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** | CB Nathan |
| 13:05-14:25 | CB eIAB, TEI17 (Johan) | **CB Sergio**  **- Redcap CB session, including offline discussion outcomes**  **- CE offline discussion outcome (if any)**  **CB Diana** | 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/Diana** | 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)

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): Thursday 2021-08-19 2200 UTC

Proposals marked "for agreement" in R2-2108883 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Status: Ongoing

* [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): Thursday 2021-08-19 2200 UTC

Deadline for reply LSs: Week2 (after CB session)

Proposals marked "for agreement" in R2-2108884 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Status: Ongoing

* [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): Thursday 2021-08-19 1600 UTC

Proposals marked "for agreement" in R2-2108890 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Status: Ongoing

* [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

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

Status: Ongoing

* [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): Thursday 2021-08-19 1600 UTC

Proposals marked "for agreement" in R2-2108882 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Status: Ongoing

* [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): Thursday 2021-08-19 1600 UTC

Deadline for reply LSs: Week2 (after CB session)

Proposals marked "for agreement" in R2-2108887 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Status: Ongoing

* [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): Thursday 2021-08-19 1600 UTC

Proposals marked "for agreement" in R2-2108889 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

Status: Ongoing

## 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

R2-2108885 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

R2-2108888 Response LS on Multiple TACs per PLMN Nokia, Nokia Shanghai Bell LS out Rel-17 NR\_NTN\_solutions-Core To:CT1, SA2 Cc:RAN3

* 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): Thursday 2021-08-19 1600 UTC

Proposals marked "for agreement" in R2-2108882 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

R2-2108882 [offline 106] RACH aspects 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): Thursday 2021-08-19 2200 UTC

Proposals marked "for agreement" in R2-2108883 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

R2-2108883 [offline 101] Other MAC aspects Interdigital discussion Rel-17 NR\_NTN\_solutions-Core

[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.

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.

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.

[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): Thursday 2021-08-19 2200 UTC

Deadline for reply LSs: Week2 (after CB session)

Proposals marked "for agreement" in R2-2108884 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

R2-2108884 [offline 102] LCS aspects Qualcomm discussion Rel-17 NR\_NTN\_solutions-Core

[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): Thursday 2021-08-19 1600 UTC

Deadline for reply LSs: Week2 (after CB session)

Proposals marked "for agreement" in R2-2108887 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

R2-2108887 [offline 107] Reply LS on TAC handling Nokia discussion Rel-17 NR\_NTN\_solutions-Core

[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): Thursday 2021-08-19 1600 UTC

Proposals marked "for agreement" in R2-2108889 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

R2-2108889 [offline 108] Idle mode aspects 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

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[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): Thursday 2021-08-19 1600 UTC

Proposals marked "for agreement" in R2-2108890 not challenged until Friday 2021-08-20 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue offline until the CB session in Week2).

R2-2108890 [offline 103] CHO and NTN -TN mobility aspects 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

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[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)

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[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

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

[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

[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

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).

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.

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

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;

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

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

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

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;

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

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);

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;

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.

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;

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;

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);

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;

[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.

[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 indication which can be configured to be enabled/disabled can be specified from RAN2 point of view.

Proposal 4 [Easy] Solution for early indication in MsgA will be specified.

Proposal 7 [Easy] Specify separate indications in SIB1 for barring RedCap UEs with 1 Rx chain and 2 Rx chains.

Proposal 8 [Easy] 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.

Proposal 3 [To discuss] A Msg3 early indication based on LCID is supported.

Proposal 6 [To discuss] Continue discussion on whether UE ignores or applies the existing cellBarred in MIB.

Proposal 9 [To discuss] Specify IFRI separately for RedCap UEs with 1 Rx and 2 Rx branches.

Proposal 10 [To discuss] If RedCap-specific IFRI is not broadcasted, the existing IFRI in MIB is followed.

Proposal 11 [To discuss] Whether information on neighboring cell acceptance of RedCap UE access is provided in system information.

Proposal 12 [To discuss] Whether to support RedCap specific cell (re)selection parameters and/or priorities (e.g. Qrxlevmin, Qualmin, offsets, cellReselectionPriorities, etc.)

Postpone:

Proposal 5 [Postpone] Discuss the details of MsgA based early indication after Msg1/Msg3 discussion has progressed.

[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

[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.

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.

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.

Proposal 10: [To agree] [19/20] For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and RAN 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.

Proposal 15: [To agree] [20/20] 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 INACTIVE eDRX cycle outside CN PTW.

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.

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.

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.

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.

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.

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

Proposal 5: [To discuss] [9/20]: RAN2 to discuss enhancement on CN PTW\_Start position is configurable by network.

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.

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.

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).

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.

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.

[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.

* 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).

* 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

??

* 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 reporting the results. Including…

* Relaxation method in CONNECTED and need and content of an LS to RAN4

Proposal 5: Send LS to RAN4, includes following…

[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.

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.

Proposal 2: To introduce separate RSRP threshold for deciding 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.

(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.

)

Proposal 4: To introduce separate cell selection threshold (i.e. q-RxLevMin) in SIB1, this threshold is applicable to UEs supporting Msg3 repetition.

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.

Proposal 6: To confirm that Msg3 repetition can be configured on either NUL or SUL, or both.

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

)

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).

[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.

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.

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.

[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