion Rel-17 NR\_redcap-Core [R2-2103887](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103887.zip)

Observation 1: Some RedCap UEs (for eg., wearables) are expected to receive emergency broadcast while still benefitting from power savings that arise from longer DRX cycles.

Observation 2: It should be possible to come up with solutions that address the power saving needs without missing out on the emergency broadcast reception for the wearable or vice-versa.

Observation 3: Solution 2 is similar to Solution 1 but can carry the requirement/impact of requiring additional broadcast/dedicated signaling in RAN. Solution 1 is simpler and in many ways same as lowering the eDRX lower bound to 2.56sec.

Observation 4: Both solution 1 and 2 have similar impact on the SI update where the NW has to be aware that additional paging cycle are necessary to reach out to the RedCap UEs compared to leagcay devices, if the default RAN paging cycle is shorter than 2.56sec.

Observation 5: If we consider the extending the lower bound of eDRX for NR RedCap to 2.56sec as Solution 1, Solution-3 does not handle emergency reception while still saving power for RedCap UEs, and so it does not help with the two objectives of wearable type RedCap UEs.

Proposal 1: RAN2 agree to using Solution 1 from TR 38.875 for RedCap and eDRX lower bound is set to 2.56sec.

Proposal 2: For RedCap UEs that follow 2.56sec DRX cycle, no specification changes are needed to handle the potential for missed pages for SI update.

[R2-2105321](file:///C:\Data\3GPP\Extracts\R2-2105321.doc) Discussion on eDRX for NR RRC Inactive and Idle CATT discussion Rel-17 NR\_redcap-Core

* [AT114-e][110][RedCap] eDRX aspects (Ericsson)

Initial scope: Discuss PTW length + starting point and min eDRX cycle value

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 2021-05-25 08:00 UTC

Initial deadline (for rapporteur's summary in [R2-2106530](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106530.zip)): Tuesday 2021-05-25 12:00 UTC

Final scope: Draft an LS to SA2/CT1 to check if they have any concerns on RAN2 decision to have a lower bound for eDRX configuration in RRC\_IDLE and RRC\_INACTIVE of 2.56 seconds

Final intended outcome: LS to SA2/CT1 in R2-2106537

Updated deadline (for companies' feedback): Wednesday 2021-05-26 22:00 UTC

Updated deadline (for LS in R2-2106537): Thursday 2021-05-27 06:00 UTC

[R2-2106530](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106530.zip) [Offline 110] eDRX aspects Ericsson discussion Rel-17 FS\_NR\_redcap

For agreement:

Proposal 1 Lower bound for eDRX configuration in RRC\_IDLE and RRC\_INACTIVE is 2.56 seconds. Inform SA2/CT1 and check if there is any concern.

* Agreed
* Send an LS to SA2/CT1 on p1

Proposal 2 It is up to RAN to configure the length for PTW for RAN paging, the RAN PTW length can be different from the CN PTW length.

* Agreed

Proposal 3 When RAN and CN paging coincide in the same PH, the PTW starting locations are the same. FFS how to calculate the PTW starting location so that it is the same for RAN and CN PTW.

* Agreed

Agreements via email - from offline 110:

1. Lower bound for eDRX configuration in RRC\_IDLE and RRC\_INACTIVE is 2.56 seconds. Inform SA2/CT1 and check if there is any concern.
2. It is up to RAN to configure the length for PTW for RAN paging, the RAN PTW length can be different from the CN PTW length.
3. When RAN and CN paging coincide in the same PH, the PTW starting locations are the same. FFS how to calculate the PTW starting location so that it is the same for RAN and CN PTW.

For further discussion:

Proposal 4 Continue discussion on how UE is expected to monitor RAN and CN PTW, e.g. whether UE in RRC\_INACTIVE monitors for only RAN PTW or both CN and RAN PTW when they overlap.

- Intel thinks we should keep the principle as in LTE and wonders whether the discussion on this is about changing that principle. Ericsson thinks that yes, this might imply we change the LTE principle. QC notes that PTW was not supported for RRC Inactive in LTE and there are details to work out

* Agreed

Agreements online:

1. Continue in the next meeting the discussion on how UE is expected to monitor RAN and CN PTW, e.g. whether UE in RRC\_INACTIVE monitors for only RAN PTW or both CN and RAN PTW when they overlap

R2-2106537 LS on lower bound for eDRX cycle length Ericsson LS out Rel-17 NR\_redcap-Core To: SA2, CT1 Cc: RAN3

[R2-2104810](file:///C:\Data\3GPP\Extracts\R2-2104810%20-%20Discussion%20on%20eDRX%20for%20RedCap%20UEs.doc) Discussion on eDRX for RedCap UEs OPPO discussion Rel-17 NR\_redcap-Core

[R2-2104912](file:///C:\Data\3GPP\Extracts\R2-2104912_Discussions%20on%20eDRX%20for%20RedCap%20UEs.doc) Discussion on eDRX for RedCap UEs vivo, Guangdong Genius discussion Rel-17 FS\_NR\_redcap

[R2-2104929](file:///C:\Data\3GPP\Extracts\R2-2104929_NR-eDRX_Intel.docx) Leftover issues for eDRX Intel Corporation discussion Rel-17 NR\_redcap

[R2-2105070](file:///C:\Data\3GPP\Extracts\R2-2105070%20Discussion%20on%20e-DRX%20for%20Redcap%20Devices.doc) Discussion on e-DRX for Redcap Devices Xiaomi Communications discussion

[R2-2105162](file:///C:\Data\3GPP\Extracts\R2-2105162%20On%20eDRX%20for%20RedCap.docx) On eDRX for RedCap ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2105464](file:///C:\Data\3GPP\Extracts\R2-2105464.docx) Open issues on eDRX cycles DENSO CORPORATION discussion Rel-17 NR\_redcap-Core

[R2-2105636](file:///C:\Data\3GPP\Extracts\R2-2105636%20eDRX%20for%20RedCap%20UE-v4.docx) eDRX for RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

[R2-2105671](file:///C:\Data\3GPP\Extracts\R2-2105671%20Remaining%20issues%20for%20eDRX.docx) Remaining issues for eDRX MediaTek Inc. discussion Rel-17 NR\_redcap-Core [R2-2103783](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103783.zip)

[R2-2105813](file:///C:\Data\3GPP\Extracts\R2-2105813.docx) Consideration on eDRX for RedCap UE Lenovo, Motorola Mobility discussion Rel-17

[R2-2105869](file:///C:\Data\3GPP\Extracts\R2-2105869%20eDRX%20for%20REDCAP.docx) eDRX for REDCAP Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2105881](file:///C:\Data\3GPP\Extracts\R2-2105881%20Support%20for%20eDRXs%20for%20RRC%20Inactive%20and%20Idle.docx) Support for eDRXs for RRC Inactive and Idle LG Electronics UK discussion Rel-17

R2-2106100 Leftover issues for eDRX Intel Corporation discussion Rel-17 NR\_redcap Withdrawn

#### 8.12.3.2 RRM relaxations

Continue the investigation of RRM measurement relaxation criteria for neighbouring cells, with the intention to provide recommendation for a WID update for the RRM relaxations objective.

Including the outcome of [POST113bis-e][102][RedCap] RRM relaxations (Qualcomm). No company inputs expected on aspects covered by [POST113bis-e][102]. Company contributions should focus on the measurement-based R17 stationarity criterion and the related not-at-cell-edge criterion.

[R2-2105418](file:///C:\Data\3GPP\Extracts\R2-2105418_Summary%20of%20%5bPost103bis-e%5d%5b102%5d%5bREDCAP%5d%20RRM%20relaxations%20(Qualcomm).docx) Summary of [Post103bis-e][102][REDCAP] RRM relaxations (Qualcomm) Qualcomm Wireless GmbH discussion Rel-17

Proposals for agreement:

Proposal 2. (15/21) If subscription based relaxations is adopted for RRC Idle/Inactive, network advertises in system information if it allows UEs with stationarity provisioned in their subscription to relax their RRM measurements.

Proposal 3. (16/22) If subscription based relaxations is adopted for RRC Connected, core network indicates UE’s stationarity to RAN during UE’s connection establishment.

Proposal 4. (16/23) If RAN2 agree to support criteria-triggered relaxations in RRC Connected, UE can trigger relaxations themselves when the configured relaxation criteria are met.

Proposal 5. (16/22) If RAN2 agree to support criteria-triggered relaxations in RRC Connected, then the R17 RRM relaxation criteria being specified for RRC Idle/Inactive are reused for RRC Connected.

- VC suggested compromise: "RRM relaxation in RRC Connected is supported, under network control (UEs cannot trigger relaxations themselves when the configured relaxation criteria are met)."

- Ericsson thinks the claimed gain for this is minimal, as the real power consumption in RRC connected is not due to measurements but due to TX/RX. Intel agrees. Mediatek also agrees. T-mobile/VDF also agree. ZTE also supports Ericsson view

- QC thinks that for RedCap UE measurements could lead to significant power consumption

- vivo/Oppo/Apple/Spreadtrum/Nokia agree with the compromise

* Come back in the Wednesday CB session

VC updated proposal (for discussion in the Wednesday CB session):

An RSRP/RSRQ based stationarity criterion (Working Assumption: the same as in idle/inactive) can be configured for UEs in RRC Connected. If the criterion is met, this is reported to the network (FFS how/when). It is FFS whether, based on this, besides possibly reconfiguring RRM measurements (up to network implementation), the network can enable RRM measurement relaxation (FFS whether same method as in Idle/Inactive)

- Oppo supports this. QC/Thales/Xiaomi/ZTE/vivo/LG/Lenovo/CATT/Fraunhofer/Spreadtrum as well.

- Ericsson thinks the FFS on enabling RRM measurement relaxation would imply extra work and would like to remove that part as well

- VDF supports this as it keeps everything under network control

- Samsung can accept this as a compromise

- Nokia supports and does not see the problem raised by Ericsson and would rather remove the FFS

- Huawei has some concerns but can accept the proposal provided it's in full network control, including that the NW can avoid configuring the stationarity criterion.

- Ericsson still hopes at the end we can rely on measurement reconfiguration

* Agreed

Agreements:

1. An RSRP/RSRQ based stationarity criterion (Working Assumption: the same as in idle/inactive) can be configured for UEs in RRC Connected. If the criterion is met, this is reported to the network (FFS how/when). It is FFS whether, based on this, besides possibly reconfiguring RRM measurements (up to network implementation), the network can enable RRM measurement relaxation (FFS whether same method as in Idle/Inactive)

Proposal for further discussion:

Proposal 1. (12/23) Continue the discussion on whether RRM relaxations based on subscription information can be supported.

- Apple thinks we are limiting ourselves using a subscription based mechanism

- LG thinks we can use the subscription information for RRM relaxation

- T-mobile don't see the need for this. Fraunhofer agrees.

- Oppo agrees we could focus on the other criteria

- vivo still supports the proposal

- ZTE was one of the proponents of this but based on the situation are fine not to consider this in this release

- QC suggests to have subscription based relaxation only for idle/inactive. T-mobile doesn't support this either

- Apple supports to have relaxation criteria based on the stationarity information sent by the UE

- Huawei thinks this is not needed as it does not bring additional gains. Truly fixed UEs still need to perform measurements

* Subscription based relaxation criteria will not be considered in Rel-17 RRM relaxation

Agreements:

1. Subscription based relaxation criteria will not be considered in Rel-17 RRM relaxation

[R2-2106403](file:///C:\Data\3GPP\Extracts\R2-2106403.doc) RRM relaxation criteria in RRC\_Idle/Inactive Samsung discussion Rel-17

Proposal 1. For Rel-17 RRM relaxation in RRC\_IDLE/INACTIVE, RAN2 defines more stringent stationary criterion for Rel-17 than low mobility criterion in Rel-16.

Proposal 2. For Rel-17 RRM relaxation in RRC\_IDLE/INACTIVE, RAN2 introduces SSearchDeltaP\_stationary and TSearchDeltaP\_stationary with the following conditions:

1) When NW configures both SSearchDeltaP and SSearchDeltaP\_stationary simultaneously, SSearchDeltaP\_stationary is set less than SSearchDeltaP.

2) When NW configures both TSearchDeltaP and TSearchDeltaP\_stationary simultaneously, TSearchDeltaP\_stationary is set larger than SSearchDeltaP.

Proposal 3. For Rel-17 RRM relaxation in RRC\_IDLE/INACTIVE, when NW configures Rel-17 RRM relaxation, stationary criterion is mandatory, but not-at-cell-edge criterion is optional configuration.

Proposal 4. RAN2 reuses Rel-16 not-at-cell-edge criterion for Rel-17 not-at-cell-edge criterion.

Proposal 5. When NW provides both Rel-16 configuration and Rel-17 configuration for RRM relaxation in RRC\_Idle/Inactive,

1) when both Rel-16 and Rel-17 criteria are fulfilled, UE performs Rel-17 RRM relaxation method,

2) when only Rel-16 criterion is fulfilled, UE performs Rel-16 RRM relaxation method,

3) when only Rel-17 criterion is fulfilled, UE performs Rel-17 RRM relaxation method.

[R2-2105637](file:///C:\Data\3GPP\Extracts\R2-2105637%20RRM%20measurement%20relaxation%20for%20RedCap%20UE-V3.doc) RRM measurement relaxation for RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

Proposal 1: Rel-17“stationarity criterion” and Rel-16 “not-at-cell-edge criterion” can be used together or independently, i.e. not to define Rel-17 not-at-cell-edge thresholds, if a different Rel-17 relaxation method based on the combined criteria will be specified.

Proposal 2: The legacy Rel-16 relaxation criterion and Rel-17 relaxation criterion are checked independently. In case both Rel-16 and Rel-17 relaxation criteria are fulfilledt, it is up to UE implementation to select either Rel-16 or Rel-17 relaxation operation.

Proposal 3: Rel-17 stationarity criterion is based on a combination of Rel-16 low-mobility criterion and/or beam-change based criterion.

Proposal 4: For beam-change based criterion is determined base on whether quality change of beam(s) for a period of time is lower than a threshold.

* [AT114-e][111][RedCap] RRM relaxation criteria in idle/inactive (Samsung)

Initial scope: Discuss RSRP/RSRQ based stationarity criterion + not-at-cell-edge criterion + coexistence with R16 configuration, e.g. based on proposals in [R2-2106403](file:///C:\Data\3GPP\Extracts\R2-2106403.doc) and [R2-2105637](file:///C:\Data\3GPP\Extracts\R2-2105637%20RRM%20measurement%20relaxation%20for%20RedCap%20UE-V3.doc)

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 2021-05-25 08:00 UTC

Initial deadline (for rapporteur's summary in [R2-2106531](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106531.zip)): Tuesday 2021-05-25 12:00 UTC

Proposals marked "for agreement" in [R2-2106531](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106531.zip) not challenged until Tuesday 2021-05-25 22:00 UTC will be declared as agreed via email by the session chair.

For the rest the discussion will continue online in the Wednesday CB session.

[R2-2106531](file:///C:\Data\3GPP\RAN2\Inbox\R2-2106531.zip) [Offline 111] RRM relaxation criteria in idle/inactive Samsung discussion Rel-17 FS\_NR\_redcap

For agreement,

Proposal1. Reuse R16 low mobility criterion, as part or whole of Rel-17 stationary criterion in RRC\_IDLE/INACTIVE. When NW configures both Rel-17 stationary criterion and Rel-16 low mobility criterion, NW configures different Rel-17 thresholds (i.e., SSearchDeltaP\_stationary/TSearchDeltaP\_stationary) from Rel-16 (SSearchDeltaP / TSearchDeltaP).

* Agreed

Proposal 3. If Proposal 1 is adopted, how to configure the criterion (e.g. more stringent) is left to NW implementation (i.e. no specification impact to RAN2).

* Agreed

Proposal 4. If beam-level criterion is adopted for Rel-17 stationary criterion in RRC\_IDLE/INACTIVE, it is configured separately with Rel-16 low mobility criterion reused.

- QC has a question for clarification on Proposal 4 and 6. Proposal 6 says that R17 stationary criteria is mandatory if R17 relaxations are enabled. Proposal 4 says we have both beam-level criterion and low-mobility criterion for R17 stationary criterion. When R17 stationary criteria are enabled, do P6 and P4 together mean that they have to be configured together, or configuration of only one of them is also allowed? The impression from the discussion on Question 3 is that the latter is supported (by the word “separately”), i.e. network has the option of configuring either only one of them or both of them.

* Continue online

- ZTE/Oppo/LG/Mediatek thinks that it's early to agree on this since we did not agree beam-level indication for now. vivo/Samsung thinks there is condition

* Agreed as a Working Assumption

Proposal 6. When NW configures Rel-17 RRM relaxation for RRC\_IDLE/INACTIVE (also for RRC Connected if the WA to reuse the same criteria for RRC connected will be confirmed), Rel-17 stationary criterion is mandatory, and Rel-17 not-at-cell-edge criterion is optional configuration.

* Continue online

- Ericsson suggests to remove R17 at the end of the agreement. Samsung/VC thinks we already agreed to have a Rel-17 not-at-cell-edge criterion

- Nokia thinks we should not mandate any network implementation

- ZTE thinks the intention was to exclude the configuration of only not-at-cell-edge criterion. Oppo agrees

* Agreed

Proposal 7. Postpone the following discussion until RAN4 defines RRM relaxation method for Rel-17:

When NW configures both R16/R17 relaxation criteria and the UE fulfills both, UE performs:

- Option 1) UE performs Rel-17 RRM relaxation method

- Option 2) It is up to UE implementation to select either Rel-16 or Rel-17 relaxation operation

* Agreed

Agreements via email - from offline 111:

1. Reuse R16 low mobility criterion, as part or whole of Rel-17 stationary criterion in RRC\_IDLE/INACTIVE. When NW configures both Rel-17 stationary criterion and Rel-16 low mobility criterion, NW configures different Rel-17 thresholds (i.e., SSearchDeltaP\_stationary/TSearchDeltaP\_stationary) from Rel-16 (SSearchDeltaP / TSearchDeltaP). How to configure the criterion (e.g. more stringent) is left to NW implementation (i.e. no specification impact to RAN2).
2. Postpone the following discussion until RAN4 defines RRM relaxation method for Rel-17:

When NW configures both R16/R17 relaxation criteria and the UE fulfills both, UE performs:

- Option 1) UE performs Rel-17 RRM relaxation method

- Option 2) It is up to UE implementation to select either Rel-16 or Rel-17 relaxation operation

For further online discussion,

Proposal 2. Discuss on whether to use beam-level criterion, as part of Rel-17 stationary criterion in RRC\_IDLE/INACTIVE.

Proposal 5. Continue discussion on Rel-17 not-at-cell-edge criterion in RRC\_IDLE/INACTIVE within two options:

- Option 1) Reuse Rel-16 not-at-cell-edge criterion with the same thresholds (i.e., SSearchThresholdP / SSearchThresholdQ)

- Option 2) Reuse Rel-16 not-at-cell-edge criterion with the different thresholds

* Agreed

Agreements online:

1. Working Assumption: If beam-level criterion is adopted for Rel-17 stationary criterion in RRC\_IDLE/INACTIVE, it is configured separately with Rel-16 low mobility criterion reused
2. When NW configures Rel-17 RRM relaxation for RRC\_IDLE/INACTIVE, Rel-17 stationary criterion is mandatory, and Rel-17 not-at-cell-edge criterion is optional configuration. FFS whether the same applies to RRC Connected
3. Continue discussion on Rel-17 not-at-cell-edge criterion in RRC\_IDLE/INACTIVE within two options:

- Option 1) Reuse Rel-16 not-at-cell-edge criterion with the same thresholds (i.e., SSearchThresholdP / SSearchThresholdQ)

- Option 2) Reuse Rel-16 not-at-cell-edge criterion with the different thresholds

[R2-2104776](file:///C:\Data\3GPP\Extracts\R2-2104776_RRM%20measurement%20relaxations%20for%20stationary%20UEs.docx) RRM measurement relaxations for stationary UEs Qualcomm Incorporated discussion Rel-17 FS\_NR\_redcap

[R2-2104811](file:///C:\Data\3GPP\Extracts\R2-2104811%20-%20Discussion%20on%20RRM%20relax%20%20for%20RedCap%20UEs.doc) Discussion on RRM relax for RedCap UEs OPPO discussion Rel-17 NR\_redcap-Core

[R2-2104913](file:///C:\Data\3GPP\Extracts\R2-2104913_RRM%20Relaxation%20for%20Neighboring%20Cells%20in%20Connected%20State.docx) RRM relaxation for neighboring cell for RedCap UEs vivo, Guangdong Genius discussion Rel-17 FS\_NR\_redcap

[R2-2104926](file:///C:\Data\3GPP\Extracts\R2-2104926%20RRM%20measurement%20relaxation%20criteria%20for%20RedCap%20devices.docx) RRM measurement relaxation criteria for RedCap devices Intel Corporation discussion Rel-17 NR\_redcap [R2-2102853](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2102853.zip)

[R2-2105138](file:///C:\Data\3GPP\Extracts\._R2-2105138-RRM-confined-mob.docx) Confined Mobility impact on RRM Relaxation Apple Inc discussion Rel-17 NR\_redcap-Core

[R2-2105159](file:///C:\Data\3GPP\Extracts\R2-2105159%20RRM%20relaxation%20for%20RedCap%20UE.docx) RRM relaxation for RedCap UEs ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2105229](file:///C:\Data\3GPP\Extracts\R2-2105229_RRM%20relaxation%20enhancement%20for%20RedCap%20UE.docx) RRM Relaxation for RedCap UE NTT DOCOMO INC. discussion

R2-2105237 Triggering conditions for Rel-17 RRM relaxation Ericsson discussion NR\_redcap-Core Withdrawn

[R2-2105246](file:///C:\Data\3GPP\Extracts\R2-2105246%20-%20RRM%20relaxation.docx) RRM Relaxation Ericsson discussion Rel-17 NR\_redcap-Core

[R2-2105296](file:///C:\Data\3GPP\Extracts\R2-2105296%20Discussion%20on%20RRM%20relaxations%20for%20RedCap%20UE.docx) Discussion on RRM relaxations for RedCap UE Xiaomi Communications discussion Rel-17 NR\_redcap

[R2-2105521](file:///C:\Data\3GPP\Extracts\R2-2105521%20RRM%20relaxation%20in%20RRC_CONNECTED%20for%20RedCap%20UEs.doc) RRM relaxation in RRC\_CONNECTED for RedCap UEs SHARP Corporation discussion [R2-2103206](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2103206.zip)

[R2-2105705](file:///C:\Data\3GPP\Extracts\R2-2105705_RedcapRRM.docx) Redcap relaxed measurements and number of beams Sony discussion Rel-17 NR\_redcap-Core

[R2-2105706](file:///C:\Data\3GPP\Extracts\R2-2105706_RedCap_Stationary_Final.docx) RedCap Relaxed measurements, stationary definition Sony discussion Rel-17 NR\_redcap-Core

[R2-2105788](file:///C:\Data\3GPP\Extracts\R2-2105788%20RRM%20relaxation%20for%20stationary%20RedCap%20UEs.DOC) RRM relaxation for stationary RedCap Ues LG Electronics Inc. discussion Rel-17 NR\_redcap-Core

[R2-2105812](file:///C:\Data\3GPP\Extracts\R2-2105812.docx) RRM relaxation for stationary UE with reduced capability Lenovo, Motorola Mobility discussion Rel-17

[R2-2105909](file:///C:\Data\3GPP\Extracts\R2-2105909%20On%20RRM%20relaxation%20for%20REDCAP%20UE.docx) On RRM relaxations for REDCAP Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2105959](file:///C:\Data\3GPP\Extracts\R2-2105959%20Discussion%20on%20R17%20stationarity%20criterion%20and%20not-at-cell-edge%20criterion%20for%20RedCap%20UEs.docx) Discussion on R17 stationarity criterion and not-at-cell-edge criterion for RedCap UEs Futurewei Technologies discussion Rel-17 NR\_redcap-Core

R2-2106097 RRM measurement relaxation criteria for RedCap devices Intel Corporation discussion Rel-17 NR\_redcap [R2-2102853](file:///C:\Data\3GPP\archive\RAN2\RAN2%23113bis\Tdocs\R2-2102853.zip) Withdrawn

[R2-2106229](file:///C:\Data\3GPP\Extracts\R2-2106229.docx) Discussion on the RRM relaxation for RedCap Ues CMCC discussion Rel-17 NR\_redcap

[R2-2106272](file:///C:\Data\3GPP\Extracts\R2-2106272%20RRM%20relaxation%20of%20RedCap%20UE.docx) RRM relaxation of RedCap UE China Telecommunications discussion

[R2-2106404](file:///C:\Data\3GPP\Extracts\R2-2106404.doc) RRM relaxation criteria in RRC\_Connected Samsung discussion Rel-17

## Summary

Agreed CRs

TBD

Approved LSs out

TBD

[POST114-e] Email discussions

Short

TBD

Long

TBD