3GPP TSG-RAN WG2 Meeting #115 electronic R2-2108832

Online, Aug 16th - 27th, 2021

**Agenda item: 10.2**

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

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

**Document for: Approval**

General

Recording of voice or video at meetings is not used in 3GPP. This applies also to this e-Meeting. At this e-Meeting, no specific actions are taken to prevent the recording of web conferences. Companies that have concerns related to recordings, if any, may express those by email in the main meeting organizational thread [AT115-e][000]

Organizational

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

* [AT115-e][100] ****Organizational - NTN, REDCAP and CE session (RAN2 VC)****

Scope:

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

Schedule/Plan

WEEK 1:

|  |  |  |  |
| --- | --- | --- | --- |
| **Time Zone UTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Monday** |  |  |  |
| 12:15-13:05 | NR15 NR16 Main session (Johan) | NR16 Pos (Nathan) | **NR17 NTN, non-pos aspects (Sergio)**  **- [8.10.1]**  **- [8.10.2.1]**  **- [8.10.2.2]**  **- [8.10.2.3]** |
| 13:05-14:25 | NR15 NR16 Main session (Johan) | NR17 Multi-SIM (Tero) | **NR17 NTN (Sergio)**  **- [8.10.3.1]**  **- [8.10.3.2]**  **- [8.10.3.3]** |
| 14:25-15:45 | TEI17 (Johan) | 14:25 – 15:15: NR17 SL enh (Kyeongin)  15:15 – 15:45: NR17 Tero Early Items (will be specified in more detail) | LTE17 IoT (Brian) |
| **Tuesday** |  |  |  |
| 12:15-13:05 | NR17 QoE (Johan) | NR17 RAN Slicing (Tero) | NR17 Small Data Enh (Diana) |
| 13:05-14:25 | NR17 eIAB (Johan) | NR16 V2X (Kyeongin) | NR17 Small Data Enh (Diana) |
| 14:25-15:45 | NR17 ePowSav (Johan) | NR17 DCCA (Tero) | NR17 SL enh (Kyeongin) |
| **Wednesd** |  |  |  |
| 12:15-13:05 | NR17 eNPN (Johan) | **12:15-13:35: NR17 RedCap (Sergio)**  **- [8.12.1]**  **- [8.12.2.1] including outcome of [Post114-e] [105]**  **- [8.12.2.2]**  **- [8.12.3.1]**  **- [8.12.3.2]** | NR17 SL Relay (Nathan) |
| 13:05-14:25 | NR17 Multicast (Johan) | **13:35-14:25: NR17 CovEnh (Sergio)**  **- [8.19.1]**  **- [8.19.2]** | NR17 Pos (Nathan) |
| 14:25-15:45 | NR17 Multicast (Johan) | NR17 SONMDT (HuNan) | NR17 IIOT URLLC (Diana) |
| **Thursday** |  |  |  |
| 04:00-05:00 | NR17 feMIMO (Johan) | NR17 SL Relay (Nathan) | LTE16e IoT (Emre, Brian) |
| **Friday** |  |  |  |
| 04:00-05:00 | NR17 Other (Johan) | NR17 SL Relay (Nathan) | LTE All releases Misc (Tero) |

WEEK 2:

|  |  |  |  |
| --- | --- | --- | --- |
| **Time Zone UTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Monday** |  |  |  |
| 12:15-13:05 | NR17 Other (Johan) | NR17 up to 71 GHz (Tero) | NR16 SONMDT (HuNan) |
| 13:05-14:25 | NR17 IoT NTN (Johan) | CB Tero | CB Kyeongin |
| 14:25-15:45 | NR15 NR16 Main session (Johan) | NR17 RACH indication / partitioning (Diana) | NR17 Pos (Nathan) |
| **Tuesday** |  |  |  |
| 12:15-13:05 | CB eNPN, ePowsav, QoE if needed (Johan) | **CB Sergio**  **- NTN CB session, including offline discussion outcomes**  **- also start the discussion on SMTC aspects** | CB Nathan |
| 13:05-14:25 | CB eIAB, TEI17 (Johan) | **CB Sergio (until 14:05)**  **- CE offline discussion outcome**  **- Redcap CB session, including offline discussion outcomes**  CB Diana (from 14:05) | CB Brian Emre |
| 14:25-15:45 | CB Multicast, IoT NTN (Johan) | CB Diana | CB Kyeongin |
| **Wednesd** |  |  |  |
| 04:00-05:00 | CB Multicast, feMIMO (Johan) | CB Tero | CB Nathan |
| **Thursday** |  |  |  |
| 04:00-05:00 | CB NR16 NR15 (Johan) | CB HuNan | CB TBD |
| **Friday** |  |  |  |
| 04:00-05:00 | CB TBD (Johan) | **CB Sergio (NTN and …)** | CB Tero |

List and status of offline email discussions

NOTE: No offline email discussions will be kicked off before Monday Aug 16th, 07:00 UTC

* [AT115-e][101][NTN] Other MAC aspects (Interdigital)

Updated Scope: Continue the discussion on p3 from [R2-2108883](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108883.zip) and to see if additional details based on company comments can be agreed:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Updated deadline (for companies' feedback): Monday 2021-08-23 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2108896](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108896.zip)): Monday 2021-08-23 2000 UTC

Proposals marked "for agreement" in [R2-2108896](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108896.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

Status: Closed

* [AT115-e][102][NTN] LCS aspects (Qualcomm)

Final scope: Draft reply LS responses to RAN3 (contact Qualcomm) and SA3 (contact Huawei) and new LS to SA3 (contact Qualcomm) for the need of NTN specific user consent for obtaining UE location by gNB.

Intended outcome: LSs to RAN3 (in R2-2109128) and SA3 (in R2-2108886 and R2-2108902)

Final deadline (for companies' feedback): Thursday 2021-08-26 1600 UTC

Final deadline (for final LSs): Thursday 2021-08-26 2000 UTC

Status: Ongoing

* [AT115-e][103][NTN] CHO and NTN -TN mobility aspects (Ericsson)

Final scope: Continue the discussion on p5 from [R2-2108900](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108900.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2108904): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2108904 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair.

Status: Ongoing

* [AT115-e][104][RedCap] Identification, access and camping (Ericsson)

Final scope: Continue the discussion on p2 from [R2-2108892](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108892.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2109131): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2109131 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

Status: Ongoing

* [AT115-e][105][RedCap] eDRX cycles (Vivo)

Final scope: discuss the remaining proposals from [R2-2109117](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109117.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2109132): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2109132 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

Status: Ongoing

* [AT115-e][106][NTN] RACH aspects (CATT)

Final scope: Continue the discussion on p1 and p2 from [R2-2108897](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108897.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2108901): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2108901 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

Status: Ongoing

* [AT115-e][107][NTN] Reply LS on TAC handling (Nokia)

Updated scope: Finalize reply LS response to CT1 and SA2

Intended outcome: Reply LS to CT1 and SA2

Updated deadline (for companies' feedback): Monday 2021-08-23 1000 UTC

Updated deadline (for reply LS in [R2-2108888](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108888.zip)): Monday 2021-08-23 1600 UTC

Status: Closed

* [AT115-e][108][NTN] idle mode aspects (ZTE)

Final scope: Continue the discussion to clarify the understanding of the expiry time and its implications as well as a possible acceptable rewording of p4.1 from [R2-2108899](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108899.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2108903): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2108903 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

Status: Ongoing

* [AT115-e][109][RedCap] Capabilites (Intel)

Final scope: Continue the discussion on p3, p13 and p14 from [R2-2108891](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108891.zip) and draft the LS to RAN1 on L2 buffer size reduction

Intended outcome: LS(s) and summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2109129 and LS in R2-2109130): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2109129 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

Status: Ongoing

* [AT115-e][110][RedCap] RRM relaxation (Huawei)

Initial scope: Continue the remaining proposals from [R2-2108894](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108894.zip) and draft LS to RAN4

Intended outcome: LS and summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2109133): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2109133 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

Status: Ongoing

* [AT115-e][111][CE] Msg3 repetition (ZTE)

Final scope: Draft reply LS to RAN1 based on meeting agreements and possibly something from p5 in [R2-2108895](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108895.zip)

Intended outcome: LSs to RAN1 in R2-2108905

Final deadline (for companies' feedback): Thursday 2021-08-26 1600 UTC

Final deadline (for final LSs): Friday 2021-08-27 0000 UTC

Status: Ongoing

## 8.10 NR Non-Terrestrial Networks (NTN)

(NR\_NTN\_solutions-Core; leading WG: RAN2; REL-17; WID: RP-211557)

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.

Workplan

[R2-2107146](file:///C:\Data\3GPP\Extracts\R2-2107146-Rel17%20NR-NTN%20workplan%20updated%20v29.docx) Updated NR-NTN-solutions work plan THALES Work Plan Rel-17 NR\_NTN\_solutions

* Noted

Incoming LSs

* UE location aspects

[R2-2106941](file:///C:\Data\3GPP\Extracts\R2-2106941_R3-212917.docx) Reply LS on UE location aspects in NTN (R3-212917; contact: Qualcomm) RAN3 LS in Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH To:RAN2, SA2, SA3-LI, SA3, CT1

- QC clarifies that this LS was sent while we took further decision in the last meeting and sent a newer LS. In any case it's good to further clarify and answer all the questions

* Noted. Continue the discussion in AI 8.10.3.1

[R2-2106976](file:///C:\Data\3GPP\Extracts\R2-2106976_S3-212306.doc) Reply LS on UE location aspects in NTN (S3-212306; contact: Huawei) SA3 LS in Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH To:RAN2, SA2, SA3-LI, RAN3 Cc:CT1

- Thales thinks the first question can be answered by RAN3. ZTE agrees but SA3 explicitly asked us to answer as well

* Noted. Continue the discussion in AI 8.10.3.1

[R2-2107568](file:///C:\Data\3GPP\Extracts\R2-2107568%20draft%20LS%20on%20RAN3%20question.docx) [Draft] Reply LS on UE location aspects in NTN Qualcomm Incorporated LS out Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH To:RAN3 Cc:SA2, CT1

* revised in [R2-2108885](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108885.zip)

[R2-2108885](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108885.zip) Reply LS on UE location aspects in NTN Qualcomm Incorporated LS out Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH To:RAN3 Cc:SA2, CT1

* revised in R2-2109128

R2-2109128 Reply LS on UE location aspects in NTN Qualcomm Incorporated LS out Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH To:RAN3 Cc:SA2, CT1

[R2-2107346](file:///C:\Data\3GPP\Extracts\R2-2107346%20Draft%20reply%20LS%20on%20UE%20location%20aspects%20in%20NTN.doc) Draft Reply LS on UE location aspects in NTN Huawei, HiSilicon LS out Rel-17 NR\_NTN\_solutions-Core To:SA3 Cc:CT1, SA2, SA3-LI, RAN3

moved here from 8.10.3.1

* revised in R2-2108886

R2-2108886 Reply LS on UE location aspects in NTN Huawei, HiSilicon LS out Rel-17 NR\_NTN\_solutions-Core To:SA3 Cc:CT1, SA2, SA3-LI, RAN3

* Multiple TACs

[R2-2106904](file:///C:\Data\3GPP\Extracts\R2-2106904_C1-213965.doc) LS reply on multiple TACs per PLMN (C1-213965; contact: Nokia) CT1 LS in Rel-17 5GSAT\_ARCH-CT, NR\_NTN\_solutions-Core To:RAN2, SA2 Cc:RAN3

* Noted. Continue the discussion in AI 8.10.3.1

[R2-2106966](file:///C:\Data\3GPP\Extracts\R2-2106966_S2-2104891.docx) LS Response to LS on multiple TACs per PLMN (S2-2104891; contact: Qualcomm) SA2 LS in Rel-17 5GSAT\_ARCH To:RAN2, CT1 Cc:RAN3

* Noted. Continue the discussion in AI 8.10.3.1

[R2-2107523](file:///C:\Data\3GPP\Extracts\R2-2107523%20Draft%20Response%20LS%20on%20Multiple%20TACs%20per%20PLMN.docx) Draft Response LS on Multiple TACs per PLMN Nokia, Nokia Shanghai Bell LS out Rel-17 NR\_NTN\_solutions-Core To:CT1, SA2 Cc:RAN3

* revised in [R2-2108888](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108888.zip)

[R2-2108888](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108888.zip) Response LS on Multiple TACs per PLMN Nokia, Nokia Shanghai Bell LS out Rel-17 NR\_NTN\_solutions-Core To:CT1, SA2, RAN3

* Approved
* TA pre-compensation

[R2-2106924](file:///C:\Data\3GPP\Extracts\R2-2106924_R1-2106341.docx) Reply LS on TA pre-compensation (R1-2106341; contact: OPPO) RAN1 LS in Rel-17 NR\_NTN\_solutions-Core To:RAN2

* Noted (no reply LS needed for now)
* PDB for new 5QI

[R2-2106922](file:///C:\Data\3GPP\Extracts\R2-2106922_R1-2106331.docx) Reply LS on PDB for new 5QI (R1-2106331; contact: Ericsson) RAN1 LS in Rel-17 5GSAT\_ARCH, NR\_NTN\_solutions-Core To:SA2 Cc:RAN2, RAN3

* Noted
* On SA2 assumptions on architecture aspects

[R2-2106940](file:///C:\Data\3GPP\Extracts\R2-2106940_R3-212916.doc) Reply LS on SA WG2 assumptions from conclusion of study on architecture aspects for using satellite access in 5G (R3-212916; contact: Ericsson) RAN3 LS in Rel-17 NR\_NTN\_solutions-Core To:RAN2, SA2 Cc:SA3-LI, SA5

* Noted

Running CRs

[R2-2108829](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108829.zip) Stg 2 Running CR\_38.300\_NR-NTN THALES draftCR Rel-17 38.300 16.6.0 NR\_NTN\_solutions R2-2106539 Late

[R2-2107732](file:///C:\Data\3GPP\Extracts\R2-2107732_Stage-3%20running%20304%20CR%20for%20NTN.docx) Stage-3 running 304 CR for NTN ZTE corporation, Sanechips draftCR Rel-17 38.304 16.5.0 B NR\_NTN\_solutions-Core

[R2-2108345](file:///C:\Data\3GPP\Extracts\38331_runningCR_R2-2108345_Stage3%20NTN.docx) Stage-3 running RRC CR for NTN Rel-17 Ericsson draftCR Rel-17 38.331 16.5.0 NR\_NTN\_solutions-Core

[R2-2108664](file:///C:\Data\3GPP\Extracts\R2-2108664%20(R17%20NTN%20WI%20AI%208.10.1)%20NTN%20MAC%20running%20CR_115e.docx) Stage 3 NTN running CR for 38.321 - RAN2#115 InterDigital draftCR Rel-17 38.321 16.5.0 NR\_NTN\_solutions-Core

### 8.10.2 User Plane

[R2-2107280](file:///C:\Data\3GPP\Extracts\R2-2107280_For8.10.2_UserPlanIssues_Samsung.doc) User Plane Issues and Enhancements for an NTN Samsung Research America discussion

[R2-2108663](file:///C:\Data\3GPP\Extracts\R2-2108663%20(R17%20NTN%20WI%20AI%208.10.2)%20MAC%20Open%20Issues_115e.docx) MAC open issues in NTN - RAN2#115 InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

#### 8.10.2.1 RACH aspects

[R2-2107314](file:///C:\Data\3GPP\Extracts\R2-2107314.docx) Discussion on UE Specific TA Report CATT discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: For the UE-specific TA reporting under network control, two options can be supported:

Option 1: the UE-specific TA Report requested by network;

Option 2: periodically triggering the UE-specific TA report.

Proposal 2: For the UE-specific TA reporting under UE control, event triggered method should be supported in NTN, e.g. a threshold between current TA and the last reported TA.

- CATT thinks both options in p1 can be considered together

- HW thinks option 1 in p1 is enough but wonders if this is one time request in System Info or what.

- QC thinks the enabling/disabling in SI should be an independent proposal. Dynamic request from the network (e.g. via DCI) is not needed, if option 2 and proposal 2 are supported

* UE specific TA reporting during RACH procedure is enabled/disabled by SI (FFS for RACH in connected mode)

Updated proposal: periodical reporting of UE-specific TA report in connected is supported

- Ericsson thinks this is not sufficient.

- Nokia thinks that event triggered reporting is needed

* Continue in offline 106

Agreements:

1. UE specific TA reporting during RACH procedure is enabled/disabled by SI (FFS for RACH in connected mode)

[R2-2108453](file:///C:\Data\3GPP\Extracts\R2-2108453%20-%20Random%20Access%20timers%20and%20reporting%20information%20about%20UE%20specific%20TA%20pre-compensation%20in%20NTNs.docx) Random Access timers and reporting information about UE specific TA pre-compensation in NTNs Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1 The start of ra-ResponseWindow is specified in both 38.321 and 38.213 which increases complexity as changes to ra-ResponseWindow have to be made in two places.

Proposal 1 Discuss and select one of option a) and option b).

* Postponed to when we will discuss Stage 3 details

Proposal 2 In the MAC specification section 5.1.5, delay the start of ra-ContentionResolutionTimer by the UE-gNB RTT (i.e. sum of UE's TA and K\_mac)

- ZTE/CMCC/vivo support this proposal

- Ericsson clarifies that they did not suggest to add msgB-ResponseWindow as this is not specified in RAN2 specs

* Agreed

Observation 2 The UE reported TA can be used to accurately estimate the UE position.

Observation 3 Reporting TA and TA drift will give faster estimation of UE position.

Observation 4 Reporting TA or UE position in a MAC CE will enable any entity to estimate the UE position.

Proposal 3 The report about UE specific TA pre-compensation using MAC CE is the UE TA or UE position with a low resolution.

- vivo has some concern on the (low resolution) UE position, at least in initial access

- CATT/Mediatek think we can wait for RAN1.

- Apple also thinks we should not report the UE position

* Continue in offline 106

Proposal 4 If the UE reports information about UE specific TA pre-compensation after random access, RRC signalling is used after security has been activated.

- QC/Mediatek thinks that after security is activated we can actually send TA value via MAC CE

- Apple supports p4 to send UE specific TA

* Continue in offline 106

Observation 5 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.

Proposal 5 The report about UE specific TA pre-compensation using RRC is the UE position.

- Nokia supports p4 and p5

* Continue in offline 106

Proposal 6 Network can request the UE to report information about UE specific TA pre-compensation.

* Continue in offline 106

Proposal 7 The network may configure triggers for reporting information about UE specific TA pre-compensation.

* Continue in offline 106

Proposal 8 The network may configure a number of TA levels that triggers reporting of information about UE specific TA pre-compensation.

Proposal 9 The network may configure an offset for triggering reporting of information about UE specific TA pre-compensation when going towards lower TA values.

Proposal 10 The network may configure an offset for triggering reporting of information about UE specific TA pre-compensation when going towards higher TA values.

Proposal 11 The network may configure a time threshold when going towards lower TA values where a report with information about UE specific TA pre-compensation is triggered if time since passing the TA threshold is above the time threshold.

Proposal 12 The network may configure a time threshold when going towards higher TA values where a report with information about UE specific TA pre-compensation is triggered if time until passing the TA threshold is below the time threshold.

Proposal 13 The network may configure the time thresholds and offsets separately or combine them together.

Proposal 14 The network may configure the UEs to report the times (or time until) it will cross each TA level with an indication if it will pass from lower to higher TA or from higher to lower TA.

Proposal 15 The network may configure the UE to only consider the TA levels closest to the TA when last successfully reported information about UE specific TA pre-compensation was triggered.

Observation 6 It is complicated to make the UE aware of which gateway and/or which gNB that each cell belongs to.

Proposal 16 For all types of handovers, the network indicates in the handover command whether the UE reports information about the UE specific TA pre-compensation during the random access to the target cell.

* Continue in offline 106

Proposal 17 In RA procedures triggered due to “Request for Other SI”, information about UE specific TA pre-compensation is not reported.

* Continue in offline 106

Proposal 18 In RA procedures not due to handover and not due to “Request for Other SI” and when the UE is not configured with a triggering condition for reporting information about UE specific TA pre-compensation, the UE shall report information about UE specific TA pre-compensation in the RA procedure.

* Continue in offline 106

Agreements:

1. In the MAC specification section 5.1.5, delay the start of ra-ContentionResolutionTimer by the UE-gNB RTT (i.e. sum of UE's TA and K\_mac)

* [AT115-e][106][NTN] RACH aspects (CATT)

Scope: Continue the discussion on p1 and p2 from [R2-2107314](file:///C:\Data\3GPP\Extracts\R2-2107314.docx) and p3-p7 and p16-p18 from [R2-2108453](file:///C:\Data\3GPP\Extracts\R2-2108453%20-%20Random%20Access%20timers%20and%20reporting%20information%20about%20UE%20specific%20TA%20pre-compensation%20in%20NTNs.docx) (p8-p15 may be discussed in the future if p7 is agreed)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Thursday 2021-08-19 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2108882](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108882.zip)): Thursday 2021-08-19 1600 UTC

Proposals marked "for agreement" in [R2-2108882](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108882.zip) not challenged until Friday 2021-08-20 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Updated scope: Continue the discussion on p1, p2 and (updated) p6 from [R2-2108882](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108882.zip), as well as on remaining FFSs in the agreements

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Updated deadline (for companies' feedback): Monday 2021-08-23 1400 UTC

Updated deadline (for rapporteur's summary in [R2-2108897](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108897.zip)): Monday 2021-08-23 1600 UTC

Proposals marked "for agreement" in [R2-2108897](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108897.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

Final scope: Continue the discussion on p1 and p2 from [R2-2108897](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108897.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2108901): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2108901 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

[R2-2108882](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108882.zip) [offline 106] RACH aspects CATT discussion Rel-17 NR\_NTN\_solutions-Core

Proposals for agreements:

The trigger conditions of UE specific TA reporting in connected state aspect:

Proposal 3: RAN2 to agree event-triggers for reporting UE specific TA in connected mode is supported. FFS on the details.

- Huawei thinks there is not sufficient justification yet and would like to postpone this. Lenovo agrees

- ZTE thinks we could wait for RAN1 but is also fine to accept the majority view, with the addition that "confirmation by RAN1 is needed" or "final decision is up to RAN1"

- Nokia suggests to revise as "RAN2 to agree event-triggers for reporting on the information about UE specific TA in connected mode is supported. FFS on the details". Ericsson supports

* Agreed with the formulation "Event-triggers for reporting on the information about UE specific TA in connected mode is supported. FFS on the details. Confirmation by RAN1 is also needed"

What and how to report UE specific TA aspect:

Proposal 4: RAN2 to agree the content of UE specific TA pre-compensation reported in RA procedure using MAC CE is UE specific TA.

- Nokia suggests to postpone the agreement (as we previously asked RAN1 view on this) or add note that it can be revisited after receiving RAN1 response

- CATT is ok to add "(this can be revisited after receiving RAN1 response)"

* Agreed with the formulation "The content of UE specific TA pre-compensation reported in RA procedure using MAC CE is UE specific TA (this can be revisited after receiving RAN1 response)"

Proposal 5: RAN2 to support reporting UE specific TA pre-compensation in connected mode, FFS via RRC signalling or MAC CE.

- Huawei has the same comment as for p3 and also think p5 should be discussed first. Lenovo and Ericsson agree.

- Nokia suggests to revise as "RAN2 to support reporting on the information about UE specific TA pre-compensation in connected mode, FFS via RRC signalling or MAC CE.". Ericsson supports

- Ericsson has a question for supporters of no reporting info about UE specific TA in connected mode: The UE will autonomously adjust the UE specific TA during a connection and gNB need to know the UE specific TA (and Kmac) to adjust the UE specific Koffset. If no reporting at all in connected mode, how will gNB know when the UE has adjusted the TA so that a UE specific Koffset adjustment is needed?

* Agreed with the formulation "Reporting on the information about UE specific pre-compensation in connected mode is supported, FFS via RRC signalling or MAC CE"

UE specific TA reporting in RA procedure aspect:

Proposal 7: RAN2 to agree the UE should report information of the UE specific TA pre-compensation to the target cell during the random access, FFS a new indication in RRC reconfiguration with sync or not.

- Oppo thinks the FFS part was not suggested by anyone and should be removed

- Huawei suggests to reword as "RAN2 to agree the UE should report information of the UE specific TA ~~pre-compensation~~ to the target cell during the random access if the enable/disable indication of TA report in SI is also carried in HO command (similar to other IEs in SIB1 that are carried in HO command)~~, FFS a new indication in RRC reconfiguration with sync or not~~.". Nokia agrees

- ZTE wonders if some sort of implicit indication (e.g., presence of NTN parameters) can be used to inform the UE to report TA via HO, therefore the FFS can be kept for the moment

- Ericsson thinks there are handover cases where the network do not need the reported TA because it can deduct it from known information (for example for HO to a cell in the same satellite without a feeder link switch, the UE shall use the same TA as before the HO and no TA report is needed), therefore proposes a new flag to trigger this report as the SIB indication from the new cell is not sufficient.

- CATT is ok with Huawei's formulation with the addition of the FFS: "RAN2 to agree the UE should report information of the UE specific TA ~~pre-compensation~~ to the target cell during the random access if the enable/disable indication of TA report in SI is also carried in HO command (similar to other IEs in SIB1 that are carried in HO command). FFS a new indication in RRC reconfiguration with sync or not."

* Agreed with the formulation "If configured, the UE shall report information of the UE specific TA pre-compensation to the target cell during the random access. FFS if a new indication in RRC reconfiguration with sync is needed or not (besides the SIB indication carried in HO command on whether TA report is enabled/disabled in the target cell)"

Proposal 8: RAN2 to agree information about UE specific TA pre-compensation is not reported in RA procedures triggered due to “Request for Other SI”.

* Agreed

Proposals for further discussion:

Proposal 1: RAN2 to further discuss if UE specific TA report can dynamically be requested by network when UE in connected mode.

Proposal 2: RAN2 to further discuss if periodical reporting of UE-specific TA report in connected node.

Proposal 6: RAN2 to further discuss if the UE coarse location can represent UE specific TA in connected mode and discuss if an LS to RAN1 is required.

- Oppo thinks there is a clear majority for option 1 (UE specific TA) and wonders why we have this p6 and the need to send an LS to RAN1. Huawei, ZTE and Lenovo agree.

- vivo also agrees and suggests to revises as "RAN2 to further discuss if ~~the UE coarse location can represent~~ the reporting of UE specific TA in connected mode is needed~~and discuss if an LS to RAN1 is required~~."

- Nokia agrees with the proposal

* Continue the discussion on the content of UE specific TA, e.g. UE specific TA pre-compensation or UE position

Agreements via email - from offline 106:

1. The content of UE specific TA pre-compensation reported in RA procedure using MAC CE is UE specific TA (this can be revisited after receiving RAN1 response).
2. Reporting on the information about UE specific pre-compensation in connected mode is supported, FFS via RRC signalling or MAC CE
3. Event-triggers for reporting on the information about UE specific TA in connected mode is supported. FFS on the details. Confirmation by RAN1 is also needed
4. If configured, the UE shall report information of the UE specific TA pre-compensation to the target cell during the random access. FFS if a new indication in RRC reconfiguration with sync is needed or not (besides the SIB indication carried in HO command on whether TA report is enabled/disabled in the target cell).
5. Information about UE specific TA pre-compensation is not reported in RA procedures triggered due to “Request for Other SI”

[R2-2108897](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108897.zip) [offline 106] RACH aspects - second round CATT discussion Rel-17 NR\_NTN\_solutions-Core

Proposals for easy agreements:

Proposal 1: The content of UE specific TA reported in connected mode is UE specific TA pre-compensation (13/17), FFS the UE position (3/17).

- Nokia is not convinced of this and would like to postpone

- Xiaomi wonders what is UE specific TA-precompensation and suggests to revise as:

"Proposal 1: The content of UE specific TA reported in connected mode is ~~UE specific TA pre-compensation~~ TA value (FFS on the details of TA value, e.g. UE’s TA or UE specific TA or differential TA, etc, it is up to RAN1 to decide) (13/17), FFS the UE position"

* Discuss online, e.g. with formulation: "The content of UE specific TA reported in connected mode is UE specific TA pre-compensation (for the details of the TA value, confirmation from RAN1 is needed)"

- Nokia suggests to keep both options: if the UE location cannot be reported the UE sends the UE specific TA-precompensation value. Sony agrees, Ericsson, Intel as well

- ZTE doesn't think UE location is a good candidate for this. Apple agrees. Vivo/LG/Oppo/ Lenovo agree.

- QC thinks this discussion focusses on TA and supports sending the TA but can also accept the Nokia proposal. Samsung wonders why we need the TA reporting in addition to the UE location reporting.

- Huawei thinks if we go as Nokia suggested the response is pending on SA3 response and it will be postponed

New proposal: In connected mode the network can request the UE to send either the TA precompensation value and/or the UE location"

* Continue in offline 106

Proposal 2: The UE reports information about UE specific TA in connected mode using a MAC CE (13/17).

- Oppo would like to add "(if SA3 sees no security issue).". ZTE agrees

- Nokia thinks this is related to p1 and in case it should use RRC

* Discuss online with formulation: "The UE reports information about UE specific TA in connected mode using a MAC CE (if SA3 sees no security issue)".
* Continue in offline 106

Proposal 4: The event-triggers for reporting information about UE specific TA are based on TA values (17/17).

- ZTE suggests to add that "(confirmation from RAN1 is needed)"

* Agreed with formulation: "The event-triggers for reporting information about UE specific TA are based on TA values (confirmation from RAN1 is needed)"

Proposal 5: An TA offset threshold can be used for event-triggered reporting, at least the offset threshold can be between current information about UE specific TA and the last successfully reported information about UE specific TA (13/17).

- Oppo thinks this rules out p5a and would like to revise as "Proposal 5: An TA offset threshold can be used for event-triggered reporting, FFS how to define the offset threshold.". ZTE agrees.

- CATT thinks that p5 reflects the majority view and thinks we should stick to it. We can add "other candidate threshold offset can be FFS for the next meeting, e.g. offset between Koffset configured by NW and UE’s current TA" to p5a

* Agreed

Proposal 7: The event-triggers for reporting information about UE specific TA based on time threshold is not supported in NTN (15/17).

* Agreed

Proposal 9: No new indication in RRC reconfiguration with sync is needed to configure the UE to report information about UE specific TA in handover procedure (besides the SIB indication carried in HO command on whether TA report is enabled/disabled in the target cell) (15/17).

* Agreed

Proposals for further discussion:

Proposal 8: Further discuss the network may configure a number of TA levels that triggers reporting of information about UE specific TA pre-compensation.

Proposal 5a: Threshold used between Koffset configured by NW and UE’s current TA can be FFS for the next meeting.

- CATT suggests to add "other candidate threshold offset can be FFS for the next meeting, e.g. offset between Koffset configured by NW and UE’s current TA"

Proposal 6: Further discuss the two proposals:

 The network may configure an offset for triggering reporting of information about UE specific TA pre-compensation when going towards lower TA values. [2]

 The network may configure an offset for triggering reporting of information about UE specific TA pre-compensation when going towards higher TA values. [2]

Proposal 3: FFS UE specific TA report can be requested by network (11/17).

- Oppo suggests to keep periodical UE reporting FFS as well, i.e. revise as "Proposal 3: FFS UE specific TA report can be requested by network or periodical UE specific reporting.". ZTE agrees

- Xiaomi also suggests to cover periodic reporting in the proposal

Agreements via email - from offline 106 second round:

1. The event-triggers for reporting information about UE specific TA are based on TA values (confirmation from RAN1 is needed)
2. A TA offset threshold can be used for event-triggered reporting, at least the offset threshold can be between current information about UE specific TA and the last successfully reported information about UE specific TA
3. The event-triggers for reporting information about UE specific TA based on time threshold is not supported in NTN.
4. No new indication in RRC reconfiguration with sync is needed to configure the UE to report information about UE specific TA in handover procedure (besides the SIB indication carried in HO command on whether TA report is enabled/disabled in the target cell).

R2-2108901 [Offline 106] RACH aspects - third round CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107075](file:///C:\Data\3GPP\Extracts\R2-2107075%20-%20Discussion%20on%20RACH%20in%20NTN.doc) Discussion on RACH in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107362](file:///C:\Data\3GPP\Extracts\R2-2107362%20TA%20report%20in%20Random%20access%20procedure.doc) TA report in Random access procedure Spreadtrum Communications discussion Rel-17

[R2-2107908](file:///C:\Data\3GPP\Extracts\R2-2107908%20Considerations%20on%20new%20criteria%20for%20RA%20type%20selection%20(Revision%20of%20R2-2105817).docx) Considerations on new criteria for RA type selection Lenovo, Motorola Mobility discussion Rel-17

[R2-2107972](file:///C:\Data\3GPP\Extracts\R2-2107972%20%20RACH%20Type%20selection%20and%20TA%20report.doc) RACH Type selection and TA report Beijing Xiaomi Mobile Software discussion Rel-17

[R2-2108114](file:///C:\Data\3GPP\Extracts\R2-2108114%20Further%20discussion%20on%20RACH%20issues%20for%20NR%20NTN.docx) Further discussion on RACH issues for NR NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108350](file:///C:\Data\3GPP\Extracts\R2-2108350%20Considerations%20on%20Random%20Access%20aspects.doc) Considerations on RACH aspects ZTE Corporation, Sanechips discussion Rel-17

[R2-2108609](file:///C:\Data\3GPP\Extracts\R2-2108609_Discussion%20on%20RACH%20and%20TA%20report%20aspects.docx) Discussion on RACH and TA report aspects LG Electronics Inc. discussion NR\_NTN\_solutions-Core

[R2-2108715](file:///C:\Data\3GPP\Extracts\R2-2108715%20Discussion%20on%20LCH-based%20RA%20type%20selection.docx) Discussion on LCH-based RA type selection ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core [R2-2105381](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105381.zip)

#### 8.10.2.2 Other MAC aspects

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

[R2-2109031](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109031.zip) [Pre115-e][101][NTN] Summary of AI 8.10.2.2 - Other MAC aspects Interdigital discussion Rel-17 NR\_ NTN\_solutions-Core

Likely agreeable

Proposal 7: Confirm the RAN2 working assumption that offset to drx-HARQ-RTT-TimerUL length is equal to UE-gNB RTT (i.e. sum on UE's TA and K\_mac).

* Agreed

Proposal 9: Confirm the RAN2 working assumption that for HARQ processes with DL HARQ feedback enabled, the drx-HARQ-RTT-TimerDL length is increased by an offset equal to UE-gNB RTT (i.e. sum on UE's TA and K\_mac)..

* Agreed

Needs discussion

Proposal 1: A HARQ process can be optionally configured as having UL HARQ retransmission state “enabled” or “disabled”. Configuration is semi-static and signalled via RRC. The decision and criteria to enable/disable UL HARQ retransmission for a HARQ process is under network control.

* Continue in offline 101

Proposal 2: If a HARQ process is not configured with an UL HARQ retransmission state, the network may schedule according to any scheme (i.e. as in legacy).

* Continue in offline 101

Proposal 3: RAN2 to discuss definition of “enabled” and “disabled” UL HARQ retransmission state (i.e. supported network scheduling strateg(ies) and corresponding UE behaviour).

* Continue in offline 101

(Set of alternative proposals suggested via email:

Proposal 1A: For dynamic grants, a UL HARQ process can be configured with HARQ reliability low/high, but HARQ processes remain configured. The criteria and decision to set HARQ reliability as high/low is under network control and is signalled to the UE via RRC in a semi-static manner.

* Continue in offline 101

Proposal 1B: As in legacy, the network may, when UE is in Active Time and respecting RAN1 restrictions on time between grants/assignments for a specified HARQ process, send a grant/assignment with NDI toggled or not toggled and the UE shall act as indicated in the grant/assignment.

* Continue in offline 101

)

Proposal 4: A new LCP restriction is introduced in NTN.

Proposal 5: RAN2 to discuss details of new LCP restriction, e.g. if LCP restriction maps LCH to HARQ process ID or UL HARQ retransmission state, and if LCP restriction is optionally configurable (i.e. it may not apply UL grant assigned to HARQ process(es) not configured with an UL HARQ retransmission state).

(Set of alternative proposals suggested via email:

Proposal 5A: No new LCP restrictions are introduced for exisiting UL MAC CEs (if new MAC CEs will be introduced we can revisit this)

- Ericsson clarifies that the intention is not to change anything for MAC CE handling (they can be multiplexed into any TB)

* Agreed

Proposal 5B: For dynamic grants, each LCH can optionally be semi statically by RRC configured to use LCP restrictions

•             Only map to low reliability HARQ process

•             Only map to high reliability HARQ process

If low/high reliability HARQ state is not configured, this mapping has no effect.

If no mapping is signalled for an LCH, then the LCH can be mapped to any low/high reliability HARQ process.

- ZTE can accept this as long as we don't introduce restrictions on the retx scheme. Maybe it's sufficient to say that we can have LCP restriction to map LCH to one or more HARQ process, with mapping method to be further discussed

- HW thinks it's early to agree to on p5B

- vivo can support p5B with some rewording as suggested by ZTE

* For dynamic grants, each LCH can optionally be semi statically configured (by RRC) to be mapped to one or more HARQ processes (FFS if it's possible to map to more than one HARQ process/ process type. FFS on mapping method). If there is no RRC configuration for this, this mapping has no effect (legacy behaviour applies).
* Continue in offline 101

Proposal 5C: For configured grants, the legacy allowedCG-List is used for deciding if a LCH may be mapped to a CG. No spec change is needed.

* Continue in offline 101

)

Proposal 6: The following behaviours are supported for drx-HARQ-RTT-TimerUL in NTN per HARQ process: 1) Timer length is extended by offset; 2) Timer disabled (i.e. not started).

* Continue in offline 101

Proposal 8: For HARQ process(es) not configured with an UL HARQ retransmission state, drx-HARQ-RTT-TimerUL (unless explicitly configured with a different behaviour) and drx-RetransmissionTimerUL behave as per legacy (i.e. as per configuration in DRX-config).

* Continue in offline 101

Lower priority

Proposal 10: RAN2 may further discuss how drx-RetransmissionTimerDL is handled in HARQ feedback disabled case by taking related RAN1 agreements into account.

Agreements:

1. Confirm the RAN2 working assumption that offset to drx-HARQ-RTT-TimerUL length is equal to UE-gNB RTT (i.e. sum on UE's TA and K\_mac).
2. Confirm the RAN2 working assumption that for HARQ processes with DL HARQ feedback enabled, the drx-HARQ-RTT-TimerDL length is increased by an offset equal to UE-gNB RTT (i.e. sum on UE's TA and K\_mac).
3. No new LCP restrictions are introduced for exisiting UL MAC CEs (if new MAC CEs will be introduced we can revisit this)
4. For dynamic grants, each LCH can optionally be semi statically configured (by RRC) to be mapped to one or more HARQ processes (FFS if it's possible to map to more than one HARQ process/ process type. FFS on mapping method). If there is no RRC configuration for this, this mapping has no effect (legacy behaviour applies).

* [AT115-e][101][NTN] Other MAC aspects (Interdigital)

Scope: Continue the discussion on a revision of p1-p6 and p8 from [R2-2109031](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109031.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Thursday 2021-08-19 1600 UTC

Initial deadline (for rapporteur's summary in [R2-2108883](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108883.zip)): Thursday 2021-08-19 2000 UTC

Proposals marked "for agreement" in [R2-2108883](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108883.zip) not challenged until Friday 2021-08-20 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Updated Scope: Continue the discussion on p3 from [R2-2108883](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108883.zip) and to see if additional details based on company comments can be agreed:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Updated deadline (for companies' feedback): Monday 2021-08-23 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2108896](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108896.zip)): Monday 2021-08-23 2000 UTC

Proposals marked "for agreement" in [R2-2108896](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108896.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

[R2-2108883](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108883.zip) [offline 101] Other MAC aspects Interdigital discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1A: For at least dynamic grants, the network may optionally configure an UL HARQ retransmission state per HARQ process. Two UL HARQ retransmission states are defined in NTN: HARQ state A and HARQ state B.

- Vivo suggests to use different names for HARQ state A and HARQ state B.

- VC thinks this can be solved by adding "(FFS whether "HARQ state A" and "HARQ state B" should be renamed)"

* P1A is agreed with the addition on the FFS on the naming of the states

Proposal 1B: HARQ state A/B are defined as follows:

- HARQ state A: length of drx-HARQ-RTT-TimerUL is extended by UE-gNB RTT (i.e. UE PDCCH monitoring is optimized to support UL retransmission grant based on UL decoding result).

- HARQ state B: drx-HARQ-RTT-TimerUL is not started.

- Vivo suggests to add "Proposal 1C: FFS on the HARQ schemes included in each HARQ states and the corresponding naming of each state based on Proposal 1B."

- Ericsson doesn't support P1C

- Vivo can accept the way forward but would like to keep the suggest P1C for further discussion

* P1B is agreed
* Continue the discussion to see if additional details based on company comments can be agreed

Proposal 2: Configuration of UL HARQ retransmission state is semi-static, signalled via RRC, and the decision and criteria to configure UL HARQ retransmission state is under network control. (18/19)

* Agreed

Proposal 3: UE shall always act as indicated in a grant/assignment regardless of whether an UL HARQ retransmission state is configured or not (as in legacy). (18/20)

- QC thinks drx-HARQ-RTT-TimerUL defines the minimum duration before a UL HARQ retransmission grant is expected by the MAC entity. IDC and others think that if the UE is in active time for some other reason, the UE always acts on the received grant and p3 intends to confirm that this legacy behaviour is maintained

* Continue in the second round of offline 101

Proposal 4: For dynamic grants, each LCH can be optionally mapped to an UL HARQ retransmission state via semi-static RRC configuration. If there is no configuration, the mapping has no effect (legacy behaviour applies). (15/19)

* Agreed

Proposal 5: If HARQ process has not been configured with an UL HARQ retransmission state, new LCH mapping rule has no effect (i.e. UE applies legacy behaviour). (19/20)

* Agreed

Proposal 6: The following behaviours are supported for drx-HARQ-RTT-TimerUL in NTN per HARQ process: 1) Timer length is extended by offset; 2) Timer disabled (i.e. not started) (16/19)

* Agreed

Proposal 7: UE determines drx-HARQ-RTT-TimerUL behaviour per HARQ process based on configured UL HARQ retransmission state. (14/20)

* Agreed

Proposal 8: For HARQ process(es) not configured with an UL HARQ retransmission state, drx-HARQ-RTT-TimerUL and drx-RetransmissionTimerUL behave as per legacy. (consensus)

* Agreed

Agreements via email - from offline 101:

1a. For at least dynamic grants, the network may optionally configure an UL HARQ retransmission state per HARQ process. Two UL HARQ retransmission states are defined in NTN: HARQ state A and HARQ state B (FFS whether "HARQ state A" and "HARQ state B" should be renamed)

1b. HARQ state A/B are defined as follows:

- HARQ state A: length of drx-HARQ-RTT-TimerUL is extended by UE-gNB RTT (i.e. UE PDCCH monitoring is optimized to support UL retransmission grant based on UL decoding result).

- HARQ state B: drx-HARQ-RTT-TimerUL is not started.

2. Configuration of UL HARQ retransmission state is semi-static, signalled via RRC, and the decision and criteria to configure UL HARQ retransmission state is under network control.

3. For dynamic grants, each LCH can be optionally mapped to an UL HARQ retransmission state via semi-static RRC configuration. If there is no configuration, the mapping has no effect (legacy behaviour applies).

4. If HARQ process has not been configured with an UL HARQ retransmission state, new LCH mapping rule has no effect (i.e. UE applies legacy behaviour).

5. The following behaviours are supported for drx-HARQ-RTT-TimerUL in NTN per HARQ process: 1) Timer length is extended by offset; 2) Timer disabled (i.e. not started)

6. UE determines drx-HARQ-RTT-TimerUL behaviour per HARQ process based on configured UL HARQ retransmission state.

7. For HARQ process(es) not configured with an UL HARQ retransmission state, drx-HARQ-RTT-TimerUL and drx-RetransmissionTimerUL behave as per legacy.

[R2-2108896](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108896.zip) [offline 101] Other MAC aspects - second round Interdigital discussion Rel-17 NR\_NTN\_solutions-Core

Proposals for email agreement:

Proposal 1: An UL HARQ retransmission state is configured per HARQ process to support new LCH mapping restriction (15/16) and proper configuration of drx-HARQ-RTT-TimerUL behaviour (12/16).

* Agreed

Proposal 2: The network may consider delay (14/16) and reliability (10/16) characteristics of ongoing services when choosing to configure an UL HARQ retransmission state.

- vivo suggests to add "(No RAN2 specification impact)"

- IDC thinks P2 captures the intention of P3A/B but would avoid any possibility of being misinterpreted as a scheduling restriction, which is clearly not the intention.

* Agreed

Proposal 4: Alternative naming for HARQ state A/B can be further considered during stage 3, however UE behaviour in each state should be defined in specification.

* Agreed

Proposals for possible inclusion in the chair notes but with no expected specification impact:

Proposal 3A: RAN2 understanding is that UE behaviour in HARQ state A (i.e. extending the drx-HARQ-RTT-TimerUL by UE-gNB RTT) best supports reception of UL retransmission grant based on UL decoding result. (No RAN2 specification impact) (15/16)

- for p3a and p3b vivo suggests to remove "(No RAN2 specification impact)"

- IDC thinks the discussion on Inactivity timer vs. retransmission timer for blind retransmission is somewhat unrelated to the intention of the proposal.

- vivo is fine to follow the majority view

* Agreed

Proposal 3B: RAN2 understanding is that UE behaviour in HARQ state B (i.e. not starting drx-HARQ-RTT-TimerUL) best supports no UL retransmission (15/16) and/or blind UL retransmission (8/16). (No RAN2 specification impact)

- Oppo suggests to add "(FFS to run drx-RetransmissionTimerUL for blind UL retransmission).". LG supports. Xiaomi agrees and would like to put the FFS in p1

- Oppo can accept p3b but would like to add a "p3c: For HARQ state B, FFS to run drx-RetransmissionTimerUL for blind UL retransmission"

* Agreed

New proposal suggested via email:

Proposals 3c: For HARQ state B, FFS to run drx-RetransmissionTimerUL for blind UL retransmission

* Continue online
* For HARQ state B, FFS to run drx-RetransmissionTimerUL for blind UL retransmission

Additional proposal:

Proposal 5: For HARQ process(es) configured with HARQ state A, UE in DRX active time may receive a grant/assignment while drx-HARQ-RTT-TimerUL is running, and UE will act as indicated in grant/assignment. (12/15)

OR

Proposal 5(alt): UE configured with an UL HARQ retransmission state (i.e. A or B) will always act as indicated in a grant/assignment provided during a valid occasion (i.e. subject to legacy restrictions in e.g. MAC and RAN1 specifications). (No RAN2 specification impact)

- QC cannot accept p5 but can accept p5(alt)

* Continue online

- Huawei also think p5(alt) is better. Oppo agrees

* p5(alt) is agreed

- VC thinks that if further clarification is needed on the legacy behaviour this will have to be discussed in the main room as part of the maintenance session.

Agreements via email - from offline 101 second round:

1. An UL HARQ retransmission state is configured per HARQ process to support new LCH mapping restriction and proper configuration of drx-HARQ-RTT-TimerUL behaviour.

2. The network may consider delay and reliability characteristics of ongoing services when choosing to configure an UL HARQ retransmission state.

3. Alternative naming for HARQ state A/B can be further considered during stage 3, however UE behaviour in each state should be defined in specification.

4. RAN2 understanding is that UE behaviour in HARQ state A (i.e. extending the drx-HARQ-RTT-TimerUL by UE-gNB RTT) best supports reception of UL retransmission grant based on UL decoding result. (No RAN2 specification impact)

5. RAN2 understanding is that UE behaviour in HARQ state B (i.e. not starting drx-HARQ-RTT-TimerUL) best supports no UL retransmission and/or blind UL retransmission. (No RAN2 specification impact)

Agreements online:

1. For HARQ state B, FFS to run drx-RetransmissionTimerUL for blind UL retransmission
2. UE configured with an UL HARQ retransmission state (i.e. A or B) will always act as indicated in a grant/assignment provided during a valid occasion (i.e. subject to legacy restrictions in e.g. MAC and RAN1 specifications). (No RAN2 specification impact)

[R2-2107076](file:///C:\Data\3GPP\Extracts\R2-2107076%20-%20Discussion%20on%20UL%20HARQ%20retransmission%20in%20NTN.doc) Discussion on UL HARQ retransmission in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107315](file:///C:\Data\3GPP\Extracts\R2-2107315.docx) Discussion on HARQ Aspects and UL Scheduling Enhancement in NTN CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107361](file:///C:\Data\3GPP\Extracts\R2-2107361%20Discussion%20on%20HARQ%20and%20LCP%20remaining%20issues.doc) Discussion on HARQ and LCP remaining issues Spreadtrum Communications discussion Rel-17

[R2-2107449](file:///C:\Data\3GPP\Extracts\R2-2107449%20Impact%20on%20DRX%20timers%20with%20UL%20and%20DL%20HARQ%20enhancement%20in%20NTN.docx) Impact on DRX timers with UL/DL HARQ enhancement in NTN vivo discussion

[R2-2107450](file:///C:\Data\3GPP\Extracts\R2-2107450%20Impact%20on%20LCP%20with%20disabled%20UL%20HARQ%20retransmission.docx) Impact on LCP with disabled UL HARQ retransmission in NTN vivo discussion

[R2-2107563](file:///C:\Data\3GPP\Extracts\R2-2107563%20LCP%20in%20UL%20HARQ.doc) LCP restriction for an UL HARQ process Qualcomm Incorporated, Huawei, HiSilicon, Xiaomi, Samsung discussion Rel-17 NR\_NTN\_solutions-Core [R2-2105431](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105431.zip)

[R2-2107632](file:///C:\Data\3GPP\Extracts\._R2-2107632%20HARQ%20Management%20and%20LCP%20Restrictions%20for%20NTN.docx) HARQ Management and LCP Restrictions in NTN Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107790](file:///C:\Data\3GPP\Extracts\R2-2107790%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 [R2-2105498](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105498.zip)

[R2-2107909](file:///C:\Data\3GPP\Extracts\R2-2107909%20BSR%20with%20configured%202-step%20RACH%20and%20CG.docx) BSR with configured 2-step RACH and CG Lenovo, Motorola Mobility discussion Rel-17

[R2-2107986](file:///C:\Data\3GPP\Extracts\R2-2107986%20%20Consideration%20on%20HARQ%20aspects.doc) Consideration on HARQ aspects Beijing Xiaomi Mobile Software discussion Rel-17

[R2-2108115](file:///C:\Data\3GPP\Extracts\R2-2108115%20Discussion%20on%20remaining%20MAC%20issues%20for%20NR%20NTN.docx) Discussion on remaining MAC issues for NR NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108318](file:///C:\Data\3GPP\Extracts\R2-2108318%20On%20Disabling%20uplink%20HARQ%20retransmission%20and%20Associated%20LCP%20Impacts.docx) On disabling uplink HARQ retransmission and associated LCP impacts MediaTek Inc. discussion [R2-2105250](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105250.zip)

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

[R2-2108351](file:///C:\Data\3GPP\Extracts\R2-2108351%20Considerations%20on%20HARQ%20aspects.doc) Considerations on HARQ aspects ZTE Corporation, Sanechips discussion Rel-17

[R2-2108452](file:///C:\Data\3GPP\Extracts\R2-2108452%20-%20On%20DRX%20LCP%20HARQ%20SR%20BSR%20and%20configured%20scheduling.docx) On DRX, LCP, HARQ, SR/BSR, and configured scheduling Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108544](file:///C:\Data\3GPP\Extracts\R2-2108544%20Discussion%20on%20LCP%20Restrictions%20and%20CG%20Impact%20in%20NTN.docx) Discussion on LCP Restrictions and CG Impact in NTN CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108608](file:///C:\Data\3GPP\Extracts\R2-2108608_Discussion%20on%20other%20MAC%20aspects_r1.DOCX) Discussion on other MAC aspects LG Electronics Inc. discussion NR\_NTN\_solutions-Core

[R2-2108610](file:///C:\Data\3GPP\Extracts\R2-2108610%20Consideration%20on%20LCP%20in%20NTN.DOC) Consideration on LCP in NTN Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108611](file:///C:\Data\3GPP\Extracts\R2-2108611%20Discussion%20on%20TA%20report.doc) Discussion on TA report Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108661](file:///C:\Data\3GPP\Extracts\R2-2108661%20(R17%20NTN%20WI%20AI%208.10.2.2)%20HARQ%20UL%20Retransmission.docx) UL HARQ retransmission InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108662](file:///C:\Data\3GPP\Extracts\R2-2108662%20(R17%20NTN%20WI%20AI%208.10.2.2)%20Impacts%20of%20UE-gNB%20RTT.docx) Impact of UE-gNB RTT determination on MAC InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108716](file:///C:\Data\3GPP\Extracts\R2-2108716%20Discussion%20on%20UL%20retransmission%20and%20DRX%20RTT%20timer.docx) Discussion on UL retransmission and DRX RTT timer ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108768](file:///C:\Data\3GPP\Extracts\R2-2108768.docx) HARQ Retransmission Enabling/Disabling for CG aspects ITL discussion Rel-17

#### 8.10.2.3 RLC and PDCP aspects

[R2-2108317](file:///C:\Data\3GPP\Extracts\R2-2108317_RLC%20and%20PDCP%20timers%20extension.docx) RLC and PDCP timers extension NEC Telecom MODUS Ltd. discussion [R2-2106016](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2106016.zip)

Regarding RLC t-Reassembly timer

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

* Agreed

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.

Proposal 2a: If Proposal 2 is agreed, the name of new IE can be changed to “t-ReassemblyAdd-r17”.

- QC is fine with p1 and p2

- Ericsson thinks it would be add a new IE. LG agrees with Ericsson. ZTE thinks we could have just longer values

* Continue in the CB session in week2

Regarding PDCP discardTimer:

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

* Agreed

Regarding PDCP t-Reordering timer:

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.

* Agreed

Agreements:

1. Introduce a new t-ReassemblyExt-r17 IE, which is optional present for NTN network scenario.
2. Introduce a new discardTimerExt-r17 IE with a new value ms2000 and several spare bits for future extension.
3. 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.

[R2-2108451](file:///C:\Data\3GPP\Extracts\R2-2108451%20-%20On%20RLC%20and%20PDCP%20for%20NTNs.docx) On RLC and PDCP for NTNs Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108460](file:///C:\Data\3GPP\Extracts\R2-2108460_On%20RLC%20t-Reassembly%20for%20NTN.docx) On RLC t-Reassembly for NTN Sequans Communications discussion Rel-17 NR\_NTN\_solutions-Core [R2-2106055](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2106055.zip)

### 8.10.3 Control Plane

#### 8.10.3.1General aspects

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

LCS aspects

[R2-2108848](file:///C:\Data\3GPP\RAN2\Docs\R2-2108848.zip) [Pre115-e][102][NTN] Summary of AI 8.10.3.1 - LCS aspects only Qualcomm discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1. If SA3 replies with concern on reporting UE location with any granularity during initial access, RAN2 will revisit agreement/solution for reporting UE location during initial access.

- Oppo and others suggest to turn this into a proposal

Proposal 1 RAN2 decide on definition of coarse UE location information, whether it is (1) GNSS coordinates (i.e., X MSB bits out of 24 bits of longitude/latitude or GNSS coordinates with ~2km accuracy) or (2) v2x like zone ID or (3) virtual cell identifier or (4) the detected TN cell CGI.

- Oppo thinks the solution we agreed on last time might not be required and would like to revert the decision. VC thinks we should not change the decision unless we receive negative feedback from SA3.

Updated proposal (option 1 in p1): UE coarse location information is provided by coarse GNSS coordinates (FFS on the details, e.g. X MSB bits out of 24 bits of longitude/latitude or GNSS coordinates with ~2km accuracy)

- Thales can accept this together with p4.

- Fraunhofer can accept this provided more information is sent from the UE (RX-TX time difference)

- Samsung can accept the first option if this is suggested by the majority

Show of hands:

option 1: NEC, ZTE, CATT, Nokia, Sony, CMCC, QC, Mediatek, Xiaomi, Turkcell, LG, Lenovo, Intel

option 2: Apple, Samsung, Ericsson, Fraunhofer

option 3: Thales, vivo

* Option 1 is agreed

Agreements:

1. If SA3 replies with concern on reporting UE location with any granularity during initial access, RAN2 will revisit agreement/solution for reporting UE location during initial access.
2. UE coarse location information refers to coarse GNSS coordinates (FFS on the details, e.g. X MSB bits out of 24 bits of longitude/latitude or GNSS coordinates with ~2km accuracy). FFS if any enhancements to validate the UE’s coarse location information is needed. FFS whether this is only used in initial access or also in connected

Proposal 2 The coarse location information is reported in Msg5, i.e., via RRCSetupComplete/RRCResumeComplete message.

* Continue in offline 102

Proposal 3 For coarse UE location reporting during initial access, the location granularity (i.e., accuracy to be 2 km radius or x>2 km radius) is indicated to UE via SIB.

* Continue in offline 102

Proposal 4 RAN2 decide if any enhancements to validate the UE’s coarse location information is needed.

* Continue in offline 102

Proposal 5 RAN2 decide whether the UE reports coarse UE location information (as defined by proposal 1) or full GNSS coordinates to gNB in RRC\_CONNECTED, i.e., after AS security has been established.

* Continue in offline 102

Proposal 6 After AS security is established, gNB can obtain a GNSS-based location information from the UE using existing signalling method, i.e., by configuring includeCommonLocationInfo in the corresponding reportConfig.

* Continue in offline 102

Proposal 7 Periodic reporting and location-based event triggered reporting are configured by gNB to obtain UE location update of mobile UEs in RRC\_CONNECTED.

* Continue in offline 102

Proposal 8 RAN2 discuss whether UE location reporting upon request from the gNB is necessary.

* Continue in offline 102
* [AT115-e][102][NTN] LCS aspects (Qualcomm)

Scope: Continue the discussion on p2-p8 from [R2-2108848](file:///C:\Data\3GPP\RAN2\Docs\R2-2108848.zip) and then draft reply LS responses to RAN3 (contact Qualcomm) and SA3 (contact Huawei)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Thursday 2021-08-19 1600 UTC

Initial deadline (for rapporteur's summary in [R2-2108884](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108884.zip)): Thursday 2021-08-19 2000 UTC

Deadline for reply LSs: Week2 (after CB session)

Proposals marked "for agreement" in [R2-2108884](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108884.zip) not challenged until Friday 2021-08-20 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Updated scope: Continue the discussion on remaining proposals from [R2-2108884](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108884.zip) and draft reply LS responses to RAN3 (contact Qualcomm) and SA3 (contact Huawei)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Updated deadline (for companies' feedback): Monday 2021-08-23 1600 UTC

Updated deadline (for rapporteur's summary in [R2-2108898](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108898.zip) and reply LSs to RAN3 and SA3): Monday 2021-08-23 2000 UTC

Proposals marked "for agreement" in [R2-2108898](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108898.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue online during the CB session).

Final scope: Draft reply LS responses to RAN3 (contact Qualcomm) and SA3 (contact Huawei) and new LS to SA3 (contact Qualcomm) for the need of NTN specific user consent for obtaining UE location by gNB

Intended outcome: LSs to RAN3 (in R2-2109128) and SA3 (in R2-2108886 and R2-2108902)

Final deadline (for companies' feedback): Thursday 2021-08-26 1600 UTC

Updated deadline (for final LSs): Thursday 2021-08-26 2000 UTC

[R2-2108884](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108884.zip) [offline 102] LCS aspects Qualcomm discussion Rel-17 NR\_NTN\_solutions-Core

proposals for agreement.

New Proposal 1 If SA3 has no concern reporting coarse location during initial access, the coarse location information is reported in Msg5, i.e., via RRCSetupComplete/RRCResumeComplete message.

* Agreed

New Proposal 2 For coarse UE location reporting during initial access, the location granularity is not indicated to UE via SIB [25/27].

* Agreed

New Proposal 3 Enhancements to validate the UE’s coarse location information is not needed [23/27].

- vivo suggests to add "at RAN from RAN2 perspective. Whether this is needed in CN is up to other WGs.". QC is fine with this.

* Agreed with the formulation "Enhancements to validate the UE ’s coarse location information is not needed from RAN2 perspective. Whether this is needed by the network is up to other WGs."

New Proposal 6 After AS security is established, gNB can obtain a GNSS-based location information from the UE using existing signalling method, i.e., by configuring includeCommonLocationInfo in the corresponding reportConfig [22/27].

- ZTE suggests to add "It is up to SA3 to decide whether User Consent is required before NW acquires location information from the UE in NTN.". Huawei agrees. QC thinks this is addressed by p7 and wonders whether the proposals need to be combined

* Agreed with the formulation "After AS security is established, gNB can obtain a GNSS-based location information from the UE using existing signalling method, i.e., by configuring includeCommonLocationInfo in the corresponding reportConfig. It is up to SA3 to decide whether User Consent is required before NW acquires location information from the UE in NTN. RAN2 discuss whether to send LS to SA3"

New Proposal 8 Event triggered-based UE location reporting are configured by gNB to obtain UE location update of mobile UEs in RRC\_CONNECTED [23/27].

* Agreed as a Working assumption

New Proposal 10 Aperiodic location reporting (e.g., via DCI) is not supported [24/27].

* Agreed

New Proposal 14 The answer to Q1 provided in R2-2107346 is agreeable for reply LS to SA3.

* Agreed

New Proposal 15 The answer to Q2 provided in R2-2107346 is agreeable for reply LS to SA3.

* Agreed

proposals for online discussion.

New Proposal 4 Reporting of finer location information/full GNSS coordinates in RRC\_CONNECTED is supported after AS security is enabled [20/27].

New Proposal 5 RAN2 discuss if coarse UE location report is also supported after AS security is enabled [11/27].

New Proposal 7 RAN2 discuss whether to inform SA3 for the need of NTN specific user consent for obtaining UE location by gNB [3/27].

New Proposal 9 Periodic location reporting [20/27] can also be configured by gNB to obtain UE location update of mobile UEs in RRC\_CONNECTED.

New Proposal 11 For reply LS to RAN3, revise the text in answer to Q1 in R2-2107568 with “RAN2 understand the existing mechanism of reporting GNSS coordinates in the measurement report for MDT based on User Consent can also be used in NTN”.

New Proposal 12 For reply LS to RAN3, revise the text in answer to Q3 in R2-2107568 considering the conclusion of P5/6 of email discussion [102].

New Proposal 13 For reply LS to RAN3, revise the text in answer to Q4 in R2-2107568 considering the conclusion of email discussion [107].

Agreements via email - via offline 102:

1. If SA3 has no concern reporting coarse location during initial access, the coarse location information is reported in Msg5, i.e., via RRCSetupComplete/RRCResumeComplete message.
2. For coarse UE location reporting during initial access, the location granularity is not indicated to UE via SIB
3. Enhancements to validate the UE ’s coarse location information is not needed from RAN2 perspective. Whether this is needed by the network is up to other WGs.
4. After AS security is established, gNB can obtain a GNSS-based location information from the UE using existing signalling method, i.e., by configuring includeCommonLocationInfo in the corresponding reportConfig. It is up to SA3 to decide whether User Consent is required before NW acquires location information from the UE in NTN. RAN2 discuss whether to send LS to SA3
5. Aperiodic location reporting (e.g., via DCI) is not supported.

Working assumption:

1. Event triggered-based UE location reporting are configured by gNB to obtain UE location update of mobile UEs in RRC\_CONNECTED

[R2-2108898](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108898.zip) [offline 102] LCS aspects - second round Qualcomm discussion Rel-17 NR\_NTN\_solutions-Core

For email agreement:

New Proposal 1 Given gNB has user consent to obtain UE location in NTN, reporting of finer location information/full GNSS coordinates in RRC\_CONNECTED is supported after AS security is enabled [8/11].

- Apple would like to postpone the agreement on New Proposal until after a confirmation is obtained from SA3 on New Proposal 2. Oppo agrees

* Continue online

Updated Proposal 1: If accepted by SA3, if the gNB has user consent to obtain UE location in NTN, reporting of finer location information/full GNSS coordinates in RRC\_CONNECTED is supported after AS security is enabled

- Apple has a formal objection to take this agreement

- Samsung and Nokia think we could go for a Working Agreement

- Apple can withdraw the objection if the proposal is updated as "If accepted by SA3, if the gNB has user consent to obtain UE location in NTN, reporting of finer location information/full GNSS coordinates in RRC\_CONNECTED ~~is~~can be supported after AS security is enabled"

* Agreed as "If accepted by SA3, if the gNB has user consent to obtain UE location in NTN, reporting of finer location information/full GNSS coordinates in RRC\_CONNECTED can be supported after AS security is enabled"

New Proposal 2 Send LS to SA3 for the need of NTN specific user consent for obtaining UE location by gNB [10/12]. RAN2 discuss whether to send new LS or include in reply LS to SA3.

* Agreed as "Send new LS to SA3 for the need of NTN specific user consent for obtaining UE location by gNB."

New Proposal 3 Periodic location reporting can also be configured by gNB to obtain UE location update of mobile UEs in RRC\_CONNECTED [7/10]. RAN2 discuss whether it is part of existing periodic measurement report configuration or a new configuration for periodic reporting of UE location.

- Mediatek is not ok with this, event triggered reporting is enough. Apple agrees.

- QC thinks the network can configure periodic measurement report, the measurement report can be configured to piggyback the UE location if user consent is provided. Do Mediatek and Apple mean this is also not acceptable?

* Continue online

- LG and Nokia did not think this is needed but are fine to accept this.

- Mediatek/Apple can accept the compromise for the sake of progress

* Agreed

Regarding the reply LSs to RAN3 and SA3

New Proposal 4 For LS reply to RAN3, include all relevant RAN2 agreements for answer to Q1. Include “RAN2 understands it is up to other working groups to decide based on any available information such as UE location information, if available and reported by UE” for answer to Q2. Include “it is up to other working group how to select a TAC from multiple TACs” for answer to Q4.

* Continue offline to finalize the LS to RAN3

New Proposal 5 Agree to draft LS reply to SA3 provided in R2-2107346 [3] with minor necessary change

* Continue offline to finalize the LS to SA3

Agreements via email - from offline 102 second round:

1. Send new LS to SA3 for the need of NTN specific user consent for obtaining UE location by gNB."

Agreements online:

1. If accepted by SA3, if the gNB has user consent to obtain UE location in NTN, reporting of finer location information/full GNSS coordinates in RRC\_CONNECTED can be supported after AS security is enabled
2. Periodic location reporting can also be configured by gNB to obtain UE location update of mobile UEs in RRC\_CONNECTED [7/10]. RAN2 discuss whether it is part of existing periodic measurement report configuration or a new configuration for periodic reporting of UE location.

R2-2108902 LS on NTN specific user consent Qualcomm LS out Rel-17 NR\_NTN\_solutions-Core To:SA3

[R2-2107077](file:///C:\Data\3GPP\Extracts\R2-2107077%20UE%20locations.doc) Discussion on UE location aspects in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107150](file:///C:\Data\3GPP\Extracts\R2-2107150_Virtual_Cell_Fraunhofer.docx) Virtual cells for network verified UE position in NTN networks Fraunhofer IIS; Fraunhofer HHI; Thales discussion

[R2-2107284](file:///C:\Data\3GPP\Extracts\R2-2107284_For8.10.3.1_AreaManagement_SamsungThalesRakutenMobileApple.doc) Area Management in an NTN Samsung Research America, Thales, Rakuten Mobile, and Apple discussion [R2-2106072](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2106072.zip)

[R2-2107316](file:///C:\Data\3GPP\Extracts\R2-2107316.docx) Further Discussion on LCS and TAC aspects in NTN CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107343](file:///C:\Data\3GPP\Extracts\R2-2107343%20Discussion%20on%20V2X-like%20zone%20ID.doc) Discussion on V2X-like zone ID Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107567](file:///C:\Data\3GPP\Extracts\R2-2107567%20discussion%20on%20LS%20reply.docx) Discussion on RAN3 LS reply on UE location Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108606](file:///C:\Data\3GPP\Extracts\R2-2108606_TAC%20update%20and%20UE%20location%20report.docx) TAC update and UE location report ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

TAC update

[R2-2107520](file:///C:\Data\3GPP\Extracts\R2-2107520%20On%20Tracking%20Area%20Code%20handling%20for%20NTN.docx) On Tracking Area Code handling for NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1: Short message (DCI/PDCCH) and not the paging is used to inform about the system information update.

Observation 2: It is not justified to assume the density of 400 UEs per square km for NTN scenarios other than IoT/MTC. 100 UEs per km2 is a realistic assumption for potential evaluation of paging or RA capacity.

Proposal 1: The further discussion on associating the timer with Tracking Area is pursued only if the results obtained for a typical case (e.g. based on TS 38.821 non-MTC/IoT case) show a detrimental impact on paging or RACH capacity, as argued in [4].

Observation 3: Even if the UE does not update its TAC based on the change in what is broadcasted in SI, the network can still know where to page the UE.

Observation 4: UE does not perform TAU/Registration Update when its current TAC is still broadcasted in SI.

Observation 5: No immediate awareness of the change in System Information is acceptable in many cases, especially when UE’s TAC remains to be broadcasted, while just the other TACs have disappeared.

Proposal 2: Tracking Area Update for NTN are not associated with a time validity information.

Proposal 3: RAN2 concludes that Option 2 is the baseline for NTN: AS indicates all received TACs for one PLMN to NAS layer.

* Discuss in offline 107 (to draft reply LS to CT1 and SA2)

Proposal 4: RAN2 is asked to discuss what factors can be possibly considered for TAI selection when multiple TACs are received from AS layer.

* Discuss in offline 107 (to draft reply LS to CT1 and SA2)

Proposal 5: VTAs and other non-essential parts of TA discussion are not considered in Rel-17 NTN.

* [AT115-e][107][NTN] Reply LS on TAC handling (Nokia)

Scope: Continue the discussion on p3 and p4 from [R2-2107520](file:///C:\Data\3GPP\Extracts\R2-2107520%20On%20Tracking%20Area%20Code%20handling%20for%20NTN.docx) and then draft reply LS response to CT1 and SA2

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion

Initial deadline (for companies' feedback): Thursday 2021-08-19 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2108887](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108887.zip)): Thursday 2021-08-19 1600 UTC

Deadline for reply LSs: Week2 (after CB session)

Proposals marked "for agreement" in [R2-2108887](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108887.zip) not challenged until Friday 2021-08-20 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Updated scope: Finalize reply LS response to CT1 and SA2

Intended outcome: Reply LS to CT1 and SA2

Updated deadline (for companies' feedback): Monday 2021-08-23 1000 UTC

Updated deadline (for reply LS in [R2-2108888](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108888.zip)): Monday 2021-08-23 1600 UTC

[R2-2108887](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108887.zip) [offline 107] Reply LS on TAC handling Nokia discussion Rel-17 NR\_NTN\_solutions-Core

Proposals for e-mail agreement:

Proposal 1: RAN2 confirms AS indicates to NAS layer all received TACs per PLMN.

* Agreed

Proposal 2: RAN2 indicates to CT1 that TACs in NTN are fixed to geographical location on Earth and in addition, UE’s location information can be used for TAI selection.

* Agreed

Proposal 3: RAN2 responds to CT1 and SA2 with the confirmation AS indicates to NAS layer all received TACs per PLMN. In addition it is stated that TACs in NTN are fixed to geographical location on Earth and UE’s location information can be used for TAI selection.

- QC would like to add "however, RAN2 assumes it is up to SA2 and/or CT1 whether to use UE’s location information". vivo thinks it could read "RAN2 assumes it is up to SA2 and/or CT1 to decide what specific information is used in the NAS for TAI selection".

* Agreed, with the addition that "final decision on which criteria to apply (e.g. UE location information or other) is up to CT1 and SA2 judgement"
* Draft reply LS response to CT1 and SA2 accordingly

Agreements via email - from offline 107:

1. RAN2 confirms AS indicates to NAS layer all received TACs per PLMN.
2. RAN2 responds to CT1 and SA2 with the confirmation that AS indicates to NAS layer all received TACs per PLMN. In addition it is stated that TACs in NTN are fixed to geographical location on Earth and UE’s location information can be used for TAI selection. Final decision on which criteria to apply (e.g. UE location information or other) is anyway up to CT1 and SA2 judgement

[R2-2107345](file:///C:\Data\3GPP\Extracts\R2-2107345%20Draft%20reply%20LS%20on%20multiple%20TACs%20per%20PLMN.doc) Draft Reply LS on multiple TACs per PLMN Huawei, HiSilicon LS out Rel-17 NR\_NTN\_solutions-Core To:CT1 Cc:SA2, RAN3

[R2-2107360](file:///C:\Data\3GPP\Extracts\R2-2107360%20Discussion%20on%20TAC%20update%20in%20NTN.doc) Discussion on TAC update in NTN Spreadtrum Communications discussion Rel-17

[R2-2107564](file:///C:\Data\3GPP\Extracts\R2-2107564%20TAC%20update.doc) Tracking area update timing Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107729](file:///C:\Data\3GPP\Extracts\R2-2107729%20Discussion%20on%20the%20remaining%20issue%20on%20TAC%20update.docx) Discussion on the remaining issue on TAC update vivo discussion

[R2-2108323](file:///C:\Data\3GPP\Extracts\R2-2108323_TAU_NR-NTN.DOCX) On Soft-switch based Tracking Area Updates in NR-NTN MediaTek Inc. discussion [R2-2105252](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105252.zip)

Other

[R2-2107131](file:///C:\Data\3GPP\Extracts\R2-2107131.docx) Signalling Solution for Feeder Link Switching of NTN VODAFONE Group Plc discussion

[R2-2107281](file:///C:\Data\3GPP\Extracts\R2-2107281_For8.10.3.1_TrackingAreas_EllipticalBeam_Samsung.doc) Remaining Beam Issues in an NTN: Tracking Area Management and Elliptical Beams Samsung Research America discussion

R2-2107633 NTN Area Management Apple discussion Rel-17 NR\_NTN\_solutions-Core Withdrawn

#### 8.10.3.2 Idle/Inactive mode

Idle/inactive mode specific issues.

Cell selection and reselection

[R2-2107733](file:///C:\Data\3GPP\Extracts\R2-2107733_Further%20consideration%20on%20cell%20selection%20and%20reselection%20in%20NTN.docx) Further consideration on cell selection and reselection in NTN ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

Usage of the cell expire time for quasi-earth fixed cell

Proposal 1a: The remaining valid time of the serving cell should be considered by UE to trigger measurement on neighbor cells.

Proposal 1b: UE shall perform intra-frequency measurements if the remaining valid time of the serving cell Tremaining <= TIntraSearch is fulfilled.

Proposal 1c: UE shall perform measurements of NR inter-frequency cells of equal or lower priority if the remaining valid time of the serving cell fulfils Tremaining <= TnonIntraSearch.

Proposal 2a: The serving time of a neighbor cell is derived based on the following equation:

TServingTime = TExpire – T0

TServingTime refers to the serving time of a neighbor cell;

TExpire refers to the expire time of the neighbor cell which is broadcast in the serving cell’s system information;

T0: The time when UE detects the neighbor cell and starts evaluation.

Proposal 2b: Cells with longer serving time should be prioritized in cell reselection.

Proposal 2c: Down select from the following options on how to prioritize cells with longer serving time:

 Option 2: Introduce threshold of the serving time ThreshServingtTime and QoffsetTime as adjustment to cell-ranking criterion Rs and Rn for cells with serving time longer than the threshold.

Rs = Qmeas,s +Qhyst - Qoffsettemp+QoffsetTime

Rn = Qmeas,n -Qoffset - Qoffsettemp+QoffsetTime

 Option 3: Introduce threshold of the serving time ThreshServingtTime and CellReselectionPriorityOffset as adjustment for cells with serving time longer than the threshold.

 Option 4: Introduce rangeToBestCellNTN. UE rank the neighbor cells based on the R-criterion while the cells whose R value is within rangeToBestCellNTN of the R value of the highest ranked cell will be considered as candidate cells. Among all these candidate cells, UE will reselect to the cell with longest serving time.

Challenges in provisioning the cell expire time for earth moving cell

Observation: The expire time of an earth moving cell for UE in different location in the cell would be different, making it difficult to broadcast such information for all UEs under this cell.

Proposal 3: For earth moving cells, the association cell and satellite as well the beam information is provisioned as part of ephemeris information and it is up to UE to derive the serving time or remaining valid time for the serving and neighbor cells.

Ephemeris/Location assisted cell reselection

Proposal 4: Location assisted cell reselection should be introduced in NTN.

Proposal 5: 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.

Proposal 6: For earth moving and earth fixed cells, the association between cell and satellite as well the beam information is provisioned as part of the ephemeris and it is up to UE to derive the reference location, i.e. the cell center.

Proposal 7: Down select from the following options on how to assist cell reselection with awareness of the distance to the reference location:

 Option 1: Configure a threshold of the distance between UE and the reference location and only neighbor cells with distance shorter than the threshold will be considered during cell reselection.

 Option 2: Configure a threshold of the distance between UE and the reference location along with an adjustment to the cell reselection priority or Qoffset. Cells with shorter distance between the serving satellite and UE will get a bonus in determination of the reselection priority or R-value calculation.

 Option 3: Configure a rangeToBestCellNTN, cells with R-value within this range will be considered as candidate cells for reselection while UE will re-select to the cell with shortest distance between the reference location and UE.

[R2-2108320](file:///C:\Data\3GPP\Extracts\R2-2108320_Cell-Reselection_NR-NTN.docx) On Cell Re-selection in NR-NTN MediaTek Inc. discussion [R2-2105251](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105251.zip)

Observation 1: The difference in RSRP between TN and NTN is not significant at cell edge.

Proposal 1: R16-based cell selection procedures, intra frequency and equal priority inter frequency measurements could be reused in NR-NTN for all scenarios (earth-fixed cell-GEO, quasi earth-fixed cell LEO and earth moving cells LEO) through suitable settings of threshold parameters.

Observation 2: The use of UE’s Location information does not provide significant additional performance gain over existing cell re-selection mechanisms and may result in increased power consumption.

Observation 3: The use of satellite serving duration information especially for quasi-earth cell scenarios might provide additional gain over existing re-selection mechanisms in terms of power consumption.

Proposal 2: In Idle mode, the use of satellite serving duration information is not an essential feature to have a working NR-NTN solution and can be de-prioritized.

Proposal 3: R16 based priority mechanisms can be reused to control inter-frequency NR-NTN intra access and TN-NTN inter access cell re-selection.

Proposal 4: R16-based cell ranking schemes could be reused to trigger cell re-selection of upcoming neighbour cells in earth moving cells scenario of NR-NTN.

Proposal 5: Satellite ephemeris information will be useful for cell reselection by mobile UEs, especially for VSATs.

- Mediatek thinks the UE should not be required to continuously determine its location. However it is fine to consider satellite ephemeris information

Proposal 6: In case of coverage holes in LEO, this information could be signalled to the UEs. UEs can use this information (e.g. satellite’s ephemeris, field of view and beam pattern) as well as its location for acquiring knowledge about coverage holes (out-of-coverage) and take it into account in the cell re-selection. The exact format of this signalling will be discussed in RAN2.

* [AT115-e][108][NTN] idle mode aspects (ZTE)

Scope: Continue the discussion on cell (re)selection aspects, with focus on stage3 details for usage of the cell expire time for quasi-earth fixed cells, but also on possible usage of cell expire time / ephemeris information for earth moving cells, considering e.g. the proposals in [R2-2107733](file:///C:\Data\3GPP\Extracts\R2-2107733_Further%20consideration%20on%20cell%20selection%20and%20reselection%20in%20NTN.docx) and [R2-2108320](file:///C:\Data\3GPP\Extracts\R2-2108320_Cell-Reselection_NR-NTN.docx)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Thursday 2021-08-19 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2108889](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108889.zip)): Thursday 2021-08-19 1600 UTC

Proposals marked "for agreement" in [R2-2108889](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108889.zip) not challenged until Friday 2021-08-20 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Updated scope: Continue the discussion on the remaining proposals from [R2-2108889](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108889.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Updated deadline (for companies' feedback): Monday 2021-08-23 1400 UTC

Updated deadline (for rapporteur's summary in [R2-2108899](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108899.zip)): Monday 2021-08-23 1600 UTC

Proposals marked "for agreement" in [R2-2108899](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108899.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue online during the CB session).

Final scope: Continue the discussion to clarify the understanding of the expiry time and its implications as well as a possible acceptable rewording of p4.1 from [R2-2108899](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108899.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2108903): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2108903 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

[R2-2108889](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108889.zip) [offline 108] Idle mode aspects ZTE discussion Rel-17 NR\_NTN\_solutions-Core

Proposals for email agreement

[17 VS 8] Proposal 3: Using the timing information on when a cell is going to stop serving the area to assist measurements or cell reselection is not supported for earth moving cell in this release.

- QC wonders if the correct interpretation of p3 is:

1 Cell stop time in SIB is only applicable to quasi earth fixed cell (not to moving cell).

2 Even if UE is able to estimate cell stop time by using ephemeris and beam information (or current elevation angle), UE is not allowed to trigger measurement/cell reselection before this estimated cell stop time (i.e., until current RSRP-based condition triggers it).

3 UE shall not estimate the cell stop time in earth moving cell.

- ZTE agrees with 1 and thinks 2/3 is up to UE implementation but we will not specify any enhancements for this in Rel17

* Agreed with the formulation: "Broadcast of cell stop time in SIB is only applicable to quasi earth fixed cell (not to moving cell). No further work in this release to address any moving cell specific details on using the cell stop time to assist measurements or cell reselection".

[20 VS 5] Proposal 4.1: Location assisted cell reselection, with the distance between UE and the reference location of the cell (serving cell and/or neighbour cell) taken into account, should be supported for quasi-earth fixed cell.

- Mediatek has strong concerns on this: Location based trigger will incur heavy power consumption in the UE. In Idle mode, UE’s power savings is the most important aspect and any additional power consumption should be avoided. Furthermore, Mediatek thinks there is no clear benefit to the UE for using location based cell selection/re-selection over existing measurement based methods in Idle Mode.

- ZTE understands that, with p4.1 and p6, location assisted cell reselection will be supported as enhancement in NTN , which does not require all the UEs to execute such enhancement all the time. UE with available location information can use the location info to assist cell reselection. If there is no available location info at UE side, the legacy behavior applies. Furthermore, since UE with GNSS capability is assumed for NTN and UE will use its location info in random access, if UE does not have the location info available and waits until paging arrives, paging and access delay is foreseen. Thus ZTE understands UE will have the location info ready in advance and it would be fine if we take advantage and use it for cell reselection.

- Mediatek thinks the real issue is not just the availability of the location information, but checking the location information: in the idle mode, the UE needs to check its location information in every DRX cycle, which will incur additional computation and power consumption overhead. Mediatek also thinks that Random Access and Cell reselection are two completely different things: for Random Access and TA the UE needs fine grained ephemeris information for the satellite and its own location; however, it is not necessary that UE will use that same location information during cell reselection.

- vivo shares the concerns from Mediatek

* Continue in a second round of offline 108

[18 VS 6] Proposal 5: For quasi-earth fixed cell, the reference location of the cell (serving cell or the neighbor cells) is broadcast in system information.

* Agreed

[14 VS 6] Proposal 6: For quasi-earth fixed cell, introduce a threshold of the distance between UE and the reference location of a cell and only neighbour cells with distance shorter than the threshold will be considered during cell reselection.

- Mediatek: same comment as p4.1

- Xiaomi would like to add "FFS only one threshold or multiple thresholds for different neighbour cells."

* Continue in a second round of offline 108

Proposals for further discussion

[14 VS 12] Proposal 1: Introduce threshold(s) of the remaining valid time and UE will perform measurements on neighbour cells if the remaining valid time of the serving cell is shorter than or equal to the threshold(s).

[13 VS 12] Proposal 2: One single threshold of the remaining valid time and UE will perform intra-frequency and inter-frequency measurements on neighbour cells if the remaining valid time of the serving cell is shorter than or equal to the threshold.

[15 VS 10] Proposal 4.2: Location assisted cell reselection, with the distance between UE and the reference location of the cell (serving cell and/or neighbour cell) taken into account, should be supported for earth moving cell.

Agreements via email - from offline 108:

1. Broadcast of cell stop time in SIB is only applicable to quasi earth fixed cell (not to moving cell). No further work in this release to address any moving cell specific details on using the cell stop time to assist measurements or cell reselection
2. For quasi-earth fixed cell, the reference location of the cell (serving cell or the neighbor cells) is broadcast in system information

[R2-2108899](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108899.zip) [offline 108] Idle mode aspects - second round ZTE discussion Rel-17 NR\_NTN\_solutions-Core

[11 VS 5] Proposal 4.1: Location assisted cell reselection, with the distance between UE and the reference location of the cell (serving cell and/or neighbor cell) taken into account, is supported for quasi-earth fixed cell, if the UE does not need to acquire the GNSS location every DRX cycle in IDLE mode (confirmation from RAN1 is needed for this). FFS on the details.

- MediaTek cannot agree with this proposal: this proposal still could mean that location information is used for cell reselection, even if location (GNSS) acquisition needs to be performed 9 out of 10 DRX cycles. Without knowing what the location (GNSS acquisition) requirements are, Mediatek cannot agree to give a blind consent on this way forward, especially given that this is an optimization feature, with not clear benefits, over a baseline cell reselection mechanism that still works fine.

- CATT supports the proposal

* Continue online

- For quasi-earth fixed cell, VC also wonders what the current assumption is for when a cell "expires": will the new cell start covering the same area exactly when the previous cell expires? Or before? How much before?

- ZTE thinks the new cell will start covering the area of the old cell before it expires. QC thinks for the UE the overlap does not matter but we need to clarify exactly what the expiry time is.

- Nokia thinks this would be scenario specific.

- ZTE thinks there are two understandings on the expiry time and it would be good to clarify. Samsung agrees

* Continue in offline 108 to clarify the understanding of the expiry time and its implications as well as a possible acceptable rewording of p4.1

R2-2108903 [offline 108] Idle mode aspects - third round ZTE discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107078](file:///C:\Data\3GPP\Extracts\R2-2107078%20NTN%20Idle%20inactive%20mode%20procedures.doc) Discussion on idle/inactive mode procedures in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107282](file:///C:\Data\3GPP\Extracts\R2-2107282_For8.10.3.2_CellReselection_SI_Paging_NeighborSearch_Samsung.doc) Cell Reselection, System Information, Paging Enhancements, and Power-Efficient Neighbor Cell Search for an NTN Samsung Research America discussion

[R2-2107317](file:///C:\Data\3GPP\Extracts\R2-2107317.docx) Further Discussion on the Leftover Issues of IDLE/INACTIVE CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107344](file:///C:\Data\3GPP\Extracts\R2-2107344%20Discussion%20on%20cell%20reselection.doc) Discussion on cell reselection Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107359](file:///C:\Data\3GPP\Extracts\R2-2107359%20Discussion%20on%20stop%20serving%20time%20of%20NTN%20cell.doc) Discussion on stop serving time of NTN cell Spreadtrum Communications discussion Rel-17

moved here from 8.10.3.1

[R2-2107448](file:///C:\Data\3GPP\Extracts\R2-2107448%20Remaining%20issues%20on%20cell%20reselection%20for%20NTN.docx) Remaining issues on cell reselection for NTN vivo discussion

moved here from 8.10.3

[R2-2107634](file:///C:\Data\3GPP\Extracts\._R2-2107634%20Cell%20Selection%20And%20Cell%20Reselection%20Solutions%20for%20Non%20Terrestrial%20Networks.docx) Cell Selection and Cell Reselection Solutions for Non Terrestrial Networks Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107845](file:///C:\Data\3GPP\Extracts\R2-2107845%20Remaining%20issues%20in%20NTN%20Idle%20mode.DOC) Remaining issues in NTN Idle mode LG Electronics Inc. discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107853](file:///C:\Data\3GPP\Extracts\R2-2107853_NTN_reselection.doc) Issues of cell reselection for prioritizing TN over NTN ITRI discussion NR\_NTN\_solutions-Core

[R2-2108064](file:///C:\Data\3GPP\Extracts\R2-2108064.doc) Idle mode enhancement in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108170](file:///C:\Data\3GPP\Extracts\R2-2108170%20Cell%20selection%20and%20reselection%20enhancements%20for%20NTN.doc) Cell selection and reselection enhancements for NTN Xiaomi discussion

[R2-2108234](file:///C:\Data\3GPP\Extracts\R2-2108234_NTN%20to%20TN%20in%20Idle%20or%20Inactive%20mode%20mobility.docx) NTN to TN mobility in Idle/Inactive mode NEC Telecom MODUS Ltd. discussion

[R2-2108235](file:///C:\Data\3GPP\Extracts\R2-2108235_NTN%20Neighbour%20Cell%20information.docx) NTN Neighbour Cell information NEC Telecom MODUS Ltd. discussion

moved here from 8.10.3.1

[R2-2108281](file:///C:\Data\3GPP\Extracts\R2-2108281%20NTN%20Idle%20mode.docx) Idle mode aspects for NTN Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108412](file:///C:\Data\3GPP\Extracts\R2-2108412%20NTN%20Indication.docx) NTN type and scenario indication Convida Wireless discussion

[R2-2108413](file:///C:\Data\3GPP\Extracts\R2-2108413%20NTN%20cell%20(re)selection%20enhancements.docx) NTN Cell (re)selection enhancements Convida Wireless discussion

[R2-2108526](file:///C:\Data\3GPP\Extracts\R2-2108526 Discussion on location assisted cell reselection.docx) Discussion on location assisted cell reselection CMCC, Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108779](file:///C:\Data\3GPP\Extracts\R2-2108779.docx) NTN Idle/Inactive mode cell re-selection ITL discussion Rel-17

Ephemeris data and provision

[R2-2107630](file:///C:\Data\3GPP\RAN2\Docs\R2-2107630.zip) On NTN Ephemeris Definitions and Signaling Apple discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: RAN2 assumes that the entire ephemeris is always available on the UE for pre-compensation and continues with protocol enhancements as needed.

Proposal 2: RAN2 will send an LS to RAN1 on the assumption of entire ephemeris at the UE.

Proposal 3: Only the essential elements of ephemeris (as defined in TR 38.821 [1]), i.e. the Almanac is communicated to a UE.

Proposal 4: A new SIB is needed for ephemeris broadcast to ensure that the serving and neighboring cell information is provided to the UE like that of SIB1.

Proposal 5: If a SIB needs to be used for ephemeris broadcast, the network needs to ensure that only changes to certain “important” fields trigger SI modification procedures on UE. This is needed for power constraints.

Proposal 6: Alternately, RAN2 can also consider two SIBs of varying differently in frequency – a SIBfast and a SIBslow. SIBfast contains information that triggers SI modification procedures but is broadcasted infrequently while SIBslow is only read by the UE in case of need but is broadcasted more frequently.

Proposal 7: Alternatively, RAN2 to consider dedicated RRC and NAS signaling for ephemeris delivery with NAS used for slowly changing ephemeris and RRC Signaling for rapidly changing ephemeris.

Proposal 8: RAN2 to send LS to SA2 and CT1 for confirmation of dedicated NAS based ephemeris delivery to UE.

[R2-2107910](file:///C:\Data\3GPP\Extracts\R2-2107910%20Considerations%20on%20ephemeris%20provision%20for%20NTN%20(Revision%20of%20R2-2105818).docx) Considerations on ephemeris provision for NTN Lenovo, Motorola Mobility discussion Rel-17

#### 8.10.3.3 Connected mode

Connected mode specific issues.

CHO and NTN-TN mobility aspects

[R2-2109025](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109025.zip) [Pre115-e][103][NTN] Summary of AI 8.10.3.3 - CHO and NTN -TN mobility aspects only Ericsson discussion NR\_NTN\_solutions-Core

Proposal 1 Discuss whether combination of serving and target cell reference location is supported for location report trigger event and for CHO location trigger

Proposal 2 If combination is supported, start discussing event descriptions for the combination of reference locations

Proposal 3 Both hysteresis and time to trigger is supported for location based trigger event

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

Proposal 5 RAN2 to discuss whether periodic reporting of location should be supported for NTN.

Proposal 6 RAN2 to discuss whether timing information and t1 are understood as different parameters or same .

Proposal 7 RAN2 to discuss UE shall perform the CHO by T2 or whether at T” if UE has not made CHO UE forgets the configuration.

Proposal 8 RAN2 to discuss whether T1 and T2 should be expressed as UTC, timer, or a combination .

a. Option 1: UTC time + duration/timer, e.g. 00:00:01 + 40s

b. Option 2: Two UTC time to indicate the start (T1) and end time (T2) of the candidate cell, e.g. 00:00:01 + 00:00:41

c. Option 3: Reference time + duration/timer，e.g. SFN =0 + 40s

d. Option 4: Two timers, e.g. t1=301s + t2=341s.

Proposal 9 RAN2 to discuss whether to support configurable CHO conditions for NTN operation.

Proposal 10 Discuss whether to down-prioritize further enhancements to connected mode NTN-TN

Proposal 11 Discuss whether existing idle mode features up to release 16 are sufficient and enable sufficient priority and in a power efficient manner according to the agreements in RAN2#115-e.

Proposal 12 Discuss whether enhancement is needed to address the problem of performing idle mode mobility from NTN to TN in terms of power consumption and signaling efficiency.

* [AT115-e][103][NTN] CHO and NTN -TN mobility aspects (Ericsson)

Scope: Continue the discussion on the proposals in [R2-2109025](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109025.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Thursday 2021-08-19 1000 UTC

Initial deadline (for rapporteur's summary in [R2-2108890](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108890.zip)): Thursday 2021-08-19 1600 UTC

Proposals marked "for agreement" in [R2-2108890](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108890.zip) not challenged until Friday 2021-08-20 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Updated scope: Continue the discussion on the remaining proposals from [R2-2109056](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109056.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Updated deadline (for companies' feedback): Monday 2021-08-23 1400 UTC

Updated deadline (for rapporteur's summary in [R2-2108900](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108900.zip)): Monday 2021-08-23 1600 UTC

Proposals marked "for agreement" in [R2-2108900](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108900.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

Updated scope: Continue the discussion on the remaining proposals from [R2-2109056](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109056.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion
    - List of proposals that should not be pursued (if any)

Updated deadline (for companies' feedback): Monday 2021-08-23 1400 UTC

Updated deadline (for rapporteur's summary in [R2-2108900](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108900.zip)): Monday 2021-08-23 1600 UTC

Proposals marked "for agreement" in [R2-2108900](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108900.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

Final scope: Continue the discussion on p5 from [R2-2108900](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108900.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals for further discussion

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2108904): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2108904 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair.

[R2-2108890](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108890.zip) [offline 103] CHO and NTN -TN mobility aspects Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

* Revised in [R2-2109056](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109056.zip)

[R2-2109056](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109056.zip) [offline 103] CHO and NTN -TN mobility aspects Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

For email agreement:

p1. RAN2 specifies support combination of serving and target cell reference location is supported for location report trigger event and for CHO location trigger

- Huawei has concerns about location reporting and specifically p1, p4 and p5. Huawei thinks that to extend UE location reporting also for NTN feature, it should be based on user consent as well. Huawei suggests to add one proposal for further discussion:

"Proposal X: RAN2 understands network configuration for UE location provision in measurement report can be sent to UE based on user consent, and an LS is sent to SA3 for confirmation" and take p1, p4 and p5 as Working Assumptions waiting for SA3 response

- Ericsson is fine to have this as a Working Assumption for this meeting

* Agreed as a Working Assumption with the formulation: "Combination of serving and target cell reference location is supported for location report trigger event and for CHO location trigger"

p2. condEvent L4: Distance between UE and the PCell’s reference location becomes larger than absolute threshold1 AND the distance between UE and the Conditional reconfiguration candidate becomes shorter than absolute threshold2.

* FFS other options
* Agreed

p3. Specify hysteresis and time to trigger for the location event for RRM and CHO

* Agreed

p4. Specify that measurement reports can be configured to be piggybacked with location report when location based event triggers it.

- Ericsson is fine to have this as a Working Assumption for this meeting

* Agreed as a Working Assumption

p5. Periodic location reporting is not supported in Rel-17.

- QC thinks this conflicts with other agreements (from offline 102) and would like to rediscuss this

- Ericsson is fine to leave the discussion about UE location reporting to offline 102 and not make a proposal here

p6. Timing information from RRCReconfiguration message in RRC running CR is removed

* Agreed

p7. UE is allowed to perform HO only during T1 to T2 and at T2 UE discards the CHO configuration for that candidate target cell.

- Lenovo thinks that in legacy, CHO configuration is discarded after successful HO or recovery because CHO configuration can be used for recovery. Namely, if the UE selects one cell associated with CHO configuration after UE initiates re-establishment procedure, the UE can perform CHO. Therefore, whether to discard CHO configuration can be discussed when we discuss failure case. Suggest to remove: "and at T2 UE discards the CHO configuration for that candidate target cell". Ericsson is fine

* Agreed with the formulation: "UE is allowed to perform HO only during T1 to T2"

p8. Agree to limit to A or B and continue discussion between options A and B

Option A: UTC time + duration/timer, e.g. 00:00:01 + 40s

Option B: Two UTC time to indicate the start (T1) and end time (T2) of the candidate cell, e.g. 00:00:01 + 00:00:41

- QC would like to add back option c: "Option C: Reference time + duration/timer, e.g. SFN =0 + 40s" but could accept to go for option A

* Agreed

For further discussion:

p9. Continue discussing whether the flexible CHO trigger configuration can be supported for NTN operation.

p10. Continue discussion on “further enhancements for NTN-TN mobility for connected mode UEs” based on company input and interest

p11. Continue discussion on “further enhancements for NTN-TN mobility for idle mode UEs” based on company input and interest

p12. Continue discussion on “enhancements are needed to address power consumption issues and signaling in case an NTN covers multiple TNs” based on company input and interest

Working Assumptions:

1. Combination of serving and target cell reference location is supported for location report trigger event and for CHO location trigger
2. Specify that measurement reports can be configured to be piggybacked with location report when location based event triggers it

Agreements via email - from offline 103:

1. The following event is supported: condEvent L4: Distance between UE and the PCell’s reference location becomes larger than absolute threshold1 AND the distance between UE and the Conditional reconfiguration candidate becomes shorter than absolute threshold2.

FFS other options

1. Specify hysteresis and time to trigger for the location event for RRM and CHO
2. Timing information from RRCReconfiguration message in RRC running CR is removed
3. UE is allowed to perform HO only during T1 to T2
4. Agree to limit to A or B and continue discussion between options A and B

Option A: UTC time + duration/timer, e.g. 00:00:01 + 40s

Option B: Two UTC time to indicate the start (T1) and end time (T2) of the candidate cell, e.g. 00:00:01 + 00:00:41

[R2-2108900](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108900.zip) [offline 103] CHO and NTN-TN mobility aspects - second round Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

For email agreement:

1. RAN2 adopts Option 1: UTC time + duration/timer, e.g. 00:00:01 + 40s for representing T1 and T2 for CHO time event.

* Agreed

2. RAN2 adopts supporting options C: location + RRM and D: time + RRM to be configuration options for CHO

- Lenovo suggests to clarifies this as: "RAN2 adopts options C: location and RRM and D: time and RRM to be configuration options for CHO"

* Agreed as "RAN2 adopts options C: location and RRM and D: time and RRM to be configuration options for CHO"

3. RAN2 down priorities further enhacnements for connected mode for Rel-17 for TN-NTN mobility

* Agreed

4. RAN2 continue discussing the exact solution for TN priorization over NTN for idle mode

* Agreed

Discuss online:

5. A very simple solution would be to broadcast neighboring RATs/frequencies/cell in group, Neighboring RAT/frequencies/cell from a certain region will be broadcasted in one group, hence a UE has detected neighbors in one group does not need to search neighbors indicated by another group.

This solution is simple and no need of UE location to assist.

- Oppo is not sure about the benefits and think we can live with the signalling of the TN type. Ericsson is not sure existing mechanisms are sufficient

- NEC/Sony/Nokia thinks we should have more discussion on this as this is the first time we discuss this

* Continue in offline 103

Agreements via email - from offline 103 second round:

1. RAN2 adopts Option 1: UTC time + duration/timer, e.g. 00:00:01 + 40s for representing T1 and T2 for CHO time event.

2. RAN2 adopts options C: location and RRM and D: time and RRM to be configuration options for CHO

3. RAN2 down priorities further enhacnements for connected mode for Rel-17 for TN-NTN mobility

4. RAN2 continue discussing the exact solution for TN priorization over NTN for idle mode

R2-2108904 [offline 103] CHO and NTN-TN mobility aspects - third round Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107079](file:///C:\Data\3GPP\Extracts\R2-2107079%20NTN%20connected%20mode%20mobility.doc) Discussion on mobility management for connected mode UE in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107283](file:///C:\Data\3GPP\Extracts\R2-2107283_For8.10.3.3_HandoverEnhancements_Samsung.doc) Remaining Issues on Handover and Neighbor Search for an NTN Samsung Research America discussion [R2-2106071](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2106071.zip)

[R2-2107318](file:///C:\Data\3GPP\Extracts\R2-2107318.docx) Discussion on NTN CP left issues CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107447](file:///C:\Data\3GPP\Extracts\R2-2107447%20Discussion%20on%20CHO%20related%20aspects%20for%20NTN.docx) Discussion on CHO related aspects for NTN vivo discussion

[R2-2107457](file:///C:\Data\3GPP\Extracts\R2-2107457%20Discussion%20of%20CHO%20in%20NTN.doc) Consideration of location reporting in NTN CHO China Telecommunication discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107519](file:///C:\Data\3GPP\Extracts\R2-2107519%20Further%20discussion%20on%20CHO%20in%20NTN.docx) Further discussion on CHO in NTN Rakuten Mobile, Inc discussion Rel-17

[R2-2107522](file:///C:\Data\3GPP\Extracts\R2-2107522%20Even%20further%20thoughts%20on%20mobility%20in%20NTN.docx) Even further thoughts on mobility in NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107565](file:///C:\Data\3GPP\Extracts\R2-2107565%20CHO.doc) Open issues in CHO Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core [R2-2105433](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105433.zip)

[R2-2107631](file:///C:\Data\3GPP\Extracts\._R2-2107631%20On%20NTN%20Conditional%20Handovers.docx) On NTN Conditional Handovers Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107704](file:///C:\Data\3GPP\Extracts\R2-2107704.docx) Discussion on NTN-TN service continuity KT Corp. discussion

[R2-2107846](file:///C:\Data\3GPP\Extracts\R2-2107846%20Remaining%20issues%20for%20NTN%20connected%20mode%20mobility.DOC) Remaining issues for NTN connected mode mobility LG Electronics Inc. discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2107912](file:///C:\Data\3GPP\Extracts\R2-2107912%20Execution%20condition%20for%20CHO%20in%20NTN%20v1.0.doc) Execution condition for CHO in NTN Lenovo, Motorola Mobility discussion Rel-17

[R2-2108017](file:///C:\Data\3GPP\Extracts\R2-2108017%20Discussion%20on%20connected%20mode%20aspects%20for%20NTN.docx) Discussion on connected mode aspects for NTN Xiaomi Communications discussion

[R2-2108065](file:///C:\Data\3GPP\Extracts\R2-2108065.docx) Signaling storm during HOs and Timer based trigger details Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108100](file:///C:\Data\3GPP\RAN2\Docs\R2-2108100.zip) Service continuity between NTN and TN Turkcell, Hughes/EchoStar, Network Systems, Thales, BT Plc, Vodafone, ESA, Inmarsat, Aselsan discussion Rel-17

moved here from 8.10.3.1

[R2-2108329](file:///C:\Data\3GPP\Extracts\R2-2108329%20-%20Mobility%20for%20TN-NTN%20scenarios.docx) Mobility for NTN-TN scenarios MediaTek Inc. discussion [R2-2105253](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105253.zip)

[R2-2108341](file:///C:\Data\3GPP\Extracts\R2-2108341%20Connected%20mode%20aspects%20for%20NTN.docx) Connected mode aspects for NTN Ericsson discussion NR\_NTN\_solutions-Core

[R2-2108528](file:///C:\Data\3GPP\Extracts\R2-2108528%20Discussion%20on%20NTN-TN%20mobility%20.docx) Discussion on NTN-TN mobility CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108607](file:///C:\Data\3GPP\Extracts\R2-2108607_Further%20consideration%20on%20CHO%20in%20NTN.docx) Further consideration on CHO in NTN ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108717](file:///C:\Data\3GPP\Extracts\R2-2108717%20Discussion%20on%20location-based%20measurement%20event%20triggering.docx) Discussion on location-based measurement event triggering ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

SMTC and measurement gaps

[R2-2108286](file:///C:\Data\3GPP\Extracts\R2-2108286%20Remaining%20Issues%20on%20SMTC%20and%20measurement%20Gap%20configuration%20for%20NTN.docx) Remaining Issues on SMTC and measurement Gap configuration for NTN CMCC,Ericsson,ZTE Corporation,Huawei,CATT,Lenovo, Motorola Mobility discussion Rel-17 NR\_NTN\_solutions-Core

Observation 1: In NTN, both SMTC and measurement gaps configuration need consider the propagation delay difference information.

Proposal 1: it is proposed to allow the UE be configured with multiple SMTCs per carrier and use them all in parallel.

Observation 2: Although there will be not so much neighbor satellites, it is possible that multiple beams with different PCIs from one satellite as discussed in RAN1. Besides, considering the potential requirement for NR positioning, the current 2 SMTC configuration is not enough.

Proposal 2: it is proposed that the specific maximum number of SMTC configuration in one measurement object with the same ssbFrequency can be 3 or 4.

Proposal 3: RAN2 can regard NW-based SMTC/GAP Configuration scheme as baseline, i.e., the serving cell provided proper measurement configuration to the UE according the reported propagation delay information by the UE.

Proposal 4: Considering the RTT delay, the reporting granularity of the propagation delay could be a specific delay or a step range.

Proposal 5: We suggest RAN2 consider UE-based SMTC/GAP Selection Scheme, the NW configures a UE with multiple SMTC/measurement gap configurations corresponding to different propagation delay information, and the UE select an appropriate measurement configuration matching the UE-calculated propagation delay difference.

Proposal 6: It is proposed that in the UE-based SMTC/GAP Selection Scheme approach, the UE needs explicitly or implicitly report the selected SMTC/measurement gap configuration to the NW to guarantee an alignment between the NW and the UE.

Observation 3: In order to improve measurement robustness, the validity of the measurement configuration needs to be considered due to the long delay and the high-speed movement of the satellite. And timer-based or threshold-based solution could be discussed.

Proposal 7: In case of NW-based SMTC/GAP Configuration scheme, a timer or a location threshold with a pre-configured drift rate or a relative value is needed to enable the UE can timely refresh the SMTC or GAP configuration to compensate the delay variation from the satellite’s moving.

[R2-2107521](file:///C:\Data\3GPP\Extracts\R2-2107521%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 [R2-2105000](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105000.zip)

moved here from 8.10.3.2

[R2-2107566](file:///C:\Data\3GPP\Extracts\R2-2107566%20SMTC%20and%20MG.doc) SMTC and MG enhancements Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core [R2-2105434](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105434.zip)

[R2-2107878](file:///C:\Data\3GPP\Extracts\R2-2107878%20Measurement%20window%20enhancements%20for%20NTN%20cell.doc) Measurement window enhancements for NTN cell LG Electronics Inc. discussion Rel-17

[R2-2107911](file:///C:\Data\3GPP\Extracts\R2-2107911%20UE%20assistance%20for%20measurement%20gap%20and%20SMTC%20configuration%20in%20NTN%20(Revision%20of%20R2-2105819).docx) UE assistance for measurement gap and SMTC configuration in NTN Lenovo, Motorola Mobility discussion Rel-17

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

[R2-2108198](file:///C:\Data\3GPP\Extracts\R2-2108198%20Remaining%20Issues%20on%20SMTC%20and%20measurement%20Gap%20configuration%20for%20NTN.docx) Discussion on UE feedback based SMTC and GAPS measurement configuration Rakuten Mobile, Inc discussion Rel-17 [R2-2105389](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105389.zip)

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

Other

[R2-2107987](file:///C:\Data\3GPP\Extracts\R2-2107987%20%20Consideration%20on%20RRC%20release.doc) Consideration on RRC release Beijing Xiaomi Mobile Software discussion Rel-17

[R2-2108066](file:///C:\Data\3GPP\Extracts\R2-2108066.doc) Cell coverage spillage over multiple countries issue in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2108527](file:///C:\Data\3GPP\Extracts\R2-2108527%20Signaling%20overhead%20reduction%20for%20connected%20mobility.docx) Signaling overhead reduction for connected mobility CMCC discussion Rel-17 NR\_NTN\_solutions-Core

## 8.12 Reduced Capability

(NR\_redcap-Core; leading WG: RAN1; REL-17; WID: RP-211574)

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.

Workplan

[R2-2108276](file:///C:\Data\3GPP\Extracts\R2-2108276%20-%20Revised%20WI%20work%20plan%20for%20RedCap.docx) Revised WI work plan for RedCap Ericsson discussion NR\_redcap-Core

* Noted

Incoming LSs

[R2-2106905](file:///C:\Data\3GPP\Extracts\R2-2106905_C1-213966.doc) Reply LS on introducing extended DRX for RedCap UEs (C1-213966; contact: Qualcomm) CT1 LS in Rel-17 NR\_redcap-Core To:RAN2 Cc:SA2, RAN3

- VC/Apple/Ericsson think we can postpone further discussion on this waiting for possible outcome from SA2 discussion

- QC thinks that CT1 concluded that they will not be able to work on this but are fine to wait for further SA2 feedback

* RAN2 will wait for possible outcome of the SA2 discussion before continuing the discussion on this
* Noted

[R2-2106921](file:///C:\Data\3GPP\Extracts\R2-2106921_R1-2106329.docx) LS on RAN1 agreements on RAN2-led features for RedCap (R1-2106329; contact: NTT DOCOMO) RAN1 LS in Rel-17 NR\_redcap-Core To:RAN2

- Apple thinks the UE will not signal 1RX or 2RX, but the NW will derive the capability. If the UE is seen as supporting 2RX, the NW will assume it supports MIMO.

- ZTE thinks that RAN1 view on the support of Msg3 identification is that this is up to RAN2

* Noted

[R2-2106964](file:///C:\Data\3GPP\Extracts\R2-2106964_S1-211363.doc) Reply LS on Unified Access Control (UAC) for RedCap (S1-211363; contact: Huawei) SA1 LS in Rel-17 NR\_redcap To:RAN, CT1, RAN2

- vivo thinks that SA1 agreed that traffic from RedCap UEs will be treated in the same way as from other UEs

* Noted

Running CRs

[R2-2108277](file:///C:\Data\3GPP\Extracts\R2-2108277%20-%20Running%20RedCap%20CR%20for%2038331.docx) Running 38331 CR for RedCap Ericsson draftCR Rel-16 38.331 16.5.0 NR\_redcap-Core

[R2-2108411](file:///C:\Data\3GPP\Extracts\R2-2108411.docx) Running RedCap CR for 38.304 Ericsson draftCR Rel-17 38.304 16.5.0 B NR\_redcap

### 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

Including the outcome of [POST114-e][105][RedCap] Capabilities (Intel)

[R2-2107676](file:///C:\Data\3GPP\Extracts\R2-2107676_RedCap_EmailDisc-105_phase-2_v23_Summary_V02.docx) Email discussion report on [105][RedCap] Capabilities (Intel) Intel Corporation discussion Rel-17 NR\_redcap

Proposals for easy agreement

Proposal 1. [To agree] [15/16] The number of DRBs supported by RedCap UEs is less than legacy value (which is 16). FFS on the value(s).

* Agreed

Proposal 2. [To agree] [11/16] Not mandatory support 18 bits PDCP SN. FFS on the mandatory value;

Proposal 3. [To agree] [11/16] Not mandatory support 18 bits RLC AM SN. FFS on the mandatory value;

Proposal 4. [To agree] [9/13] “RRC processing delay” is not relaxed for RedCap UE.

- Apple has strong concerns with p4

- DT/BT disagree with many proposals that imply a different NW handling for RedCap UEs: operators cannot create a new NW just because of Redcap UEs

- Ericsson agrees with DT&BT and thinks there is no clear objective for this. Intel/HW agree

- Apple still has concerns on this but can accept the majority view

* Agreed

Proposal 5. [To agree] Leave the discussion on “small scalling factor values for RedCap UEs” to RAN1.

- Intel reports that RAN1 is still discussing this and then we don't need to treat

- vivo thinks that RAN1 has some discussion but that the understanding is that this should be discussed in RAN2

- Spreadtrum/Apple/ZTE/Lenovo think companies in RAN1 have different understanding on the motivation for this and then RAN1 needs RAN2 guidance on this

* Continue in offline 109 to check whether we can give some input to RAN1 (will come back in the CB session)

Proposal 7. [To agree] [18/20] PDCP/RLC AM 12 bits SN is mandatory for RedCap UE, and PDCP/RLC AM 18bits SN is optional supported by RedCap UE; FFS on how to capture this in specification;

- QC supports p7

* Agreed

Proposal 9. [To agree] [19/21] ANR feature is optional for RedCap UE; FFS on how to capture this in specification;

- DT thinks at least it should be optional but preferably mandatory and we should understand the implications of having this optional. Tmobile/DT/BT think it should mandatory.

- Huawei thinks this could really reduce the cost for RedCap UEs and then should be considered. vivo agrees with Huawei: if there are no RedCap only cells it's not clear why this should be mandatory. DT thinks this could happen in industrial environments

* Continue in offline 109

Proposal 10. [To agree] [21/21] From RAN2 perspective, inter RAT mobility related capabilities are applicable for RedCap UE; No specification impact is foreseen;

- Regarding p10-p15, ZTE thinks we should continue to discuss whether these capabilities can be supported and then can be reported or not by a RedCap UE: if reported, should the network consider the UE as a fake UE or not?

* Continue in offline 109

Proposal 11. [To agree] [15/21] From RAN2 perspective, measurement related capabilities are applicable for RedCap UE; No specification impact is foreseen;

* Continue in offline 109

Proposal 12. [To agree] [13/20] From RAN2 perspective, URLLC related capabilities are applicable for RedCap UE except those impacted by CA/DC; No specification impact is foreseen;

* Continue in offline 109

Proposal 13. [To agree] [15/19] From RAN2 perspective, IAB related capabilities are not applicable for RedCap UE; FFS on specification impact;

* Continue in offline 109

Proposal 14. [To agree] [21/21] NE-DC, and (NG)EN-DC are not supported by RedCap UE; FFS on how to capture it in the specification (see proposal 19);

* Agreed

Proposal 15. [To agree] [20/20] DAPS and CAPC related capabilities are not applicable for RedCap UE; [8/20] FFS on CHO. FFS on how to capture this in the specification;

* Agreed

Proposal 17. [To agree] [20/21] Do not introduce capability signalling on the supported Rx number for RedCap UE since the number of Rx branches for RedCap is implicitly indicated by the corresponding capability parameter maxNumberMIMO-LayersPDSCH in the existing UE capability framework. FFS on specification impact.

* Continue in offline 109

Proposal 19. [To agree] [TP to TS38.306] to capture maximum modulation order for RedCap UE as, for the field “pdsch-256QAM-FR1”, the value for column “M” should be changed from “Yes” into “CY”, add in the field description “It is mandatory with capability signaling for non-RedCap UE and optional for RedCap UE.”.

Proposal 20. [To agree] [14/20] [TP to TS38.306] Add the clarification “All UE capabilities related to CA and MR-DC are not applicable for RedCap UE.”in RedCap specific section; FFS on the definition of RedCap UE, and whether to capture other restrictions together, e.g. BW, RX, MIMO, QAM, etc.

Proposals for discussion (1st priority) or to be captured as FFS

Proposal 6. [To discuss] Continue the discussion on how to reduce maximum DRBs supported by RedCap UEs.

Proposal 6.1. Option 1 (supported by 8 companies): On “the number of DRBs that a UE shall support”, a single mandatory value is specified for all RedCaps UEs without any optional capability signalling; FFS on what is the mandatory value, 4 or 8?

Proposal 6.2. Option 2 (supported by 4 companies): Introduce optional capability to indicate the number of DRBs that the RedCap UE supports; FFS on what is the possible value 2, 4, 8, 16?

Proposal 6.3. Option 3 (supported by 11 companies): On “the number of DRBs that a UE shall support”, a single mandatory value is specified for all RedCap UE; FFS on what is the mandatory value, 4 or 8? In addition, introduce the optional capability to indicate the number of DRBs that the RedCap can additionally support. FFS on what is possible value 8 or 16, depends on the mandatory value;

- Intel thinks the UE should support only 4 as mandatory

* There will be a single mandatory value (FFS if 4 or 8). FFS if it will be possible to have an optional capability
* Continue in offline 109

Proposal 8. [To discuss] whether whole L2 buffer reduction discussion should be left to RAN1, i.e. based on proposal 5, or RAN2 should still discuss it;

* Continue in offline 109

Proposal 16. [To discuss] [TP to TS 38.306]. RAN2 to discuss how to capture Maximum BW:

Proposal 16.1. Option 2 9 companies

Proposal 16.1.1. to add “For FR1 RedCap UE, the bit which indicates 20MHz shall be set to 1, and the bits which indicate 25, 30, 40, 50, 60 and 80MHz are ignored. For FR2 RedCap UE, the bit which indicates 100MHz shall be set to 1, and the third / rightmost bit is ignored.” and “channelBWs-DL-v1590 is not applicable to RedCap UE.” for field description of existing fields “channelBWs-DL” and “channelBWs-UL”

Proposal 16.1.2. and add “This capability is not applicable to RedCap UE.” for field description of existing fields “channelBW-90mhz”;

Proposal 16.2. Option 3 7 companies to create a new section in 38.306 to capture the maximum UE bandwidth for RedCap UE (considering the clarification wording in Proposal 15.1.1 as the baseline);

* Continue in offline 109

Proposal 18. [To discuss] [TP to TS38.306] RAN2 to discuss how to capture the relationship between Rx and MIMO layers:

Proposal 18.1. Option 2 14 companies to add “For RedCap UE, if signalled, only 2 MIMO layers can be reported.” for field description of existing fields “maxNumberMIMO-LayersPDSCH”;

Proposal 18.2. Option 3 7 companies to create a new section in 38.306 to capture the relationship between Rx and MIMO layers;

* Continue in offline 109

Agreements:

1. The number of DRBs supported by RedCap UEs is less than legacy value (which is 16). There will be a single mandatory value (FFS if 4 or 8). FFS if it will be possible to have an optional capability
2. “RRC processing delay” is not relaxed for RedCap UE
3. PDCP/RLC AM 12 bits SN is mandatory for RedCap UE, and PDCP/RLC AM 18bits SN is optional supported by RedCap UE; FFS on how to capture this in specification
4. NE-DC, and (NG)EN-DC are not supported by RedCap UE; FFS on how to capture it in the specification
5. DAPS and CAPC related capabilities are not applicable for RedCap UE; [8/20] FFS on CHO. FFS on how to capture this in the specification;

[R2-2107677](file:///C:\Data\3GPP\Extracts\R2-2107677%20Constraining%20of%20reduced%20capabilities.docx) Constraining network access for UE with reduced capabilities Intel Corporation discussion Rel-17 NR\_redcap

Proposal 1: Send LS to SA2/CT1 to check subscription solution, whether core network should know the UE is a RedCap UE.

Proposal 2: Agree the content of LS to SA2 and CT1 on subscription solution as below.

* [AT115-e][109][RedCap] Capabilites (Intel)

Initial scope: Continue the discussion on p5, p6, p8-p13, p16-p18 (p19-p20 can be discussed during the running CR drafting). In general discuss whether, for (some of) these proposals, we need to ask anything to RAN1. Also discuss p1 and p2 from [R2-2107677](file:///C:\Data\3GPP\Extracts\R2-2107677%20Constraining%20of%20reduced%20capabilities.docx), i.e. need to send an LS to SA2/CT1

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): Monday 2021-08-23 10:00 UTC

Initial deadline (for rapporteur's summary in [R2-2108891](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108891.zip)): Monday 2021-08-23 16:00 UTC

Proposals marked "for agreement" in [R2-2108891](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108891.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue online).

Final scope: Continue the discussion on p3, p13 and p14 from [R2-2108891](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108891.zip) and draft the LS to RAN1 on L2 buffer size reduction

Intended outcome: LS(s) and summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2109129 and LS in R2-2109130): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2109129 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

[R2-2108891](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108891.zip) [offline 109] RedCap capabilities Intel discussion Rel-17 NR\_redcap-Core

Proposals for easy agreement

Proposal 2. [To agree] [17/23] Maximum 8 DRBs is mandatory supported by RedCap UEs.

* Agreed

Proposal 5. [To agree] [23/23] From RAN2 perspective, inter RAT mobility related capabilities are applicable for RedCap UE;

* Agreed

Proposal 6. [To agree] [19/21] From RAN2 perspective, measurement related capabilities are applicable for RedCap UE;

* Agreed

Proposal 7. [To agree] [20/21] From RAN2 perspective, URLLC related capabilities are applicable for RedCap UE except those affected by CA/DC;

* Agreed

Proposal 8. [To agree] [20/21] From RAN2 perspective, IAB related capabilities are not applicable for RedCap UE, i.e. the RedCap UE is not expected to act as IAB node;

* Agreed

Proposal 10. [To agree] [19/20] Do not introduce capability signalling on the supported Rx number for RedCap UE since the number of Rx branches for RedCap is implicitly indicated by the corresponding capability parameter maxNumberMIMO-LayersPDSCH in the existing UE capability framework;

* Agreed

Agreements via email - from offline 109:

1. Maximum 8 DRBs is mandatory supported by RedCap UEs.
2. From RAN2 perspective, inter RAT mobility related capabilities are applicable for RedCap UE;
3. From RAN2 perspective, measurement related capabilities are applicable for RedCap UE;
4. From RAN2 perspective, URLLC related capabilities are applicable for RedCap UE except those affected by CA/DC;
5. From RAN2 perspective, IAB related capabilities are not applicable for RedCap UE, i.e. the RedCap UE is not expected to act as IAB node;
6. Do not introduce capability signalling on the supported Rx number for RedCap UE since the number of Rx branches for RedCap is implicitly indicated by the corresponding capability parameter maxNumberMIMO-LayersPDSCH in the existing UE capability framework;

Proposals for discussion (1st priority) or to be captured as FFS

Proposal 1. [To discuss] whether to leave the whole L2 buffer reduction discussion up to RAN1;

* Discussed with [R2-2109103](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109103.zip)

Proposal 3. [To discuss] [11/22] on whether to introduce an optional capability to indicate the number of DRBs that the RedCap can additionally support.

* Continue in offline 109

Proposal 4. [To discuss] [13/23] ANR feature is optional for RedCap UE; FFS on how to capture this in specification;

Proposal 9. [To discuss] Whether to capture Maximum BW limitation for RedCap UE in existing field description, and add the clarification in the new section for the definition of RedCap UE:

Proposal 9.1. To create a new section in 38.306 to capture the maximum UE bandwidth for RedCap UE as“For RedCap UE, the maximum bandwidth on FR1 is 20 MHz, and the maximum bandwidth on FR2 is 100 MHz.”

Proposal 9.2. to add “RedCap UEs shall support the maximum channel bandwidth defined for the respective band but no more than 20 MHz for FR1 and no more than 100 Mhz for FR2.” and “channelBWs-DL-v1590 is not applicable to RedCap UE.” for field description of existing fields “channelBWs-DL” and “channelBWs-UL” and add “This capability is not applicable to RedCap UE.” for field description of existing fields “channelBW-90mhz”;

Proposal 11. [To discuss] Whether to create a new section in 38.306 to capture the relationship between Rx and MIMO layers “RedCap UE supports 1 DL MIMO layer if 1 Rx branch is supported, and 2 DL MIMO layers if 2 Rx branches are supported”;

Proposal 13. [To discuss] [6/17] whether RAN2 needs to send LS to RAN1/4 asking them to check features, URLLC, measurement, V2X, IAB, positioning

* Continue in offline 109

Proposal 14. [To discuss] [9/19] Send LS to SA2/CT1 to check subscription solution, and whether core network should know that the UE is a RedCap UE.

* Continue in offline 109

Proposals for discussion (2nd priority) or to be captured as FFS

Proposal 12. [FFS] To discuss in main session whether “support 1 DL MIMO layer” is same as “not supporting DL MIMO”, and whether current field description “If absent, the UE does not support MIMO on this carrier.” in TS38.306 needs to be updated;

R2-2109129 [offline 109] RedCap capabilities - second round Intel discussion Rel-17 NR\_redcap-Core

[R2-2109103](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109103.zip) WF on Rel-17 RedCap L2 soft buffer Reduction Spreadtrum, Apple, CAICT, CEPRI, CMCC, CTC, CUC, GDCNI, Guangdong Genius, OPPO, Sequans, Xiaomi, u-blox AG, vivo, ZTE, Sanechips discussion Rel-17 NR\_redcap-Core

Proposal:

L2 buffer size reduction is supported for Rel-17 RedCap, down-selection from the following solutions:

Solution 1: Reuse the current scaling factor in TS 38.306 for RedCap, relaxation/removal of  the current constraint, FFS smaller value(s).

For small value(s) to new relaxation/removal constraint, no impact for receiving SIB and paging should be guaranteed.

Solution 2: Introduce a new scaling factor (New IE) for RedCap to scale down the total L2 buffer size of RedCap UEs.

For the new scaling factor, no impact for receiving SIB and paging should be guaranteed.

Other solutions are not precluded.

Send an LS to RAN1 to check RAN1 spec. impact if necessary.

- Spreadtrum supports this. Ericsson as well

- QC cannot agree on this: think we cannot make any agreement in RAN2 but are ok to ask open ended questions to RAN1.

- Intel thinks these options are on the table in RAN1 but there is no conclusion.

- Mediatek is concerned that we might end up with two types of UEs and don't want to take a decision in RAN2

* Send an LS to RAN1 (contact Intel & Spreadtrum) asking to discuss L2 buffer size reduction and provide feedback to RAN2

R2-2109130 LS on L2 buffer size reduction Intel, Spreadtrum LS out Rel-17 Rel-17 NR\_redcap-Core To:RAN1

[R2-2107208](file:///C:\Data\3GPP\Extracts\R2-2107208%20Definition%20and%20reduced%20capabilities%20for%20RedCap%20UE.doc) Definition and reduced capabilities for RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

[R2-2107351](file:///C:\Data\3GPP\Extracts\R2-2107351%20Scaling%20factor%20for%20L2%20buffer%20size%20reduction%20for%20Rel-17%20RedCap.docx) Scaling factor for L2 buffer size reduction for Rel-17 RedCap Spreadtrum Communications discussion Rel-17

[R2-2107410](file:///C:\Data\3GPP\Extracts\R2-2107410_UE%20type%20defination%20and%20constraining%20for%20RedCap%20UEs.doc) UE type defination and constraining for RedCap UEs vivo, Guangdong Genius discussion Rel-17 FS\_NR\_redcap

[R2-2107608](file:///C:\Data\3GPP\Extracts\._R2-2107608-redcap-basic-capability.docx) RRC Processing Delay and remaining RedCap UE capability aspects Apple discussion Rel-17 NR\_redcap-Core

[R2-2107749](file:///C:\Data\3GPP\Extracts\R2-2107749%20Define%20and%20Constrain%20Reduced%20Capability%20for%20RedCap.docx) RedCap UE type and reduced capabilities ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2108278](file:///C:\Data\3GPP\Extracts\R2-2108278%20-%20Capabilities%20and%20definition.docx) Definition of RedCap UE and discussion on capabilities Ericsson discussion NR\_redcap-Core

[R2-2108697](file:///C:\Data\3GPP\Extracts\R2-2108697.docx) Further discussions on Redcap UE capabilities CATT discussion Rel-17 NR\_redcap-Core

#### 8.12.2.2 Identification, access and camping restrictions

Early identification of RedCap UEs (e.g. need for/details of msg3 early identification). Common Aspects related to RACH partitioning (due to msg1 early identification) shall be submitted to 8.18.

System information indication for camping restrictions.

[R2-2109023](file:///C:\Data\3GPP\RAN2\Docs\R2-2109023.zip) [Pre115-e][104][RedCap] Summary of AI 8.12.2.2 - Identification, access and camping restrictions Ericsson discussion Rel-17 NR\_redcap-Core

“Easy” proposals:

Proposal 1 [Easy] Msg1 identification which can be configured to be enabled/disabled can be specified from RAN2 point of view.

- Apple does not want this agreement to be used for the discussion on msg3 identification

* Agreed

Proposal 4 [Easy] Solution for early identification for 2-step RACH will be specified.

- Samsung would like to clarify the meaning. Ericsson thinks this says that there will some solution for MsgA, with details for FFS

* Agreed

Proposal 7 [Easy] Specify separate indications in SIB1 for barring RedCap UEs with 1 Rx chain and 2 Rx chains.

- DT thinks this is in line with the WID and then it's fine

- DENSO wonders whether it will be possible bar 2 RX and not 1 RX. DT thinks this could be completely independent.

* Agreed

Proposal 8 [Easy] Specify a RedCap specific IFRI in SIB1.

- DT thinks this might not be needed

* Agreed

Agreements:

1. Msg1 identification which can be configured to be enabled/disabled can be specified from RAN2 point of view.
2. Solution for early identification for 2-step RACH will be specified.
3. Specify separate indications in SIB1 for barring RedCap UEs with 1 Rx chain and 2 Rx chains.
4. Specify a RedCap specific IFRI in SIB1.

To discuss further:

Proposal 2 [To discuss] Both dedicated ROs and dedicated PRACH preambles in case of shared ROs are supported. Details are FFS and discussions in AI 8.18 should be taken into account.

* To be discussed later/elsewhere (e.g. in AI 8.18)

Proposal 3 [To discuss] A Msg3 early indication based on LCID is supported.

- DT thinks this is not essential but ok if some companies think 2 mechanisms are needed

- vivo thinks that RAN1 does not see the need for this and we also did not see the motivation for this.

- Ericsson thinks there is huge support for this and no drawback

- QC/CMCC/ZTE/Mediatek support p3

- Apple thinks that RAN1 discussed that there has to be some handling of msg2 that needs msg1 identification and also thinks that there would be security concerns. Ericsson thinks that if we need to do something for msg2, then of course msg1 identification would be needed.

- VC thinks that a decision should be taken in RAN2 by the end of this meeting.

* Continue in offline 104

Proposal 6 [To discuss] Continue discussion on whether UE ignores or applies the existing cellBarred in MIB.

* Continue in offline 104

Proposal 9 [To discuss] Specify IFRI separately for RedCap UEs with 1 Rx and 2 Rx branches.

* Continue in offline 104

Proposal 10 [To discuss] If RedCap-specific IFRI is not broadcasted, the existing IFRI in MIB is followed.

* Continue in offline 104

Proposal 11 [To discuss] Whether information on neighboring cell acceptance of RedCap UE access is provided in system information.

* Continue in offline 104

Proposal 12 [To discuss] Whether to support RedCap specific cell (re)selection parameters and/or priorities (e.g. Qrxlevmin, Qualmin, offsets, cellReselectionPriorities, etc.)

* Continue in offline 104

Postpone:

Proposal 5 [Postpone] Discuss the details of MsgA based early indication after Msg1/Msg3 discussion has progressed.

* [AT115-e][104][RedCap] Identification, access and camping (Ericsson)

Initial scope: Continue the discussion on p3, p6, p9-p12

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): Monday 2021-08-23 10:00 UTC

Initial deadline (for rapporteur's summary in [R2-2108892](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108892.zip)): Monday 2021-08-23 16:00 UTC

Proposals marked "for agreement" in [R2-2108892](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108892.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue online).

Final scope: Continue the discussion on p2 from [R2-2108892](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108892.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2109131): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2109131 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

[R2-2108892](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108892.zip) [offline 104] Identification, access and camping Ericsson discussion Rel-17 NR\_redcap-Core

Proposals for agreement:

Summary proposal 1: [19/8] A Msg3 early identification based on dedicated LCID is supported.

- Vivo would like to discuss this online

* Continue online

- Apple would like to ask for confirmation from SA3.

* Agreed as "A Msg3 early identification based on dedicated LCID is supported (unless SA3 will indicate there is an issue)

- Vivo is not happy with this but can accept if this is not mandatory for the UE. VC thinks the mandatory/optional support for all the UE capabilities will be discussed at a later stage.

- Apple commented offline that we don't need to send an LS to SA3 (it is sufficient that RAN2 acknowledges that SA3 might have a different view)

Summary proposal 2: [9/9/8] RedCap UE ignores the existing cellBarred in MIB.

- Huawei would like to discuss this online

* Continue online
* Continue in offline 104

Summary proposal 3: [12/9/3] IFRI for RedCap UEs in SIB1 is common for UEs with 1 Rx or 2 Rx branches.

* Agreed

Summary proposal 4: [16/7/2] If RedCap-specific IFRI is absent from broadcast SI, the UE considers the cell does not support RedCap.

* Agreed

Proposal for discussion:

Summary proposal 5: [14/12] Discuss whether system information should provide information on which cells accept RedCap UE access, and if, what this information should include (e¸g. support, barring?) and in which form (e.g. NCell, allow-list, exclude-list)

Agreements via email - from offline 104:

1. IFRI for RedCap UEs in SIB1 is common for UEs with 1 Rx or 2 Rx branches.
2. If RedCap-specific IFRI is absent from broadcast SI, the UE considers the cell does not support RedCap.

Agreements online:

1. A Msg3 early identification based on dedicated LCID is supported (if SA3 confirms there is no problem)

R2-2109131 [offline 104] Identification, access and camping - second round Ericsson discussion Rel-17 NR\_redcap-Core

[R2-2107071](file:///C:\Data\3GPP\Extracts\R2-2107071%20RedCap%20early%20identfication.doc) Discussion on RedCap UE’s early identification OPPO discussion Rel-17 NR\_redcap-Core

[R2-2107072](file:///C:\Data\3GPP\Extracts\R2-2107072%20RedCap%20access%20restriction.doc) Discussion on RedCap UE’s access restrictions OPPO discussion Rel-17 NR\_redcap-Core

[R2-2107117](file:///C:\Data\3GPP\Extracts\R2-2107117.docx) NR-REDCAP access restriction/allowance indication to ease mobility THALES discussion

[R2-2107209](file:///C:\Data\3GPP\Extracts\R2-2107209%20Identification%20and%20access%20restriction%20of%20RedCap%20UE.docx) Identification and access restriction of RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

[R2-2107216](file:///C:\Data\3GPP\Extracts\R2-2107216_Access%20and%20camping%20restriction%20for%20RedCap%20UEs.docx) Access and camping restriction for RedCap UEs Qualcomm Incorporated discussion Rel-17 FS\_NR\_redcap

[R2-2107352](file:///C:\Data\3GPP\Extracts\R2-2107352%20Further%20discussion%20on%20early%20indication%20design%20for%20RedCap%20UE.docx) Further discussion on early indication for RedCap UE Spreadtrum Communications discussion Rel-17

[R2-2107411](file:///C:\Data\3GPP\Extracts\R2-2107411_Identification%20and%20access%20restrictions%20for%20RedCap%20UEs.docx) Identification and access restrictions for RedCap UEs vivo, Guangdong Genius discussion Rel-17 FS\_NR\_redcap

[R2-2107535](file:///C:\Data\3GPP\Extracts\R2-2107535%20%20Discussion%20on%20Identification%20and%20UE%20access%20restrictions%20for%20Redcap%20devices.doc) Discussion on Identification and UE access restrictions for Redcap devices Xiaomi Communications discussion

[R2-2107555](file:///C:\Data\3GPP\Extracts\R2-2107555%20RedCap_earlyId_2.docx) Early identification and camping restrictions for RedCap UE Sierra Wireless, S.A. discussion

[R2-2107606](file:///C:\Data\3GPP\Extracts\._R2-2107606-Cell-Access.docx) Power-saving aspects from cell access and camping of RedCap UEs Apple discussion Rel-17 NR\_redcap-Core

[R2-2107607](file:///C:\Data\3GPP\Extracts\._R2-2107607-MSG3.docx) Issues with MSG3 based RedCap UE identification at intial access Apple discussion Rel-17 NR\_redcap-Core

[R2-2107652](file:///C:\Data\3GPP\Extracts\R2-2107652%20Camping%20restrictions%20of%20RedCap%20UE.doc) Camping restrictions of RedCap UE Fujitsu discussion Rel-17 NR\_redcap-Core [R2-2105399](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105399.zip)

[R2-2107678](file:///C:\Data\3GPP\Extracts\R2-2107678%20Early%20identification%20and%20camping%20restrictions%20for%20RedCap%20UE.docx) Early identification and camping restrictions for RedCap UE Intel Corporation discussion Rel-17 NR\_redcap

[R2-2107707](file:///C:\Data\3GPP\Extracts\R2-2107707%20Identification%20and%20access%20restrictions%20for%20RedCap%20UEs.docx) Identification and access restrictions for RedCap UEs LG Electronics UK discussion Rel-17

[R2-2107750](file:///C:\Data\3GPP\Extracts\R2-2107750%20Identification%20and%20Access%20Restriction%20for%20RedCap%20UEs.docx) Identification and Access Restriction for RedCap UEs ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2107783](file:///C:\Data\3GPP\Extracts\R2-2107783.docx) Access control for RedCap UEs Samsung discussion Rel-17 FS\_NR\_redcap

[R2-2107834](file:///C:\Data\3GPP\Extracts\._R2-2107834%20RedCap%20Camping%20restrictions%20and%20IFRI%20signalling.doc) Camping restrictions and IFRI for RedCap UE InterDigital, Europe, Ltd. discussion Rel-17

[R2-2107870](file:///C:\Data\3GPP\Extracts\R2-2107870.docx) Leftover issues on camping restriction and cell selection criterion DENSO CORPORATION discussion Rel-17 NR\_redcap-Core

[R2-2108136](file:///C:\Data\3GPP\Extracts\R2-2108136_early%20ind.docx) Further discussions on early identification and SI indication NEC discussion Rel-17 NR\_redcap-Core

[R2-2108137](file:///C:\Data\3GPP\Extracts\R2-2108137_initial%20BWP.docx) Initial BWP for RedCap NEC discussion Rel-17 NR\_redcap-Core

[R2-2108244](file:///C:\Data\3GPP\Extracts\R2-2108244%20Access%20for%20REDCAP%20UE.docx) Access for REDCAP UE Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2108245](file:///C:\Data\3GPP\Extracts\R2-2108245%20REDCAP%20UE%20early%20identification.docx) REDCAP UE early identification Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2108279](file:///C:\Data\3GPP\Extracts\R2-2108279%20-%20Early%20indication%20and%20access%20restriction%20for%20RedCap%20UEs.docx) Early indication & access restriction for RedCap UEs Ericsson discussion NR\_redcap-Core

[R2-2108463](file:///C:\Data\3GPP\Extracts\R2-2108463%20On%20cell%20barring%20indication%20and%20IFRI%20for%20RedCap%20UEs.docx) On Cell Barring Indication and Intra-Frequency Reselection Indication for RedCap UEs Futurewei Technologies discussion Rel-17 NR\_redcap-Core

[R2-2108524](file:///C:\Data\3GPP\Extracts\R2-2108524.docx) Discussion on identification and access restrictions CMCC discussion Rel-17 NR\_redcap-Core

[R2-2108628](file:///C:\Data\3GPP\Extracts\R2-2108628%20Access%20and%20camping%20restrictions%20for%20RedCap%20UE.docx) Access and camping restrictions for RedCap UE China Telecommunications discussion Rel-17

[R2-2108698](file:///C:\Data\3GPP\Extracts\R2-2108698.doc) Early Identification and Camping Restrictions for Redcap UEs CATT discussion Rel-17 NR\_redcap-Core

### 8.12.3 UE power saving and battery lifetime enhancement

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

#### 8.12.3.1 eDRX cycles

Extended DRX enhancements for RRC Inactive and Idle.

* [AT115-e][105][RedCap] eDRX cycles (Vivo)

Initial scope: Based on company contributions in 8.12.3.1, discuss the expected behaviour for different (RAN and CN) eDRX cycles lengths, assuming eDRX cycle in INACTIVE <= 10.24s

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): Wednesday 2021-08-18 04:00 UTC

Initial deadline (for rapporteur's summary in [R2-2108881](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108881.zip)): Wednesday 2021-08-18 08:00 UTC

Updated scope: discuss all remaining proposals from [R2-2108881](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108881.zip)

Intended outcome: Summary of the offline discussion with e.g.:

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

Updated deadline (for companies' feedback): Monday 2021-08-23 10:00 UTC

Updated deadline (for rapporteur's summary in [R2-2108893](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108893.zip)): Monday 2021-08-23 16:00 UTC

Proposals marked "for agreement" in [R2-2108893](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108893.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue online).

Final scope: discuss the remaining proposals from [R2-2109117](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109117.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2109132): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2109132 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

[R2-2108881](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108881.zip) [offline 105] eDRX cycles vivo discussion Rel-17 NR\_redcap-Core

Proposals for easy agreement

For PH/PTW calculation:

Proposal 3: [To agree] [20/20] When IDLE eDRX cycle is longer than 10.24s, PH calculation formula defined in LTE is re-used, i.e.

PH\_CN: H-SFN mod TeDRX,\_CN,H= (UE\_ID\_H mod TeDRX\_CN,H)

- where TeDRX\_CN,H is equal to IDLE eDRX cycle.

* Agreed

Proposal 6: [To agree] [20/20] When IDLE eDRX cycle is longer than 10.24s, CN PTW\_end calculation formula defined in LTE is re-used, i.e.

PTW\_end is radio frame satisfying SFN = (PTW\_start + L\*100 - 1) mod 1024,

- where L is PTW length configured by upper layers.

* Agreed

Paging monitoring mechanism in eDRX for different cases:

Proposal 8: [To agree][20/20] For RRC\_IDLE UE, when eDRX cycle is no longer than 10.24s, T is determined by IDLE eDRX cycle. When eDRX cycle is longer than 10.24s, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer and default paging cycle during the CN PTW.

* Agreed

Proposal 10: [To agree] [19/20] For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and Inactive eDRX cycle is not configured, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, RAN paging cycle and default paging cycle during CN PTW.

* Agreed

Proposal 15: [To agree] [20/20] For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and Inactive eDRX cycle is no longer than 10.24s, T is determined by INACTIVE eDRX cycle outside CN PTW.

- Huawei think the wording is confusing: is RAN eDRX and Inactive eDRX cycle the same thing? vivo agrees to change RAN eDRX to Inactive eDRX

* Agreed

Agreements:

1. When IDLE eDRX cycle is longer than 10.24s, PH calculation formula defined in LTE is re-used, i.e.

PH\_CN: H-SFN mod TeDRX,\_CN,H= (UE\_ID\_H mod TeDRX\_CN,H)

- where TeDRX\_CN,H is equal to IDLE eDRX cycle.

2. When IDLE eDRX cycle is longer than 10.24s, CN PTW\_end calculation formula defined in LTE is re-used, i.e.

PTW\_end is radio frame satisfying SFN = (PTW\_start + L\*100 - 1) mod 1024,

- where L is PTW length configured by upper layers.

3. For RRC\_IDLE UE, when eDRX cycle is no longer than 10.24s, T is determined by IDLE eDRX cycle. When eDRX cycle is longer than 10.24s, during the CN PTW, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, and default paging cycle.

4. For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and Inactive eDRX cycle is not configured, during CN PTW, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, RAN paging cycle and default paging cycle.

5. For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and Inactive eDRX cycle is no longer than 10.24s, outside CN PTW, T is determined by INACTIVE eDRX cycle.

Proposals have chance for agreement:

Configuration of eDRX cycle:

Proposal 1: [To agree] [15/20] RAN2 considers the configuration as an invalid case, where INACTIVE eDRX cycle is configured but IDLE eDRX cycle is not configured. Whether to capture this restriction in spec is FFS.

* Continue in offline 105

Proposal 2: [To agree] [18/20] RAN2 considers the configuration as invalid case, where INACTIVE eDRX cycle is longer than IDLE eDRX cycle. Whether to capture this restriction in spec is FFS.

* Continue in offline 105

PTW calculation for multi-beam:

Proposal 7: [To agree] [17/20]: When determining PTW\_start and/or PTW\_end for eDRX, the issue that multi-beam PO may be located outside the PTW will not be considered in RAN2 before getting enough supporters.

* Continue in offline 105

Paging monitoring mechanism in eDRX for different cases:

Proposal 12: [To agree] [18/20] For RRC\_INACTIVE UE, when IDLE eDRX cycle is no longer than 10.24s and RAN eDRX cycle is no longer than 10.24s, T is determined by the shortest of IDLE eDRX cycle and INACTIVE eDRX cycle. FFS whether the same eDRX cycle value should be set for both Idle and Inactive.

* Continue in offline 105

Proposal 14: [To agree] [17/20] For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and RAN eDRX cycle is no longer than 10.24s, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, INACTIVE eDRX cycle and default paging cycle during CN PTW.

* Continue in offline 105

Proposals need further online discussion:

PTW\_start calculation (P4 and P5 will be discussed together):

Proposal 4: [To agree] [15/20]: When IDLE eDRX cycle is longer than 10.24s, CN PTW\_start calculation formula defined in LTE is re-used, i.e.

PTW\_start denotes the first radio frame of the PH that is part of the PTW and has SFN satisfying the following equation:

SFN = 256\* ieDRX, where

- ieDRX = floor(UE\_ID\_H /TeDRX,H) mod 4

* Continue in offline 105

Proposal 5: [To discuss] [9/20]: RAN2 to discuss enhancement on CN PTW\_Start position is configurable by network.

* Continue in offline 105

Paging monitoring mechanism in eDRX for different cases:

P9 and P11 will be discussed together:

Proposal 9 [To discuss] [11 vs. 10] When IDLE eDRX cycle is no longer than 10.24s and INACTIVE eDRX cycle is not configured, RAN2 to discuss the following options on the paging monitoring mechanism for RRC\_INACTIVE UE:

- Option 1: T is determined by the shortest of RAN paging cycle, IDLE eDRX cycle, and default paging cycle.

- Option 2: T is determined by the shortest of RAN paging cycle and IDLE eDRX cycle.

* Continue in offline 105

Proposal 11: [To discuss] [8 vs. 13] When IDLE eDRX cycle is longer than 10.24s and INACTIVE eDRX cycle is not configured, RAN2 to discuss the following options on the paging monitoring mechanism for RRC\_INACTIVE UE outside CN PTW:

- Option 1: T is determined by the shortest of RAN paging cycle and default paging cycle.

- Option 2: T is determined by RAN paging cycle.

* Continue in offline 105

Proposal 13: [To discuss] [11 vs. 13] RAN2 to select one option for the configuration of INACTIVE eDRX cycle when it is no longer than 10.24s:

- Option 1: Extend the existing ran-pagingCycle field as LTE.

- Option 2: Introduce an additional IE for INACTIVE eDRX to contain all values of INACTIVE eDRX cycles (also include values >10.24, if agreed in future).

* Continue in offline 105

P16 will be discussed after the decision on P1:

Proposal 16: [To discuss] [4 vs. 3] If the case that IDLE eDRX cycle is not configured and INACTIVE eDRX cycle <=10.24s is allowed, RAN2 will further study the following options on the paging monitoring mechanism for RRC\_INACTIVE UE for this case:

- Option 1: T is determined by the shortest of INACTIVE eDRX cycle, default paging cycle and UE specific DRX cycle if configured by upper layer.

- Option 2: T is determined by INACTIVE eDRX cycle.

* Continue in offline 105

Proposals for discussion (1st priority) or to be captured as FFS

Proposal 17: FFS whether eDRX feature is optional or coupled with RedCap at network and UE.

* Continue in offline 105
* Huawei suggests to discuss PTW length as well in the offline

[R2-2108893](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108893.zip) [offline 105] eDRX cycles - second round vivo discussion Rel-17 NR\_redcap-Core

* revised in [R2-2109117](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109117.zip)

[R2-2109117](file:///C:\Data\3GPP\RAN2\Inbox\R2-2109117.zip) [offline 105] eDRX cycles - second round vivo discussion Rel-17 NR\_redcap-Core

Proposals for potential agreement

Proposal 1. [To agree] [22/22] RAN2 considers the configuration as an invalid case, where INACTIVE eDRX cycle is configured but IDLE eDRX cycle is not configured. FFS whether to capture this restriction in RAN2 spec.

* Agreed

Proposal 2. [To agree] [21/22] RAN2 considers the configuration as invalid case, where INACTIVE eDRX cycle is longer than IDLE eDRX cycle. FFS whether to capture this restriction in RAN2 spec.

* Agreed

Proposal 3. [To agree] [20/22] The maximum PTW length is 40.96s when IDLE eDRX cycle is longer than 10.24s.

* Agreed

Proposal 4. [To agree] [22/22] The minimum PTW length is 1.28s and the step length/granularity of PTW length is 1.28 when IDLE eDRX cycle is longer than 10.24s.

* Agreed

Proposal 5. [To agree] [18/22] When IDLE eDRX cycle is longer than 10.24s, CN PTW\_start calculation formula defined in LTE is re-used as the baseline, as below. FFS whether CN PTW\_start position could be configurable by network.

PTW\_start denotes the first radio frame of the PH that is part of the PTW and has SFN satisfying the following equation:

SFN = 256\* ieDRX, where

- ieDRX = floor(UE\_ID\_H /TeDRX,H) mod 4

- Mediatek suggests to revise as:

"…SFN = N \* ieDRX, where

- ieDRX = floor(UE\_ID\_H /TeDRX,H) mod 4

- N = 256. FFS if N can take other values"

- vivo is fine with Mediatek's suggestion. Huawei is not

- ZTE actually wonders if the "mod 4" should be configurable and wonders about the meaning of the FFS

- Mediatek then suggests to go for:

"SFN = 1024/N \* ieDRX, where

- ieDRX = floor(UE\_ID\_H /TeDRX,H) mod N

- N = 4, FFS if N can take other values"

- ZTE is fine with updated Mediatek's proposal. ZTE thinks the FFS is not only on the "configurable" part, but also FFS on which value of N we will use (even if it is not configurable).

- vivo would like to keep the original p5

* Continue online
* Continue in offline 105

Proposal 6. [To agree] [21/22] Introduce an additional new IE for INACTIVE eDRX to contain all values of INACTIVE eDRX cycles (also include values >10.24, if agreed in future).

* Agreed

Proposal 9. [To agree] [22/22] For RRC\_INACTIVE UE, when IDLE eDRX cycle is no longer than 10.24s and INACTIVE eDRX cycle is no longer than 10.24s, T is determined by the shortest of IDLE eDRX cycle and INACTIVE eDRX cycle.

* Agreed

*Proposal 10. [To agree] [21/22] For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and INACTIVE eDRX cycle is no longer than 10.24s, during CN PTW, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, INACTIVE eDRX cycle and default paging cycle.*

* Agreed

Proposal 11.[To agree] [20/22] eDRX feature is optional for any UE (including RedCap and non-RedCap UEs).

* Agreed

Proposal 12. [To agree] [19/22] eDRX is optional for any gNB (either supporting RedCap or not), which means it is up to gNB implementation whether to support eDRX.

- Sequans would like to discuss this online

* Continue online
* Continue in offline 105

Proposals for potential discussion online

Proposal 7.[To discuss] [11 vs 11] For RRC\_INACTIVE UE, when IDLE eDRX cycle is no longer than 10.24s and INACTIVE eDRX cycle is not configured, RAN2 to discuss the following options on the paging monitoring mechanism

- Option 1: T is determined by the shortest of RAN paging cycle, IDLE eDRX cycle, and default paging cycle.

- Option 2: T is determined by the shortest of RAN paging cycle and IDLE eDRX cycle.

* Continue in offline 105

Proposal 8. [To discuss] [10 vs 12] For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and INACTIVE eDRX cycle is not configured, RAN2 to discuss the following options on the paging monitoring mechanism for RRC\_INACTIVE UE outside CN PTW:

- Option 1: T is determined by the shortest of RAN paging cycle and default paging cycle.

- Option 2: T is determined by RAN paging cycle.

* Continue in offline 105

Agreements via email - from offline 105 second round:

1. RAN2 considers the configuration as an invalid case, where INACTIVE eDRX cycle is configured but IDLE eDRX cycle is not configured. FFS whether to capture this restriction in RAN2 spec.
2. RAN2 considers the configuration as invalid case, where INACTIVE eDRX cycle is longer than IDLE eDRX cycle. FFS whether to capture this restriction in RAN2 spec.
3. The maximum PTW length is 40.96s when IDLE eDRX cycle is longer than 10.24s.
4. The minimum PTW length is 1.28s and the step length/granularity of PTW length is 1.28 when IDLE eDRX cycle is longer than 10.24s.
5. Introduce an additional new IE for INACTIVE eDRX to contain all values of INACTIVE eDRX cycles (also include values >10.24, if agreed in future).
6. For RRC\_INACTIVE UE, when IDLE eDRX cycle is no longer than 10.24s and INACTIVE eDRX cycle is no longer than 10.24s, T is determined by the shortest of IDLE eDRX cycle and INACTIVE eDRX cycle.
7. For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and INACTIVE eDRX cycle is no longer than 10.24s, during CN PTW, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, INACTIVE eDRX cycle and default paging cycle.
8. eDRX feature is optional for any UE (including RedCap and non-RedCap UEs).

R2-2109132 [offline 105] eDRX cycles - third round vivo discussion Rel-17 NR\_redcap-Core

[R2-2107073](file:///C:\Data\3GPP\Extracts\R2-2107073%20-%20Discussion%20on%20eDRX%20for%20RedCap%20UEs.doc) Discussion on eDRX for RedCap UEs OPPO discussion Rel-17 NR\_redcap-Core

[R2-2107096](file:///C:\Data\3GPP\Extracts\R2-2107096.doc) CN PTW and RAN PTW for RedCap eDRX Samsung discussion Rel-17

[R2-2107210](file:///C:\Data\3GPP\Extracts\R2-2107210%20eDRX%20for%20RedCap%20UE.docx) eDRX for RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

[R2-2107217](file:///C:\Data\3GPP\Extracts\R2-2107217_eDRX%20configurations%20for%20RedCap%20UEs.docx) eDRX configurations for RedCap UEs Qualcomm Incorporated discussion Rel-17 FS\_NR\_redcap

[R2-2107412](file:///C:\Data\3GPP\Extracts\R2-2107412_Discussions%20on%20eDRX%20for%20RedCap%20UEs.doc) Discussion on eDRX for RedCap UEs vivo, Guangdong Genius discussion Rel-17 FS\_NR\_redcap

[R2-2107534](file:///C:\Data\3GPP\Extracts\R2-2107534%20%20Discussion%20on%20e-DRX%20for%20Redcap%20Devices.doc) Discussion on e-DRX for Redcap Devices Xiaomi Communications discussion

[R2-2107675](file:///C:\Data\3GPP\Extracts\R2-2107675_NR-eDRX.docx) Leftover issues for eDRX Intel Corporation discussion Rel-17 NR\_redcap

[R2-2107706](file:///C:\Data\3GPP\Extracts\R2-2107706%20Discussion%20on%20eDRX%20for%20RRC_IDLE%20and%20RRC_INACTIVE.docx) Discussion on eDRX for RRC\_IDLE and RRC\_INACTIVE LG Electronics UK discussion Rel-17

[R2-2107751](file:///C:\Data\3GPP\Extracts\R2-2107751%20eDRX%20for%20RedCap%20UEs.docx) eDRX for RedCap UEs ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2107905](file:///C:\Data\3GPP\Extracts\R2-2107905%20Consideration%20on%20eDRX%20for%20RedCap%20UE.docx) Consideration on eDRX for RedCap UE Lenovo, Motorola Mobility discussion Rel-17

[R2-2108230](file:///C:\Data\3GPP\Extracts\R2-2108230%20Remaining%20issues%20for%20eDRX.docx) Remaining issues for eDRX MediaTek Inc. discussion Rel-17 NR\_redcap-Core [R2-2105671](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105671.zip)

[R2-2108280](file:///C:\Data\3GPP\Extracts\R2-2108280%20-%20extended%20DRX%20for%20idle%20and%20inactive.docx) Details of eDRX and PTW in RRC\_IDLE and RRC\_INACTIVE Ericsson discussion NR\_redcap-Core

[R2-2108525](file:///C:\Data\3GPP\Extracts\R2-2108525.docx) Discussion on eDRX for RRC\_Idle and RRC\_Inactive CMCC discussion Rel-17 NR\_redcap-Core

[R2-2108699](file:///C:\Data\3GPP\Extracts\R2-2108699.doc) Discussion on eDRX for NR RRC Inactive and Idle CATT discussion Rel-17 NR\_redcap-Core

[R2-2108778](file:///C:\Data\3GPP\Extracts\R2-2108778.docx) Open issues on eDRX for UE in RRC\_INACTIVE DENSO CORPORATION discussion Rel-17 NR\_redcap-Core

#### 8.12.3.2 RRM relaxations

Measurement-basedstationarity criterion and related not-at-cell-edge criterion, for RRC Inactive, Idle and Connected.

[R2-2107211](file:///C:\Data\3GPP\Extracts\R2-2107211%20RRM%20measurement%20relaxation%20for%20RedCap%20UE.doc) RRM measurement relaxation for RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

Observation 1 : L3 filter should be sufficient to address the so-called frequent fluctuation issue for beam level criterion.

Observation 2 : It is difficult to identify whether UE is moving or not by evaluating the number of switched beams that is calculated based on a certain threshold, because the threshold is not possible to be sensitive for all UEs located in different distance to gNB.

Proposal 1: Beam-level criterion is adopted for Rel-17 stationary criterion.

Proposal 2: For beam-change based criterion, it is determined based on whether quality change of beam(s) for a period of time is lower than a threshold.

Proposal 3: Reuse Rel-16 not-at-cell-edge criterion with the same thresholds, when configured together with the R17 stationary criterion.

Proposal 4: For the stationary criterion in connected mode, the threshold is configured in dedicated signaling.

Proposal 5: UAI message is used for RedCap UE to report that the stationary criterion is met for RRC connected mode RRM relaxation.

Proposal 6: For RRC connected mode RRM relaxation, RAN2 does not support the R17 not-cell-edge criterion.

[R2-2107748](file:///C:\Data\3GPP\Extracts\R2-2107748%20RRM%20relaxation%20for%20RedCap%20UEs.docx) RRM relaxation for RedCap UEs ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

Observation 1: In real deployment, downlink best beam changes but with cell quality remains in a small range is a rare case.

Observation 2: Beam level results may fluctuate more than cell-level results, so it may cause misjudgment.

Observation 3: Defining too much RRM relaxation criteria increases RAN4’s workload.

Observation 4: For RRC\_CONNECTED UEs, network can use A1/A2 events to estimate UE’s position (e.g. cell edge or cell center).

Proposal 1: Do not introduce beam change based criterion in Rel-17.

Proposal 2: Introduce separate Rel-17 not-at-cell-edge threshold, and the new threshold is only associated with Rel-17 stationary criterion (if configured).

Proposal 3: Do not introduce not-at-cell-edge threshold for R17 RRC\_CONNECTED UEs. Network estimates UE’s position based on A1/A2 events.

Proposal 4: For RRC\_CONNECTED UE, RRM measurement configuration and reporting mechanism is reused for configuring RRM stationary criterion and reporting the results. Including:

- Define a new measurement event for RRM stationary criterion. TsearchDeltaP\_stationary can be formulated as TimeToTrigger.

- The reportConfig of the new event is linked to the measObject of PCell’s frequency;

- UE sends MeasurementReport to network when the event (criterion) is met.

- ReportOnLeave is reused to send report when the event (criterion) is not met any more.

- ReportAmount and ReportAmount can be reused if network wants UE to send report multiple times.

Proposal 5: Send LS to RAN4, includes followings:

- For RRC\_IDLE/INACTIVE,

o R17 stationary criterion reuses R16 low-mobility criterion with different R17 thresholds (i.e. SsearchDeltaP\_stationary, TsearchDeltaP\_stationary). Network can configure a separate not-at-cell-edge threshold associated with R17 stationary criterion.

o For R17 RRM relaxation, stationary criterion is mandatory configured, not-at-cell-edge criterion is optional configured.

o RAN4 is asked to study and define corresponding R17 RRM relaxation method.

- For RRC\_CONNECTED

o The stationary criterion defined for RRC\_IDLE/INACTIVE is reused (thresholds are sent via RRC dedicated signalling). UE sends report to network when stationary criterion is met.

o Network estimates UE’s position (e.g. cell center or cell edge) based on A1/A2 events;

o Network can reconfigure the measurements (e.g. increase SMTC period, remove measurement tasks) after receiving UE’s stationary report.

o RAN4 is asked to study whether additional RRM relaxation method is needed. If yes, please specify it.

Joint discussion:

* Beam level criterion

Proposal 1: Beam-level criterion is adopted for Rel-17 stationary criterion.

Proposal 2: For beam-change based criterion, it is determined based on whether quality change of beam(s) for a period of time is lower than a threshold.

(other beam-change based criterion suggested:

a. use Doppler shift of UE’s best beams from its serving cell instead of beam change counts.

b. beam-change evaluation method which takes Number of serving beams into account.

c. …

)

VS

Proposal 1: Do not introduce beam change based criterion in Rel-17.

- Oppo thinks we should not add new beam-level criterion in R17. QC/ZTE/Ericsson/LG agree. QC thinks it might not be a reliable way

* Continue in offline 110
* R17 not-at-cell-edge threshold for IDLE/INACTIVE

Proposal 3: Reuse Rel-16 not-at-cell-edge criterion with the same thresholds, when configured together with the R17 stationary criterion.

VS

Proposal 2: Introduce separate Rel-17 not-at-cell-edge threshold, and the new threshold is only associated with Rel-17 stationary criterion (if configured).

* Continue in offline 110
* R17 not-at-cell-edge threshold for CONNECTED

Proposal 6: For RRC connected mode RRM relaxation, RAN2 does not support the R17 not-cell-edge criterion.

OR (same proposal)

Proposal 3: Do not introduce not-at-cell-edge threshold for R17 RRC\_CONNECTED UEs. Network estimates UE’s position based on A1/A2 events.

VS

??

- Fraunhofer thinks this particular criterion is not needed but other criteria are need

* Do not introduce nor reuse not-at-cell-edge threshold for R17 RRC\_CONNECTED UEs.
* Configuration of stationarity criterion for CONNECTED

Proposal 4: For the stationary criterion in connected mode, the threshold is configured in dedicated signaling.

Proposal 5: UAI message is used for RedCap UE to report that the stationary criterion is met for RRC connected mode RRM relaxation.

VS

Proposal 4: For RRC\_CONNECTED UE, RRM measurement configuration and reporting mechanism is reused for configuring RRM stationary criterion and reorting the results. Including…

* Continue in offline 110
* Relaxation method in CONNECTED and need and content of an LS to RAN4

Proposal 5: Send LS to RAN4, includes following…

* Continue in offline 110

Agreements:

1. Do not introduce nor reuse not-at-cell-edge threshold for R17 RRC\_CONNECTED UEs.

* [AT115-e][110][RedCap] RRM relaxation (Huawei)

Initial scope: Continue the discussion on the proposals from [R2-2107211](file:///C:\Data\3GPP\Extracts\R2-2107211%20RRM%20measurement%20relaxation%20for%20RedCap%20UE.doc) and [R2-2107748](file:///C:\Data\3GPP\Extracts\R2-2107748%20RRM%20relaxation%20for%20RedCap%20UEs.docx)

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): Monday 2021-08-23 10:00 UTC

Initial deadline (for rapporteur's summary in [R2-2108894](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108894.zip)): Monday 2021-08-23 16:00 UTC

Proposals marked "for agreement" in [R2-2108894](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108894.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue online).

Initial scope: Continue the remaining proposals from [R2-2108894](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108894.zip) and draft LS to RAN4

Intended outcome: LS and summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2109133): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2109133 not challenged Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

[R2-2108894](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108894.zip) [offline 110] RRM relaxation Huawei discussion Rel-17 NR\_redcap-Core

Proposals for potential agreement

Proposal 1 [For agreement] (18/24): Do not introduce beam change based criterion in Rel-17.

* Agreed

Proposal 3 [For agreement] (25/26): The network provides the configuration of stationarity criterion to the UE via dedicated signalling (e.g. RRCReconfiguration message) in RRC\_CONNECTED.

* Agreed

Proposal 6 [For agreement] (26/26): To send LS to RAN4 to inform RAN2 conclusions for RRM relaxation.

* Agreed

Proposal 7 [For agreement]: The LS to RAN4 includes the agreed RAN2 conclusions (26/26) and “For RRC\_IDLE/INACTIVE, RAN4 is asked to study and define corresponding R17 RRM relaxation method” (24/26).

* Agreed

Agreements via email - from offline 110:

1. Do not introduce beam change based criterion in Rel-17.
2. The network provides the configuration of stationarity criterion to the UE via dedicated signalling (e.g. RRCReconfiguration message) in RRC\_CONNECTED.
3. Send LS to RAN4 to inform RAN2 conclusions for RRM relaxation.
4. The LS to RAN4 includes the agreed RAN2 conclusions and “For RRC\_IDLE/INACTIVE, RAN4 is asked to study and define corresponding R17 RRM relaxation method” .

Proposals for potential discussion online

Proposal 2 [Online discussions]: RAN2 to discuss which option is to be supported for Rel-17 not-at-cell-edge criterion in RRC\_IDLE/INACTIVE:

- Option 1 (10/25): Reuse Rel-16 not-at-cell-edge criterion with the same thresholds, when configured together with the R17 stationary criterion.

- Option 2 (15/25): Introduce separate Rel-17 not-at-cell-edge threshold, and the new threshold is only associated with Rel-17 stationary criterion (if configured).

* Continue in offline 107

Proposal 5 [Online discussions]: RAN2 to discuss which option is to be supported for reporting whether the stationarity criterion is met or not by the UE in RRC\_CONNECTED:

- Option 1 (12/25): Reuse UEAssistanceInformation message for the report.

- Option 2 (16/25): Reuse RRM measurement reporting mechanism.

* Continue in offline 107

Proposal 4 [Online discussions] (9/26): RAN2 to discuss whether dedicated signalling can be combined with broadcast signalling.

* Continue in offline 107

R2-2109133 [offline 110] RRM relaxation - second round Huawei discussion Rel-17 NR\_redcap-Core

R2-2109134 LS on RRM relaxation Huawei LS out Rel-17 Rel-17 NR\_redcap-Core To:RAN4

[R2-2107074](file:///C:\Data\3GPP\Extracts\R2-2107074%20-%20Discussion%20on%20RRM%20relax%20%20for%20RedCap%20UEs.doc) Discussion on RRM relax for RedCap UEs OPPO discussion Rel-17 NR\_redcap-Core

[R2-2107097](file:///C:\Data\3GPP\Extracts\R2-2107097.doc) RedCap RRM relaxation in RRC\_Idle/Inactive Samsung discussion Rel-17

[R2-2107098](file:///C:\Data\3GPP\Extracts\R2-2107098.doc) RedCap RRM relaxation in RRC\_Connected Samsung discussion Rel-17

[R2-2107110](file:///C:\Data\3GPP\RAN2\Docs\R2-2107110.zip) RRM relaxation for Redcap UE KDDI Corporation discussion Late

[R2-2107118](file:///C:\Data\3GPP\Extracts\R2-2107118.docx) NR-REDCAP stationarity relaxations based on measurements THALES discussion

[R2-2107145](file:///C:\Data\3GPP\Extracts\R2-2107145_On%20the%20efficient%20RRM%20relaxation%20on%20RRC%20Connected%20mode.docx) On the efficient RRM relaxation on RRC connected mode Fraunhofer IIS, Fraunhofer HHI discussion Rel-17

[R2-2107218](file:///C:\Data\3GPP\Extracts\R2-2107218_RRM%20relaxations%20for%20RedCap%20UEs.docx) RRM relaxations for RedCap UEs Qualcomm Incorporated discussion Rel-17 FS\_NR\_redcap

[R2-2107386](file:///C:\Data\3GPP\Extracts\R2-2107386%20Discussion%20on%20RRM%20measurement%20relaxation%20for%20redcap.docx) Discussion on RRM measurement relaxation for redcap Xiaomi Communications discussion Rel-17 NR\_redcap-Core

[R2-2107413](file:///C:\Data\3GPP\Extracts\R2-2107413_RRM%20Relaxation%20for%20Neighboring%20Cells.docx) RRM relaxation for neighboring cell for RedCap UEs vivo, Guangdong Genius discussion Rel-17 FS\_NR\_redcap

[R2-2107679](file:///C:\Data\3GPP\Extracts\R2-2107679%20RRM%20measurement%20relaxation%20criteria%20for%20RedCap%20devices.docx) RRM measurement relaxation criteria for RedCap devices Intel Corporation discussion Rel-17 NR\_redcap

[R2-2107754](file:///C:\Data\3GPP\Extracts\R2-2107754_RRM%20relaxation%20enhancement%20for%20RedCap%20UE.docx) RRM Relaxation for RedCap UE NTT DOCOMO INC. discussion Rel-17 [R2-2105229](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105229.zip)

[R2-2107847](file:///C:\Data\3GPP\Extracts\R2-2107847%20Further%20considerations%20on%20RRM%20relaxation%20in%20RRC_IDLE%20and%20RRC_INACTIVE.DOC) Further considerations on RRM relaxation in RRC\_IDLE and RRC\_INACTIVE LG Electronics Inc. discussion Rel-17 NR\_redcap-Core

[R2-2107848](file:///C:\Data\3GPP\Extracts\R2-2107848%20Remaining%20issues%20in%20RRM%20relaxation%20in%20RRC_CONNECTED.DOC) Remaining issues in RRM relaxation in RRC\_CONNECTED LG Electronics Inc. discussion Rel-17 NR\_redcap-Core

[R2-2107873](file:///C:\Data\3GPP\Extracts\R2-2107873%20RRM%20relaxation%20for%20RedCap%20UEs.doc) RRM relaxation for RedCap UEs SHARP Corporation discussion

[R2-2107904](file:///C:\Data\3GPP\Extracts\R2-2107904%20RRM%20relaxation%20for%20stationary%20UE%20with%20reduced%20capability.docx) RRM relaxation for stationary UE with reduced capability Lenovo, Motorola Mobility discussion Rel-17

[R2-2108070](file:///C:\Data\3GPP\Extracts\R2-2108070_RedcapRRM.docx) Redcap relaxed measurements and number of beams Sony discussion Rel-17 NR\_redcap-Core

R2-2108071 RedCap Relaxed measurements, stationary definition Sony discussion Rel-17 NR\_redcap-Core Withdrawn

[R2-2108259](file:///C:\Data\3GPP\Extracts\R2-2108259%20On%20RRM%20relaxation%20for%20REDCAP%20UE.docx) On RRM relaxations for REDCAP Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2108260](file:///C:\Data\3GPP\Extracts\R2-2108260%20On%20RRM%20relaxation%20in%20CONNECTED.docx) On RRM relaxations in CONNECTED Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2108275](file:///C:\Data\3GPP\Extracts\R2-2108275%20-%20RRM%20relaxation.docx) Details on RRM relaxation Ericsson discussion Rel-17 NR\_redcap-Core

[R2-2108465](file:///C:\Data\3GPP\Extracts\R2-2108465%20Discusion%20on%20not-at-cell-edge%20criterion%20for%20RedCap.docx) Discussion on Rel-17 not-at-cell-edge criterion Futurewei Technologies discussion Rel-17 NR\_redcap-Core

[R2-2108518](file:///C:\Data\3GPP\Extracts\R2-2108518.docx) Discussion on the RRM relaxation for RedCap Ues CMCC discussion Rel-17 NR\_redcap

[R2-2108629](file:///C:\Data\3GPP\Extracts\R2-2108629%20RRM%20relaxation%20of%20RedCap.docx) RRM relaxation of RedCap UE China Telecommunications discussion Rel-17

[R2-2108700](file:///C:\Data\3GPP\Extracts\R2-2108700.doc) Discussion on RRM relaxations for RRC\_CONNECTED CATT discussion Rel-17 NR\_redcap-Core

[R2-2108784](file:///C:\Data\3GPP\Extracts\R2-2108784.docx) Work on RRM relaxation for RedCap UEs DENSO CORPORATION discussion Rel-17 NR\_redcap-Core

## 8.19 Coverage Enhancements

(NR\_cov\_enh-Core; leading WG: RAN1; REL-17; WID: RP-211566)

Time budget: 0.5

Tdoc Limitation: 1 tdocs

Common aspects related to RACH indication (in MSG1) / RACH partitioning shall be submitted to 8.18

### 8.19.1 Organizational

Rapporteur input, incoming LS etc.

[R2-2107456](file:///C:\Data\3GPP\Extracts\R2-2107456_%20Work%20plan%20for%20NR%20coverage%20enhancements.doc) Work plan for NR coverage enhancements China Telecommunication discussion Rel-17 NR\_cov\_enh-Core

* Noted

### 8.19.2 General

RAN2 impact tech proposals.

[R2-2107745](file:///C:\Data\3GPP\Extracts\R2-2107745%20Consideration%20on%20Msg3%20repetition%20in%20CE.docx) Consideration on Msg3 repetition in CE ZTE Corporation, Sanechips discussion Rel-17 NR\_cov\_enh-Core

Observation 1: RAN2 should focus on Msg3 repetition for 4-step RACH, unless RAN1 makes solid conclusion to support Msg3 repetition for fallbackRAR.

- Samsung thinks this is not clear from RAN1 and this is why they listed in the paper, but are ok to go for this.

* Agreed

Observation 2: From UE perspective, if UE is within the extended UL coverage (i.e. RSRP lower than the pre-configured threshold), the UE can be benefit from Msg3 repetition when RACH is triggered.

Proposal 1: Msg3 repetition is applicable to all kind of 4-step CBRA procedures (can come back if we identify that some specific case should not be covered)

- Samsung supports this

- Ericsson thinks it should be possible to revisit this if we find any specific case where this is not applicable

* Agreed. Msg3 repetition is applicable to all cases that trigger 4-step CBRA procedure (can come back if we identify that some specific case should not be covered)

Proposal 2: A separate RSRP threshold is introduced for requesting Msg3 repetition.

- Samsung supports this.

- Nokia agrees but the wording is a bit odd.

* Agreed. A separate RSRP threshold is introduced for requesting Msg3 repetition

Proposal 3: The new RSRP threshold can be configured via RACH-ConfigCommon and BeamFailureRecoveryConfig. For BFR, if the parameter is not provided in BeamFailureRecoveryConfig, then the parameter from RACH-ConfigCommon is reused.

- Samsung thinks this is a bit too detailed for now and we can continue with Stage2 details first

* Come back later on this

(Additional proposal from [R2-2107008](file:///C:\Data\3GPP\Extracts\R2-2107008_MAC%20Aspects%20of%20UL%20Coverage%20Enhancements.doc) to be discussed here:

Proposal 2: RAN2 to discuss whether the UE applies criterion to request Msg3 PUSCH repetition only when the random access procedure is initiated or whether the UE applies this criterion before every random access attempt i.e. before the RACH preamble transmission.

)

- Oppo thinks we should have a comprehensive discussion of this.

- QC thinks the behaviour is similar to BFR and similar mechanism could apply (eg. use a CFRA BFR timer)

- Samsung thinks that we can further optimize the procedure but it might become quite complicated if we do it at every attempt

- Apple thinks this is related to other RACH related WIs and the ideal behaviour could be different in different cases

* Discuss in the common session AI 8.18

Proposal 4: To introduce separate cell selection threshold (i.e. q-RxLevMin) in SIB1, this threshold is applicable to UEs supporting Msg3 repetition.

- Lenovo wonders if we need any enhancements for idle and then for cell (re)selection.

- Huawei thinks that 304 is not listed in the affected specs so we could avoid discussing this

- Apple sees the point raised here and don't have such a strong view as HW but think we should postpone this discussion

- Ericsson also doesn't see the need for this

- QC supports this proposal

* Continue in offline 111

Observation 3: Different from SUL, Msg3 repetition may be enabled in part of cells on the same frequency.

Proposal 5: For cell reselection, UE needs to know whether each neighbour cell supports CE or not. FFS on solution.

* Continue in offline 111

Proposal 6: To confirm that Msg3 repetition can be configured on either NUL or SUL, or both.

- QC thinks msg3 repetition could apply to both NUL and SUL

- Oppo thinks we should consult with RAN1 on this

* Continue in offline 111, e.g. to check whether we need to ask for RAN1 view on this

Proposal 7: To confirm the following RAN2 specification impacts:

- On triggering Msg3 repetition:

o Introduce rsrp-Threshold-Msg3Repetition threshold for NUL carrier;

o Introduce rsrp-Threshold-Msg3Repetition threshold for SUL carrier.

- On NUL/SUL selection:

o Introduce additional rsrp-ThresholdSSB-SUL2 threshold, and this threshold is applicable to UEs supporting Msg3 repetition. Clarify in spec that existing rsrp-ThresholdSSB-SUL is only applicable to UEs not supporting Msg3 repetition.

- On cell selection:

o Introduce additional q-RxLevMin threshold for UE supporting Msg3 repetition but not supporting SUL.

o Introduce additional q-RxLevMinSUL threshold for UE supporting both Msg3 repetition and SUL.

Proposal 8: In case of Msg3 repetition, UE starts and restarts contention resolution timer at each HARQ retransmission and Msg3 repetition in the first symbol after the end of the Msg3 transmission (Same as the current spec).

(Alternative proposal, e.g. from [R2-2107220](file:///C:\Data\3GPP\Extracts\R2-2107220_RAN2%20enhancements%20for%20Msg3%20repetition.docx):

Proposal 4. Re-/start ra-ContentionResolutionTimer in the first symbol after all repetitions in a Msg3 re-/transmission are completed

or even, from [R2-2107008](file:///C:\Data\3GPP\Extracts\R2-2107008_MAC%20Aspects%20of%20UL%20Coverage%20Enhancements.doc):

Proposal 3: If the UL grant for Msg3 include repetitions, UE starts the ra-ContentionResolutionTimer in the first symbol after the end of Msg3 transmission in 1st transmission occasion of UL grant with repetition.

)

- QC thinks the timer should start only after completing all the repetitions.

* Continue in offline 111

Observation 4: Due to the complex deployment, Msg3 repetition may only be needed when UE is within the area of specific beams.

Proposal 9: To discuss whether network can enable Msg3 repetition on specific SSBs (e.g. to minimize the number of RACH preambles reserved for CE purpose).

* Continue in offline 111

Agreements:

1. RAN2 should focus on Msg3 repetition for 4-step RACH, unless RAN1 makes solid conclusion to support Msg3 repetition for fallbackRAR
2. Msg3 repetition is applicable to all cases that trigger 4-step CBRA procedure (can come back if we identify that some specific case should not be covered)
3. A separate RSRP threshold is introduced for requesting Msg3 repetition

[R2-2107220](file:///C:\Data\3GPP\Extracts\R2-2107220_RAN2%20enhancements%20for%20Msg3%20repetition.docx) RAN2 enhancements for Msg3 repetition Qualcomm Incorporated discussion Rel-17 NR\_cov\_enh-Core

Observation 1. To attain the full benefits of Msg3 repetition, Msg1 needs to have comparable coverage with repeated Msg3.

Proposal 1. Msg1 transmission by UE to request Msg3 repetitions can be configured with its specific set of preambleReceivedTargetPower, powerRampingStep, powerRampingStepHighPriority, preambleTransMax and groupBconfigured.

- Samsung thinks this is not in the scope of the WI

- Huawei thinks this is related to the support of separate RO which is still FFS in RAN1

Proposal 2. Preamble group B can be jointly configured with Msg3 repetition.

Proposal 3. If preamble group B is configured for Msg3 with repetitions, network can configure it with a separate set of ra-Msg3SizeGroupA, messagePowerOffsetGroupB, numberOfRA-PreamblesGroupA.

Observation 2. If UE restarts contention resolution timer after each repetition, it may consume more power and not be able to maintain the phase continuity necessary for network to perform joint channel estimation to attain the full benefits of Msg3 repetition.

Proposal 4. Re-/start ra-ContentionResolutionTimer in the first symbol after all repetitions in a Msg3 re-/transmission are completed

Proposal 5. In case a repetition in a Msg3 transmission overlaps with PUCCH or PUSCH scheduled by dynamic or configured UL grant, UE applies the same behaviors as those for a legacy Msg3 PUSCH transmission.

Proposal 6. If a gNB supports Msg3 with repetition, it should provide a separate set of Qrxlevmin and Qqualmin in SIBs for UEs capable of supporting Msg3 repetition.

Proposal 7. No UE capability signaling for Msg3 repetition is needed.

[R2-2107008](file:///C:\Data\3GPP\Extracts\R2-2107008_MAC%20Aspects%20of%20UL%20Coverage%20Enhancements.doc) MAC Aspects of UL Coverage Enhancements Samsung Electronics Co., Ltd discussion Rel-17 NR\_cov\_enh-Core

Proposal 1: RAN2 to discuss and agree on one of the following options for RA type selection

- Option 1: RA type selection take into account whether RACH configuration for UL coverage is signaled by gNB or not

- Option 2: RA type selection is independent of whether RACH configuration for UL coverage is signaled by gNB or not

Proposal 2: RAN2 to discuss whether the UE applies criterion to request Msg3 PUSCH repetition only when the random access procedure is initiated or whether the UE applies this criterion before every random access attempt i.e. before the RACH preamble transmission.

* Discuss in the common session AI 8.18

Proposal 3: If the UL grant for Msg3 include repetitions, UE starts the ra-ContentionResolutionTimer in the first symbol after the end of Msg3 transmission in 1st transmission occasion of UL grant with repetition.

[R2-2108003](file:///C:\Data\3GPP\Extracts\R2-2108003.docx) On support of Type A PUSCH repetitions for Msg3 CATT discussion Rel-17 NR\_cov\_enh-Core

Proposal 1: No enhancements on MAC RAR are needed for MSG3 repetition.

Proposal 2: ra-ContentionResolutionTimer is started for the last transmission of the MSG3 repetitions.

Proposal 3: No extension is needed for ra-ResponseWindow and ra-ContentionResolutionTimer for MSG3 repetition.

* [AT115-e][111][CE] Msg3 repetition (ZTE)

Initial scope: Continue the discussion on p4-p9 from [R2-2107745](file:///C:\Data\3GPP\Extracts\R2-2107745%20Consideration%20on%20Msg3%20repetition%20in%20CE.docx), p2-p7 from [R2-2107220](file:///C:\Data\3GPP\Extracts\R2-2107220_RAN2%20enhancements%20for%20Msg3%20repetition.docx), p3 from [R2-2107008](file:///C:\Data\3GPP\Extracts\R2-2107008_MAC%20Aspects%20of%20UL%20Coverage%20Enhancements.doc) and p1-p3 from [R2-2108003](file:///C:\Data\3GPP\Extracts\R2-2108003.docx)

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): Monday 2021-08-23 10:00 UTC

Initial deadline (for rapporteur's summary in [R2-2108895](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108895.zip)): Monday 2021-08-23 16:00 UTC

Proposals marked "for agreement" in [R2-2108895](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108895.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue online).

Final scope: Draft reply LS to RAN1 based on meeting agreements and possibly something from p5 in [R2-2108895](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108895.zip)

Intended outcome: LSs to RAN1 in R2-2108905

Final deadline (for companies' feedback): Thursday 2021-08-26 1600 UTC

Final deadline (for final LSs): Friday 2021-08-27 0000 UTC

[R2-2108895](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108895.zip) [offline 111] Msg3 repetition ZTE discussion Rel-17 NR\_cov\_enh-Core

For easy agreements:

Proposal 1 [11/14] Send LS to RAN1 to ask:

· Q1: whether Msg3 repetition can be supported on both NUL and SUL?

· Q2: If answer ‘Yes’ to Q1, whether different RSRP thresholds are needed for NUL and SUL?

- Huawei wonders if this is need and in case suggests to revise

- Ericsson thinks Q2 can be clarified as "If answer ‘Yes’ to Q1, whether different RSRP thresholds for requesting msg3 repetitions are needed for NUL and SUL?"

* Continue online

- Huawei wonders the intention to ask RAN1, if there is no RAN2 technical concern on this. Huawei thinks we could say it's feasible for RAN2. Ericsson is fine not to send this question to RAN1.

- Oppo thinks the LS to RAN1 is needed

- ZTE thinks we need to ask at least Q2 so it's fine to send an open question

- Samsung thinks this is feasible from RAN2 point of view and could ask RAN1 if this is needed

* Send an LS to RAN1, saying that support of msg3 repetition on both NUL and SUL is feasible from RAN2 point of view and asking Q1 and Q2 to RAN1

Proposal 4 [13/14] Extension of ra-ResponseWindow and ra-ContentionResolutionTimer are not needed for Msg3 repetition.

* Agreed

Proposal 8 [13/14] RAN2 confirms enhancing MAC RAR for indicating MSG3 repetition is not supported.

* Agreed

Proposal 9 Postpone the discussion on UE capability (i.e. whether explicit UE capability is needed for indicating the support of Msg3 repetition).

* Agreed

For further discussion:

Proposal 2 [4 vs 8] (To discuss) whether network can configure a separate set of minimum cell access thresholds (e.g. Qrxlevmin, Qqualmin) for Msg3 repetition capable UEs.

- Oppo suggests to revise as "Whether network needs to configure…". ZTE agrees

Proposal 3 (To discuss) For starting/re-starting ra-ContentionResolutionTimer in Msg3 repetition, to select one of following options:

· Option 1[6]: (Re)start ra-ContentionResolutionTimer in the first symbol after all Msg3 repetitions;

· Option 2[4]: (Re)start ra-ContentionResolutionTimer in the first symbol after each Msg3 repetition.

Proposal 5 [7 vs 6] (To discuss) Msg1 transmission by UE to request Msg3 repetitions can be configured with its specific set of RACH parameters (e.g. preambleReceivedTargetPower, powerRampingStep, powerRampingStepHighPriority, preambleTransMax, groupBconfigured).

- Oppo suggests to add "Whether" in front. ZTE agrees

- ZTE asks about p5. Oppo/LG/Lenovo/Samsung think this is not needed as this is not in the scope of the WI

- Ericsson/QC thinks we could ask p5

* Continue in offline 111 to discuss whether to include something for p5 in the LS to RAN1

Proposal 6 [5 vs 8] Send LS to RAN1 to ask about feasibility of preamble Group B with Msg3 repetition, i.e. to configure larger Msg3 TBS along with Msg3 repetition.

- Ericsson suggests to revise as "Send LS to RAN1 to ask about feasibility of preamble Group B with Msg3 repetition, i.e to configure larger msg3 TBS along with msg3 repetitions.". ZTE thinks we could decide ourselves.

* In the LS to RAN1 indicate that RAN2 thinks that preamble Group B with Msg3 repetition is feasible and ask RAN1 for confirmation

Proposal 7 [7/7] If Proposal 5 is agreed and preamble group B is configured for Msg3 repetition, a separate set of RACH parameters can be configured for the preamble group B.

- Lenovo thinks p7 depends on p5 and would like to keep it for discussion

Agreements via email - from offline 111:

1. Extension of ra-ResponseWindow and ra-ContentionResolutionTimer are not needed for Msg3 repetition.
2. RAN2 confirms enhancing MAC RAR for indicating MSG3 repetition is not supported.
3. Postpone the discussion on UE capability (i.e. whether explicit UE capability is needed for indicating the support of Msg3 repetition).

Agreements online:

1. Send an LS to RAN1, saying that support of msg3 repetition on both NUL and SUL is feasible from RAN2 point of view and asking Q1 and Q2 to RAN1. In the also indicate that RAN2 thinks that preamble Group B with Msg3 repetition is feasible and ask RAN1 for confirmation

R2-2108905 LS on Msg3 repetition ZTE LS out Rel-17 Rel-17 NR\_cov\_enh To:RAN1

[R2-2107059](file:///C:\Data\3GPP\Extracts\R2-2107059%20Discussion%20on%20RAN2%20Impacts%20of%20Msg3%20Repetition.docx) Discussion on RAN2 Impacts of Msg3 Repetition vivo discussion NR\_cov\_enh

[R2-2107080](file:///C:\Data\3GPP\Extracts\R2-2107080%20CE's%20RAN2%20impact.doc) Discussion on higher layer aspects of coverage enhancements OPPO discussion Rel-17 NR\_cov\_enh-Core

[R2-2108273](file:///C:\Data\3GPP\Extracts\R2-2108273%20On%20RAN2%20impacts%20for%20NR%20coverage%20enhancements%20and%20Type%20A%20PUSCH%20msg3%20repetitions.docx) On RAN2 impacts for coverage enhancements and Type A PUSCH repetitions for Msg3 Ericsson discussion Rel-17 NR\_cov\_enh

[R2-2108294](file:///C:\Data\3GPP\Extracts\R2-2108294.docx) RAN2 aspects of Msg3 PUSCH repetition Intel Corporation discussion Rel-17 NR\_cov\_enh-Core

[R2-2108604](file:///C:\Data\3GPP\Extracts\R2-2108604%20Discussion%20on%20the%20support%20of%20Msg3%20PUSCH%20repetition.docx) Discussion on the support of Msg3 PUSCH repetitions Huawei, HiSilicon discussion Rel-17 NR\_cov\_enh-Core

[R2-2108747](file:///C:\Data\3GPP\Extracts\R2-2108747%20Discussion%20on%20RACH%20with%20coverage%20enhancement.docx) Discussion on RACH with coverage enhancement LG Electronics Inc. discussion Rel-17 NR\_cov\_enh-Core

## Summary

Agreed CRs

TBD

Approved LSs out

TBD

[POST115-e] Email discussions

Short

TBD

Long

TBD