3GPP TSG-RAN WG2 Meeting #116bis electronic R2-2201662

Online, January 17-25, 2022

**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 [AT116bis-e][000]

Organizational

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

* [AT116bis-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** |  |  |  |
| 13:00-13:45 | Early Items Main session, if any.  NR17 feMIMO (Johan) | **NR17 RedCap (Sergio)**  **[8.12.1]**  **[8.12.2.1]**  **[8.12.2.2] R2-2201732 ([Pre116bis-e] [103])** | NR17 SL enh (Kyeongin) |
| 13:45-14:30 | NR17 UDC (Johan) | NR17 Small Data Enh (Diana) | NR17 SL enh (Kyeongin) |
| 14:30-15:15 | NR17 eIAB (Johan) | NR17 Small Data Enh (Diana) | NR17 Pos (Nathan)  8.11.2 Latency enhancements  8.11.3 RRC\_INACTIVE (start) |
| 15:15-16:00 | NR17 eIAB (Johan) | NR17 RACH indication / partitioning (Diana) | NR17 Pos (Nathan)  8.11.3 RRC\_INACTIVE (continued)  8.11.4 On-demand PRS |
| **Tuesday** |  |  |  |
| 13:00-13:45 | NR17 feMIMO (Johan) | LTE17 IoT (Brian) | NR17 SL enh (Kyeongin) |
| 13:45-14:30 | NR17 MGE (Johan) | NR17 IIOT (Diana) | **NR17 NTN (Sergio)**  **[8.10.1]**  **[8.10.3.1]**  **[8.10.3.2] offline [102]** |
| 14:30-15:15 | NR17 ePowSav (Johan) | NR17 SL Relay (Nathan)  8.7.2.1 Control plane procedures | **NR17 NTN (Sergio)**  **[8.10.2.1] offline [101]** |
| 15:15-16:00 | NR17 ePowSav (Johan) | NR17 SL Relay (Nathan)  8.7.2.2 Service continuity  8.7.2.3 Adaptation layer design | **NR17 CovEnh (Sergio)**  **[8.19.1]**  **[8.19.2]** |
| **Wednesd** |  |  |  |
| 05:00-06:00 | NR17 IoT NTN (Johan) | NR17 SONMDT (HuNan) | NR17 Pos (Nathan)  8.11.4 On-demand PRS (cont. if needed)  8.11.5 GNSS integrity |
| **Thursday** |  |  |  |
| 04:30-05:30 | 0430-0515: NR17 QoE (Johan)  0515-0600: NR17 Other (Johan) | NR17 DCCA (Tero)  - 8.2.4 (TRS-based SCell activation)  - 8.2.2.2 (SCG activation)  - 8.2.2.1 (UE at SCG deactivation) | **0430 – 0515 NR17 NTN (Sergio)**  **[8.10.2.2] offline [107]**  **[8.10.4]**  **0515 – 0600 NR17 RedCap (Sergio)**  **[8.12.2.1] offline [105]**  **[8.12.2.2] offline [103]**  **[8.12.3.2] offline [104]** |
| 05:30-06:30 | 06:00-06:30: NR17 MBS (Johan) | NR17 DCCA (Tero)  - 8.2.3.1 (CPAC procedures from NW perspective)  - 8.2.3.2 (CPAC procedures from UE perspective)  - 8.2.5 (UE capabilities) | 06:00-0630 NR17 SL Relay (Nathan)  8.7.2.3 Adaptation layer design (cont. if needed)  8.7.3.1 Discovery |
| **Friday** |  |  |  |
| 04:30-05:30 | NR17 MBS (Johan) | NR17 Multi-SIM (Tero)  - 8.3.1 (Organizational):  - 8.3.3 (MUSIM NW switching) | NR17 SL Relay (Nathan)  8.7.3.1 Discovery (cont. if needed)  8.7.3.2 Relay re/selection  Possible email discussion checkpoint |
| 05:30-06:30 | MR17 MBS (Johan) | 05:30-0600: NR17 Multi-SIM (Tero)  - 8.3.5 (UE capabilities)  0600-0630: NR17 up to 71 GHz (Tero)  - 8.20.1 (LSs)  - 8.20.2 (MAC, RRC and UE capabilities) | NR17 SL enh (Kyeongin) |

WEEK 2:

|  |  |  |  |
| --- | --- | --- | --- |
| **Time Zone UTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Monday** |  |  |  |
| 13:00-13:45 | NR17 Other (Johan) | NR17 RAN Slicing (Tero)  - 8.8.1 (organizational)  - 8.8.2 (cell reselection)  - 8.8.3 (RACH)  - 8.8.4 (UE capabilities) | **CB RedCap (Sergio)**  **- offline [103], [104], [105], [106]** |
| 13:45-14:30 | NR17 AI 8.0.x (Johan) | CB Tero  - 8.8.x: RAN slicing overflow from previous session  - 8.2.3.3 (CPAC other)  - 8.2.2.1 (SCG deact MAC)  - 8.2.2.2 (SCG deact UL)  - 8.2.2.3 (SCG deact other) | LTE17 IoT (Brian) |
| 14:30-15:15 | CB UDC eIAB QoE Johan | NR17 IIOT (Diana) | NR17 Pos (Nathan)  Any overflow items from first week  Email discussion checkpoint |
| 15:15-16:00 | CB feMIMO Johan | NR17 RACH indication / partitioning (Diana) | CB Nathan  Positioning |
| **Tuesday** |  |  |  |
| 13:00-13:45 | CB feMIMO MGE Johan | **CB NTN (Sergio)**  **- offline [101], [102], [107]** | CB Diana |
| 13:45-14:30 | CB MBS Johan | **CB NTN (Sergio)**  **- offline [112]**  **CB CE**  **- offline [111]** | CB Diana |
| 14:30-15:15 | CB IoT NTN Johan | CB Tero  - 8.3.2 (MUSIM paging collision)  - 8.3.3 (MUSIM configured time)  - 8.20.2 (71 GHz RRC)  - Any other CB (if needed) | CB Kyeongin |
| 15:15-16:00 | CB ePowSav Johan | CB Brian, HuNan | CB Nathan  Relay |

List and status of offline email discussions

NOTE: No offline email discussions will be kicked off before Monday Jan 17th, 00:00 UTC

* [AT116bis-e][101][NTN] RACH aspects (Oppo)

Final scope: Continue the discussion on the remaining RACH aspects.

Final 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)

Final deadline (for companies' feedback): Tuesday 2022-01-25 0800 UTC

Final deadline (for rapporteur's summary in R2-2201755): Monday 2022-01-25 1000 UTC

Status: Ongoing

* [AT116bis-e][102][NTN] Idle/Inactive mode aspects (Huawei)

Final scope: Continue the discussion on the remaining idle/inactive mode aspects and draft LS to RAN1 asking to check the agreements on SIBx.

Final 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)

Final deadline (for companies' feedback): Monday 2022-01-24 1500 UTC

Final deadline (for rapporteur's summary in R2-2201756 and draft LS in R2-2201757): Monday 2022-01-24 1700 UTC

Proposals marked "for agreement" in R2-2201756 not challenged until Tuesday 2022-01-25 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue during the GTW session on Tuesday).

Status: Ongoing

* [AT116bis-e][103][RedCap] Identification and access restriction (Huawei)

Updated scope: Continue the discussion on identification and access restriction aspects based on [R2-2201734](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201734.zip)

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

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

Updated deadline (for companies' feedback): Friday 2022-01-21 1400 UTC

Updated deadline (for rapporteur's summary in R2-2201751): Friday 2022-01-21 1600 UTC

Proposals marked "for agreement" in R2-2201751 not challenged until Monday 2022-01-24 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue in the GTW session).

Status: Closed

* [AT116bis-e][104][RedCap] RRM relaxations (Samsung)

Updated scope: Continue the discussion on p1, p4 and p5 in [R2-2201735](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201735.zip)

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

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

Updated deadline (for companies' feedback): Friday 2022-01-21 1400 UTC

Updated deadline (for rapporteur's summary in R2-2201752): Friday 2022-01-21 1600 UTC

Proposals marked "for agreement" in R2-2201752 not challenged until Monday 2022-01-24 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue in the GTW session).

Status: Closed

* [AT116bis-e][105][RedCap] Capabilities (Intel)

Updated scope: Continue the discussion on open issues for RedCap capabilities based on [R2-2201737](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201737.zip)

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

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

Updated deadline (for companies' feedback): Friday 2022-01-21 1400 UTC

Updated deadline (for rapporteur's summary in R2-2201750): Friday 2022-01-21 1600 UTC

Proposals marked "for agreement" in R2-2201750 not challenged until Monday 2022-01-24 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue in the GTW session).

Status: Closed

* [AT116bis-e][106][RedCap] NCD-SSB and Initial BWP aspects (Ericsson)

Final scope: Draft reply LS to RAN1 and new LS to RAN4

Final intended outcome: LSs to RAN1 and RAN4

Final deadline (for companies' feedback): Tuesday 2022-01-25 1400 UTC

Final deadline (for LSs in R2-2201759 and R2-2201760): Tuesday 2022-01-25 1600 UTC

Status: Ongoing

* [AT116bis-e][107][NTN] Other MAC aspects (Interdigital)

Updated scope: Discuss remaining issues from [R2-2201739](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201739.zip)

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

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

Updated deadline (for companies' feedback): Monday 2022-01-24 1800 UTC

Updated deadline (for rapporteur's summary in R2-2201749): Monday 2022-01-24 2000 UTC

Proposals marked "for agreement" in R2-2201749 not challenged until Tuesday 2022-01-25 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue in the GTW session).

Status: Ongoing

* [AT116bis-e][108][NTN] Reply LS on User Consent (QC)

Scope: Discuss the details of a reply LS to SA3 on user consent

Intended outcome: Draft reply LS

Deadline (for companies' feedback): Friday 2022-01-21 04:00 UTC

Deadline (for draft LS in R2-2201740): Friday 2022-01-21 08:00 UTC

Status: Closed

* [AT116bis-e][109][NTN] Reply LSs to RAN4 and RAN1 (QC)

Scope: Draft Reply LSs to RAN1 and RAN4 based

Intended outcome: Draft reply LSs

Deadline (for companies' feedback): Tuesday 2022-01-25 04:00 UTC

Deadline (for draft LS in R2-2201741 and R2-2201742): Tuesday 2022-01-25 08:00 UTC

Status: Ongoing

* [AT116bis-e][110][NTN] UE location during initial access (Thales)

Scope: discuss a possible reply LS to SA2, RAN3, SA3. Also discuss other possible options, if any, to provide location information to the NG-RAN during initial access in a protected manner.

Intended outcome: offline summary in R2-2201743 and draft reply LS to SA2, RAN3, SA3 in R2-2201744

Deadline (for companies' feedback): Monday 2022-01-24 09:00 UTC

Deadline (for rapporteur's summary and draft LS): Monday 2022-01-24 11:00 UTC

Status: Closed

* [AT116bis-e][111][CovEnh] general aspects (Qualcomm)

Updated scope: Continue the discussion on the remaining proposals in [R2-2201747](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201747.zip)

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

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

Updated deadline (for companies' feedback): Monday 2022-01-24 2000 UTC

Updated deadline (for rapporteur's summary in R2-2201758): Monday 2022-01-24 2200 UTC

Proposals marked "for agreement" in R2-2201758 not challenged until Tuesday 2022-01-25 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue during the GTW session on Tuesday).

Status: Ongoing

* [AT116bis-e][112][NTN] Capabilities (Intel)

Initial scope: Continue the discussion on NTN capabilities, based on [R2-2200040](file:///C:\Data\3GPP\Extracts\R2-2200040%20Report%20of%20email%20discussion%20%5bPost116-e%5d%5b111%5d%5bNTN%5d%20UE%20capabilities%20(Intel).docx) and possibly other company contributions

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

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

Initial deadline (for companies' feedback): Monday 2022-01-24 1400 UTC

Initial deadline (for rapporteur's summary in R2-2201748): Monday 2022-01-24 1600 UTC

Proposals marked "for agreement" in R2-2201748 not challenged until Tuesday 2022-01-25 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue in the GTW session).

Status: Ongoing

## 8.10 NR Non-Terrestrial Networks (NTN)

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

Time budget: 1.5 TU

Tdoc Limitation: 4 tdocs + 1 for UE caps

Email max expectation: 5 threads

### 8.10.1 Organizational

Workplan

[R2-2200886](file:///C:\Data\3GPP\Extracts\R2-2200886-Rel17%20NR-NTN%20workplan%20updated%20v30.docx) Updated NR-NTN-solutions work plan THALES Work Plan Rel-17

*Incoming LSs*

LSs from RAN1 on higher-layer impacts related to all Rel-17 WIs

[R2-2200081](file:///C:\Data\3GPP\Extracts\R2-2200081_R1-2112842.docx) LS on Rel-17 MAC-CE impacts (R1-2112842; contact: Nokia) RAN1 LS in Rel-17 NR\_feMIMO, NR\_ext\_to\_71GHz, NR\_IIOT\_URLLC\_enh, NR\_NTN\_solutions, NR\_pos\_enh, NR\_redcap, NR\_UE\_pow\_sav\_enh, NR\_cov\_enh, NR\_IAB\_enh, NR\_SL\_enh, NR\_MBS, NR\_DSS, LTE\_NR\_DC\_enh2, LTE\_NBIOT\_eMTC\_NTN, NB\_IOTenh4\_LTE\_eMTC6, LTE\_terr\_bcast\_bands\_part1 To:RAN2 Cc:RAN4

* Noted

[R2-2200095](file:///C:\Data\3GPP\Extracts\R2-2200095_R1-2112977.docx) LS on updated Rel-17 LTE and NR higher-layers parameter list (R1-2112977; contact: Ericsson) RAN1 LS in Rel-17 NR\_feMIMO, NR\_ext\_to\_71GHz, NR\_IIOT\_URLLC\_enh, NR\_NTN\_solutions, NR\_pos\_enh, NR\_redcap, NR\_UE\_pow\_sav\_enh, NR\_cov\_enh, NR\_IAB\_enh, NR\_SL\_enh, NR\_MBS, NR\_DSS, LTE\_NR\_DC\_enh2, NR\_RF\_FR1\_enh, NR\_SmallData\_INACTIVE, NB\_IOTenh4\_LTE\_eMTC6, LTE\_NBIOT\_eMTC\_NTN, LTE\_terr\_bcast\_bands\_part1 To:RAN2, RAN3 Cc:RAN4

* Noted

UE TA reporting

[R2-2200071](file:///C:\Data\3GPP\Extracts\R2-2200071_R1-2112766.docx) Reply LS on UE TA reporting (R1-2112766; contact: Ericsson) RAN1 LS in Rel-17 NR\_NTN\_solutions To:RAN2

* Noted. Discussed in offline 101.

UE location / TAC reporting aspects

[R2-2200104](file:///C:\Data\3GPP\Extracts\R2-2200104_R3-216067.doc) Reply LS on UE Location Aspects in NTN (R3-216067; contact: Ericsson) RAN3 LS in Rel-17 NR\_NTN\_solutions To:SA2, RAN2 Cc:CT1

* Noted

[R2-2200145](file:///C:\Data\3GPP\Extracts\R2-2200145_S2-2109337.docx) LS on TAC reporting in ULI and support of SAs and FAs for NR Satellite Access (S2-2109337; contact: Qualcomm) SA2 LS in Rel-17 5GSAT\_ARCH To:CT1, RAN2, RAN3

* QC clarifies that SA2 decided to support both option C and D, so: "For NR satellite access, NG-RAN will report all broadcast TACs to AMF as part of ULI. The NG-RAN may determine the TAI the UE is currently located and provide that TAI (if known) to AMF as part of ULI. The ULI contains the TAI for the TA in which the UE is physically located, no matter whether the TAC is broadcasted in the serving radio cell or not. NG-RAN determines the TAC based on its available knowledge of the UE location." QC thinks there is no impact on the UE and we can simply note the LS.
* Thales thinks the LS confirms there is a need for having the UE location at the NG-RAN otherwise the NG-RAN cannot include a specific TAC in ULI. Samsung agrees
* The UE will not send any TAC information to the NG-RAN (i.e. we don't consider option B)
* Noted. Continue the discussion in the general aspects session

[R2-2200148](file:///C:\Data\3GPP\Extracts\R2-2200148_S3-214349.docx) Reply LS on NTN specific User Consent (S3-214349; contact: Qualcomm) SA3 LS in Rel-17 NR\_NTN\_solutions-Core To:RAN2 Cc:RAN3, SA2

* QC reports that SA3 agreed that NTN specific user consent may be needed before gNB can configure the UE to report the UE location information. No RAN2 work is expected
* Xiaomi wonders if SA3 can continue the work on user consent in Rel-17. vivo has the same view so we need to decide what to do in RAN2. Nokia thinks we should ask SA3 to work on this.
* Send an LS to SA3 (cc: SA2, CT4, RAN3) saying that RAN2 will assume that it will be possible to have NTN-specific user consent, at least based on subscription, and asking SA3 to further work on this.
* Reply LS in R2-2201740

[R2-2201740](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201740.zip) Draft reply LS on NTN specific User Consent Qualcomm Incorporated LS out Rel-17 NR\_NTN\_solutions-Core To:SA3 Cc:RAN3, SA2

* Remove Draft and put RAN2 as Source
* Revised in [R2-2201754](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201754.zip)

[R2-2201754](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201754.zip) Reply LS on NTN specific User Consent (Qualcomm Incorporated) LS out Rel-17 NR\_NTN\_solutions-Core To:SA3 Cc:RAN3, SA2

* Approved
* [AT116bis-e][108][NTN] Reply LS on User Consent (QC)

Scope: Discuss the details of a reply LS to SA3 on user consent

Intended outcome: Draft reply LS

Deadline (for companies' feedback): Friday 2022-01-21 04:00 UTC

Deadline (for draft LS in [R2-2201740](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201740.zip)): Friday 2022-01-21 08:00 UTC

[R2-2200149](file:///C:\Data\3GPP\Extracts\R2-2200149_S3-214360.docx) Reply LS on UE location aspects in NTN (S3-214360; contact: CATT) SA3 LS in Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH To:RAN2 Cc:RAN1, RAN3, SA2, SA3-LI, CT1

* Noted. Continue the discussion in the general aspects session

[R2-2200150](file:///C:\Data\3GPP\Extracts\R2-2200150_S3-214394.docx) Reply LS on UE location aspects in NTN (S3-214394; contact: Xiaomi) SA3 LS in Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH To:RAN2 Cc:CT1, SA2, SA3-LI, RAN3

* Noted

[R2-2201405](file:///C:\Data\3GPP\Extracts\R2-2201405%20DRAFT%20Reply%20LS%20to%20SA2%20on%20TAC%20reporting%20in%20ULI.doc) DRAFT Reply LS on TAC reporting in ULI and support of SAs and FAs for NR Satellite Access China Telecommunications LS out Rel-17 To:SA2, RAN3, CT1

Multiple SMTCs

[R2-2200128](file:///C:\Data\3GPP\Extracts\R2-2200128_R4-2120308.docx) Reply LS on Multiple SMTCs for NR NTN (R4-2120308; contact: Qualcomm) RAN4 LS in Rel-17 NR\_NTN\_solutions-Core To:RAN2

* Noted.
* Reply LS in R2-2201741

[R2-2201741](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201741.zip) Reply LS on Multiple SMTCs for NR NTN Qualcomm Incorporated LS out Rel-17 NR\_NTN\_solutions-Core To:RAN4

[R2-2200449](file:///C:\Data\3GPP\Extracts\R2-2200449%20Reply%20LS%20to%20RAN4%20on%20SMTC.docx) [Draft] Reply LS on Multiple SMTCs for NR NTN Qualcomm Incorporated LS out Rel-17 NR\_NTN\_solutions-Core To:RAN4

* Discussed in offline 109

Neighbor cells

[R2-2200129](file:///C:\Data\3GPP\Extracts\R2-2200129_R4-2120309.docx) LS on NR NTN Neighbor Cell and Satellite Information (R4-2120309; contact: Qualcomm) RAN4 LS in Rel-17 NR\_NTN\_solutions-Core To:RAN2 Cc:RAN1

* Noted.
* Reply LS in R2-2201742

[R2-2201742](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201742.zip) Reply LS on NR NTN Neighbor Cell and Satellite Information Qualcomm Incorporated LS out Rel-17 NR\_NTN\_solutions-Core To:RAN4 Cc:RAN1

[R2-2200450](file:///C:\Data\3GPP\Extracts\R2-2200450%20Reply%20LS%20to%20RAN4%20on%20measurement.docx) [Draft] Reply LS on NR NTN Neighbor Cell and Satellite Information Qualcomm Incorporated LS out Rel-17 NR\_NTN\_solutions-Core To:RAN4 Cc:RAN1

* Discussed in offline 109
* [AT116bis-e][109][NTN] Reply LSs to RAN4 and RAN1 (QC)

Scope: Draft Reply LSs to RAN1 and RAN4 based

Intended outcome: Draft reply LSs

Deadline (for companies' feedback): Tuesday 2022-01-25 04:00 UTC

Deadline (for draft LS in R2-2201741 and R2-2201742): Tuesday 2022-01-25 08:00 UTC

Running CRs

[R2-2200887](file:///C:\Data\3GPP\Extracts\R2-2200887_Stg2%20Running%20CR_NR-NTN_v09_clean.docx) NR-NTN Stg2 running CR THALES draftCR Rel-17 38.300 16.8.0 NR\_NTN\_solutions

R2-2201002 Stage-3 running 304 CR for NTN ZTE corporation, Sanechips discussion Rel-17 38.304 NR\_NTN\_solutions-Core

* Withdrawn

[R2-2201006](file:///C:\Data\3GPP\Extracts\R2-2201006_Stage-3%20running%20304%20CR%20for%20NTN_v0.docx) Stage-3 running 304 CR for NTN ZTE corporation, Sanechips draftCR Rel-17 38.304 16.7.0 B NR\_NTN\_solutions-Core

[R2-2201167](file:///C:\Data\3GPP\Extracts\R2-2201167%20(R17%20NTN%20WI%20AI%208.10.1)%20MAC%20running%20CR_116bise.docx) Stage 3 NTN running CR for 38.321 - RAN2#116bis-e InterDigital draftCR Rel-17 38.321 16.7.0 NR\_NTN\_solutions-Core [R2-2111615](file:///C:\Data\3GPP\archive\RAN2\RAN2%23116\Tdocs\R2-2111615.zip)

[R2-2201433](file:///C:\Data\3GPP\Extracts\R2-2201433%20Stage-3%20running%20RRC%20CR%20for%20NTN%20Rel-17.docx) Stage-3 running RRC CR for NTN Rel-17 Ericsson draftCR Rel-16 38.331 16.7.0 B NR\_NTN\_enh-Core

* Offline discussions will be kicked off later during the meeting to update the running CRs based on new agreements and possibly to endorse the new versions

[R2-2201166](file:///C:\Data\3GPP\Extracts\R2-2201166%20(R17%20NTN%20WI%20AI%208.10.1)%20MAC%20Open%20Issues_116bise.docx) MAC open issues in NTN - RAN2#116bis-e InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

### 8.10.2 User Plane

#### 8.10.2.1 RACH aspects

Focus on TA reporting aspects

[R2-2201656](file:///C:\Data\3GPP\RAN2\Docs\R2-2201656.zip) [Pre116bis-e][101][NTN] Summary of 8.10.2.1 RACH aspects (OPPO) OPPO discussion Rel-17 NR\_NTN\_solutions-Core

* to be discussed in offline 101
* [AT116bis-e][101][NTN] RACH aspects (Oppo)

Initial scope: Discuss RACH aspects based on the summary in [R2-2201656](file:///C:\Data\3GPP\RAN2\Docs\R2-2201656.zip)

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

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

Initial deadline (for companies' feedback): Tuesday 2022-01-18 0700 UTC

Initial deadline (for rapporteur's summary in R2-2201736): Tuesday 2022-01-18 0900 UTC

Updated scope: Continue the discussion on the remaining RACH aspects.

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

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

Updated deadline (for companies' feedback): Thursday 2022-01-20 2200 UTC

Updated deadline (for rapporteur's summary in R2-2201746): Friday 2022-01-21 0200 UTC

Final scope: Continue the discussion on the remaining RACH aspects.

Final 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)

Final deadline (for companies' feedback): Tuesday 2022-01-25 0800 UTC

Final deadline (for rapporteur's summary in R2-2201755): Monday 2022-01-25 1000 UTC

[R2-2201736](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201736.zip) [offline-101] RACH aspects OPPO discussion Rel-17 NR\_NTN\_solutions-Core

*For easy agreements:*

*Proposal 6: (17/18) Use a single TA offset threshold for event triggered TA reporting and no other parameters are needed.*

* Continue offline

*Proposal 7: (14/17) Other than event-triggered TA reporting, no more triggers are introduced for TA reporting in connected mode.*

* Ericsson thinks we still need to discuss which RA procedures can trigger TA report.
* Oppo thinks this is to avoid periodic reporting
* Continue offline

*Proposal 8: (14/17) SR/RACH can be triggered when TA reporting has been triggered but there is no available UL-SCH resources for TA reporting.*

* Mediatek wonders if there is a use case for this. Oppo thinks this is needed also for DL reception. Ericsson agrees with Mediatek. QC agrees with Oppo so the proposal is needed.
* Continue offline

*Proposal 9: (18/19) Do not support allocating dedicated RA preamble for the RACH procedure triggered by TA reporting.*

* Agreed

*Proposal 10: (16/18) UE does not start or restart the timeAlignmentTimer after the UE reports its TA.*

* Agreed

*Proposal 14: (18/19) NTN specific parameters, e.g. ephemeris, K\_mac, common TA, cell-specific Koffset, network enable/disable TA report, etc., are provided in the new NTN-specific SIB.*

* Agreed

*Proposal 15: (18/19) The MAC CE for UE-specific K\_offset has a fixed size of a single octet.*

* Intel thinks this is the differential UE specific K\_offset.
* Agreed as: *The MAC CE for differential UE-specific K\_offset has a fixed size of a single octet.*

*Proposal 16: (14/15) Use an eLCID for the MAC CE for UE-specific K\_offset.*

* Agreed as: *Use an eLCID for the MAC CE for differential UE-specific K\_offset*

*For further discussion:*

*Proposal 1: (12/19) UE reports Full TA (i.e., T\_TA as defined in the UE’s TA formula).*

*Proposal 2: The size of the TA report MAC CE is fixed to two octets.*

*Proposal 3: Regarding the exact priority of the TA report MAC CE, RAN2 to down select between the following two options:*

*(9/19) Option 2: lower than LBT failure MAC CE and higher than MAC CE for SL-BSR prioritized.*

*(7/19) Option 5: below CG confirmation/BFR MAC CE but above MAC CE for SL-BSR prioritized.*

*Proposal 4: (13/19) TA reporting during RACH in connected mode is not controlled by the enable/disable indication configured in SI, but depends on whether a TA update event is triggered or not.*

*Proposal 5: (10/19) RAN2 to further discuss whether UE triggers a TA reporting upon reception of configuration or reconfiguration of TA reporting trigger event if the UE has not reported TA before.*

*Proposal 11: (12/19) Do not support UE reporting location information for TA reporting purpose in connected mode.*

*Proposal 12: (10/16) IF reporting UE location information for TA reporting purpose in connected mode can be agreed, reuse the TA-based trigger condition.*

*Proposal 13: (11/17) IF reporting UE location information for TA reporting purpose in connected mode can be agreed, UE can be configured to only report either the UE location or the UE specific TA information.*

*Proposal 17: (12/19) Upon UL synchronization failure due to the validity timer expiry, UE flushes all HARQ buffers, releases all resource configuration, re-acquires the SIB and triggers RACH procedure to recover from UL synchronization loss failure.*

*Proposal 18: (12/19) RAN2 do not address the issue on connected mode UE failing to acquire an accurate UE location to be used in the calculation of the full TA.*

*Proposal 19: (10/16) UE stops ra-ContentionResolutionTimer upon receiving PDCCH indicating Msg3 retransmission and then starts ra-ContentionResolutionTimer after the end of the Msg3 retransmission plus UE-gNB RTT.*

Agreements:

1. Do not support allocating dedicated RA preamble for the RACH procedure triggered by TA reporting.
2. UE does not start or restart the timeAlignmentTimer after the UE reports its TA.
3. NTN specific parameters, e.g. ephemeris, K\_mac, common TA, cell-specific Koffset, network enable/disable TA report, etc., are provided in the new NTN-specific SIB.
4. The MAC CE for differential UE-specific K\_offset has a fixed size of a single octet.
5. Use an eLCID for the MAC CE for differential UE-specific K\_offset

[R2-2201746](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201746.zip) [offline-101] RACH aspects - second round OPPO discussion Rel-17 NR\_NTN\_solutions-Core

For agreements:

Proposal 3b: (16/18) The priority of the TA report MAC CE is lower than LBT failure MAC CE and higher than MAC CE for SL-BSR prioritized.

* Agreed

Proposal 5: (15/19) UE triggers a TA reporting upon reception of configuration or reconfiguration of TA reporting trigger event if the UE has not reported TA before.

* Agreed

Proposal 6: (18/19) Use a single TA offset threshold for event triggered TA reporting and no other parameters are needed.

* Ericsson would like to further discuss p6: Earlier agreements do not exclude using an algorithm that is dependent on two thresholds instead of one “differential threshold”. Our proposed method does use an offset, but different than the “differential threshold” method. Further, our proposed method can be configured with only signalling one threshold and the other threshold is equal to the signalled threshold plus 1 ms (or minus depending on which parameter that is signalled) – which addresses the concerns of some companies on the configuration. We think the performance of our proposed method is better than the “differential threshold”. Some further analysis show the average used Koffset can be between 0.6 and 1.4 ms lower than the “differential threshold” method. Using a low delta threshold increase the number of reports for the does not help, the difference will remain.
* Continue offline

Proposal 7: (19/19) Other than event-triggered TA reporting, no more triggers are introduced for TA reporting in connected mode.

* Agreed

Proposal 8: (17/19) SR/RACH can be triggered when TA reporting has been triggered but there is no available UL-SCH resources for TA reporting.

* Mediatek cannot accept p8. The drawback with this proposal is that all connected UEs in a 1000km area (i.e. a cell) will end up always reporting TA (periodically), even when there is no data to send, leading to significant overhead. Relying on existing mechanisms will ensure that TA report is only sent when required, i.e. only when there is DL or UL data (i.e. when TA is actually needed). Given that this optimisation ends up increasing spectrum usage for a non-existent latency improvement, we are not ok with agreeing to this proposal.
* Oppo thinks the “periodicity” (or reporting interval) is actually up to network’s implementation on how to set the offset threshold and how to configure the UE-specific K\_offset. For example, if NW configures a relatively large UE-specific K\_offset, it can even set the offset threshold to a pretty large value, which will obviously result in less TA report, or in your word, less overhead. On the other hand, if NW configures the UE-specific K\_offset pretty close to the UE’s TA, then to avoid late TA update and UE-specific K\_offset becomes not usable, it has to set the offset threshold to a rather small value. So I think this is a network configuration issue and the overhead issue you mentioned is not caused by triggering SR/RACH as normally each triggered TA update is expected to be reported to NW for better management of UE-specific K\_offset.
* Continue offline

Proposal 17a: (15/18) Upon UL synchronization failure due to the validity timer expiry, UE does not trigger RLF. UE flushes all HARQ buffers and released all resource configuration. FFS on when to re-acquire the SIB and trigger RACH procedure.

* QC would like to flag p17a and p18: When UL synchronization timer expired at the UE is not known to the network. That means if the UE releases the all resources autonomously, then the network will not be aware of this. If the UE fails to acquire accurate UE location, in our understanding the UE may not have correct TA now. Why Proposal 18 is different from UL synchronization timer expiry behavior.
* LGE shares the same view as QC on p17a
* HW wonders why the validity timer expiry leads to UL synchronization failure. Here is the description of ntnUlSyncValidityDuration in RAN1 RRC parameter list R2-2200095: "A validity duration configured by the network for uplink synchronization assistance information (i.e. Serving satellite ephemeris and Common TA parameters) which indicates the maximum time during which the UE can apply assistance information without having acquired new assistance information." In our understanding the validity timer expiry only means UE cannot use this outdated information for timing pre-compensation, and if UE needs to send Preamble it should re-acquire new assistance information. Whether UL synchronization failure happens still depends on the state of timeAlignmentTimer.
* Oppo notes that in IoT NTN session, following agreements have been made regarding to UL synchronization failure, so that maybe we can also consider similar approach for NR NTN: "When SI used for UL synch (pre-compensation) is no longer valid, the UE autonomously tunes away and re-aquires the required SI, and then comes back. FFS whether anything additional is needed."
* Continue offline

Proposal 18: (15/17) RAN2 do not address the issue on connected mode UE failing to acquire an accurate UE location to be used in the calculation of the full TA.

* Continue offline

Agreements via email - from offline 101 - second round:

1. priority of the TA report MAC CE is lower than LBT failure MAC CE and higher than MAC CE for SL-BSR prioritized.
2. UE triggers a TA reporting upon reception of configuration or reconfiguration of TA reporting trigger event if the UE has not reported TA before.
3. Other than event-triggered TA reporting, no more triggers are introduced for TA reporting in connected mode.

*For discussion:*

*Proposal 1a: (12/19) UE reports Full TA (i.e., T\_TA as defined in the UE’s TA formula). The size of the TA report MAC CE is fixed to two octets.*

*Proposal 11: (11/19) Not to support UE reporting location information for TA reporting purpose in connected mode.*

*Proposal 12: (12/17) Reuse the TA-based trigger condition IF reporting UE location information for TA reporting purpose in connected mode can be agreed.*

*Proposal 13: (11/16) UE can be configured to report only the UE location or the UE specific TA information IF reporting UE location information for TA reporting purpose in connected mode can be agreed.*

*Proposal 19: (11/17) UE stops ra-ContentionResolutionTimer upon receiving PDCCH indicating Msg3 retransmission and then starts ra-ContentionResolutionTimer after the end of the Msg3 retransmission plus UE-gNB RTT.*

[R2-2201755](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201755.zip) [offline-101] RACH aspects - third round OPPO discussion Rel-17 NR\_NTN\_solutions-Core

For agreements:

Proposals for agreements:

Proposal 6a: (14/15) For the TA report triggering event which uses the offset threshold between current information about UE specific TA and the last successfully reported information about UE specific TA, no hysteresis or time to trigger is needed.

* Based on Ericsson comments offline, VC understands the algorithms related to the different alternatives under discussion have basically "the same algorithm complexity, the same configuration overhead, the same amount of TA reports, the same complexity to handle [HARQ failures of TA report transmissions] respectively [multiple triggered TA reports at the same level]", but the Ericsson proposal could in some cases lead to lower UL delay and lower DL/UL HARQ RTT. However, VC thinks the delay improvement might not be so big to justify a different choice w.r.t. to the majority view. Also it was commented that selecting koffset to minimize the delay is one NW implementation choice, but not the only one, e.g. the network could use a larger koffset to allow more robustness scheduling, etc.
* VC suggests to agree p6a

Proposal 8a: (12/16) SR can be triggered if there is a TA reporting triggered and no UL-SCH resources for TA reporting. When SR is triggered but there are no available PUCCH resources, UE will trigger RACH.

Proposal 12: (8/8) Reuse the TA-based trigger event IF reporting UE location information for TA reporting purpose in connected mode can be agreed.

Proposal 13: (6/8) UE can be configured to report only the UE location or the UE specific TA information IF reporting UE location information for TA reporting purpose in connected mode can be agreed.

Proposal 18: (14/16) RAN2 do not address the issue on connected mode UE failing to acquire an accurate UE location to be used in the calculation of the full TA.

Proposal 19: (10/13) UE stops ra-ContentionResolutionTimer upon receiving PDCCH indicating Msg3 retransmission and then starts ra-ContentionResolutionTimer after the end of the Msg3 retransmission plus UE-gNB RTT.

Proposal 4: (18/19) TA reporting during RACH in connected mode is not controlled by the enable/disable indication configured in SI, but depends on whether a TA update event is triggered or not.

Proposals for discussion:

Proposal 1a: (9/15) UE reports Full TA (i.e., T\_TA as defined in the UE’s TA formula). The size of the TA report MAC CE is fixed to two octets.

Proposal 11: (8:6:1) Not to support UE reporting location information for TA reporting purpose in connected mode.

Proposal 17b: (12/17) Follow IoT NTN’s agreements, i.e., when SI used for UL synch (pre-compensation) is no longer valid, the UE autonomously tunes away and re-acquires the required SI, and then comes back. FFS whether anything additional is needed.

[R2-2200214](file:///C:\Data\3GPP\Extracts\R2-2200214%20Discussion%20on%20remaining%20issues%20on%20TA%20reporting.docx) Discussion on remaining issues on TA reporting Intel Corporation discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200243](file:///C:\Data\3GPP\Extracts\R2-2200243%20-%20Discussion%20on%20RACH%20and%20TA%20report%20in%20NTN.doc) Discussion on RACH and TA report in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200270](file:///C:\Data\3GPP\Extracts\R2-2200270%20%20Remaining%20issues%20related%20to%20TA%20report.doc) Remaining issues related to TA report Xiaomi discussion Rel-17

[R2-2200347](file:///C:\Data\3GPP\Extracts\R2-2200347%20Remaining%20issues%20about%20RACH%20and%20TA%20reporting.doc) Remaining issues about RACH and TA reporting Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200377](file:///C:\Data\3GPP\Extracts\R2-2200377%20Discussion%20on%20UE%20specific%20TA%20reporting.docx) Discussion on UE specific TA reporting vivo discussion

[R2-2200520](file:///C:\Data\3GPP\Extracts\R2-2200520%20Consideration%20of%20TA%20report%20remaining%20issues%20of%20NTN.doc) Consideration of TA report remaining issues of NTN China Telecom discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200627](file:///C:\Data\3GPP\Extracts\R2-2200627%20TA%20report%20%20procedure.doc) TA report procedure Spreadtrum Communications discussion Rel-17

[R2-2200688](file:///C:\Data\3GPP\Extracts\R2-2200688.docx) The Left Issues on UE-specific TA information reporting in NTN CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200746](file:///C:\Data\3GPP\Extracts\R2-2200746%20Discussion%20on%20TA%20report%20during%20RA%20procedure.docx) Discussion on TA report during RA procedure ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200747](file:///C:\Data\3GPP\Extracts\R2-2200747%20Discussion%20on%20issue%20of%20restarting%20contention%20resolution%20timer.docx) Discussion on issue of restarting contention resolution timer ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200764](file:///C:\Data\3GPP\Extracts\R2-2200764%20Further%20discussion%20on%20TA%20reporting%20in%20NTN.docx) Further discussion on TA reporting in NTN Lenovo, Motorola Mobility discussion Rel-17

[R2-2200876](file:///C:\Data\3GPP\Extracts\R2-2200876%20Considerations%20on%20RACH%20aspects.docx) Considerations on RACH aspects CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201007](file:///C:\Data\3GPP\Extracts\R2-2201007%20Discussion%20on%20RACH%20open%20issues%20and%20TA%20reporting%20aspects.docx) Discussion on RACH open issues and TA reporting aspects Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201034](file:///C:\Data\3GPP\Extracts\R2-2201034%20Further%20considerations%20on%20TA%20report%20v2.docx) Further considerations on TA reporting Samsung Research America discussion NR\_NTN\_solutions-Core

[R2-2201164](file:///C:\Data\3GPP\Extracts\R2-2201164%20(R17%20NTN%20WI%20AI%208.10.2.1)%20TA%20reporting.docx) UE-specific TA reporting and other RACH aspects InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201193](file:///C:\Data\3GPP\Extracts\R2-2201193_Remaining%20issues%20on%20TA%20Report.docx) Remaining issues on TA Report NEC Telecom MODUS Ltd. discussion

[R2-2201324](file:///C:\Data\3GPP\Extracts\R2-2201324%20Consideration%20on%20remaining%20issues%20of%20RACH%20aspects.doc) Consideration on remaining issues of RACH aspects ZTE Corporation, Sanechips discussion Rel-17

[R2-2201363](file:///C:\Data\3GPP\Extracts\R2-2201363_Discussion%20on%20RACH%20and%20TA%20report%20aspects.docx) Discussion on RACH and TA report aspects LG Electronics Inc. discussion NR\_NTN\_solutions-Core

[R2-2201630](file:///C:\Data\3GPP\Extracts\R2-2201630%20-%20Reporting%20information%20about%20UE%20specific%20TA%20pre-compensation%20in%20NTNs.docx) Reporting information about UE specific TA pre-compensation in NTNs Ericsson discussion

#### 8.10.2.2 Other MAC aspects

Focus on remaining aspects of timers, HARQ, and LCP including CG/SPS aspects

[R2-2201163](file:///C:\Data\3GPP\Extracts\R2-2201163%20(R17%20NTN%20WI%20AI%208.10.2.2)%20Remaining%20UP%20open%20issues.docx) Remaining MAC open issues in NTN InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

* [AT116bis-e][107][NTN] Other MAC aspects (Interdigital)

Initial scope: Discuss remaining MAC open issues, focussing on DRX timers, CG/SPS and remaining HARQ state aspects

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

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

Initial deadline (for companies' feedback): Wednesday 2022-01-19 1300 UTC

Initial deadline (for rapporteur's summary in R2-2201739): Wednesday 2022-01-19 1500 UTC

Updated scope: Discuss remaining issues from [R2-2201739](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201739.zip)

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

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

Updated deadline (for companies' feedback): Monday 2022-01-24 1800 UTC

Updated deadline (for rapporteur's summary in R2-2201749): Monday 2022-01-24 2000 UTC

Proposals marked "for agreement" in R2-2201749 not challenged until Tuesday 2022-01-25 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue in the GTW session).

[R2-2201739](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201739.zip) [offline-107] Other MAC aspects Interdigital discussion Rel-17 NR\_NTN\_solutions-Core

For email agreement:

Proposal 3: uplinkHARQ-DRX-Mode-r17 controls the DRX behaviour of HARQ processes in the same way for configured grants as for dynamic grants. (16/17)

* Agreed

Proposal 6: It is up to network implementation to ensure proper configuration of HARQ feedback (i.e. enabled or disabled) for HARQ processes used by an SPS configuration. (16/17)

* For 6 and 7, Ericsson think RAN2 shall not specify the network behaviour. Therefore 6 and 7 are not acceptable now as that is implied –the UE shall not make any assumption about how the NW will configure these parameters. To make this clear, “(no specification impact)” can be added to both and then we are fine with them.
* Continue online to check if the following is agreeable:

It is up to network implementation to ensure proper configuration of HARQ feedback (i.e. enabled or disabled) for HARQ processes used by an SPS configuration (no specification impact)

* QC would like to have a note in the spec
* IDC thinks the compromise here, as in other cases in the past, would be to put this in the session minutes
* Agreed as "It is up to network implementation to ensure proper configuration of HARQ feedback (i.e. enabled or disabled) for HARQ processes used by an SPS configuration (no Stage 3 specification impact)"

Proposal 7: It is up to network implementation to ensure proper configuration of HARQ mode for HARQ processes used by a CG configuration. (16/17)

* Continue online to check if the following is agreeable:

It is up to network implementation to ensure proper configuration of HARQ mode for HARQ processes used by a CG configuration (no specification impact)

* Agreed as " It is up to network implementation to ensure proper configuration of HARQ mode for HARQ processes used by a CG configuration (no Stage 3 specification impact)"

Proposal 8: allowedHARQ-DRX-LCP, if configured, shall not block transmission of Msg3/MsgA PUSCH. FFS whether this can be left to NW implementation, or explicitely specified.

* Ericsson thinks it should read as "allowedHARQ-DRX-LCP shall not apply to LCP for ~~block transmission of~~ Msg3/MsgA PUSCH. FFS whether this can be left to NW implementation, or explicitly specified."
* Oppo is not sure which option is meant to be excluded among

1. Configuration of HARQ mode is up to NW implementation, and UE always follows;
2. uplinkHARQ-DRX-LCP-Mode-r17 does not applies to HARQ process 0 carring PUSCH transmission scheduled by RAR or PUSCH payload of MsgA;
3. For UL grant in RAR or UL grant associated with MsgA PUSCH resource, LCP restriction of HARQ state does not apply;

* Oppo suggests to go for majority view i.e.: "For the cases that HARQ process 0 carries PUSCH transmission scheduled by RAR or PUSCH payload of MsgA, configuration of HARQ mode is up to NW implementation, and UE always follows it."
* Continue offline
* IDC (offline rapporteur) suggests to add the following statements in the minutes:

“RAN2 understanding is that: in general, all HARQ processes used by an SPS configuration are configured with the same HARQ feedback enabled/disabled state. No specification impact.”

“RAN2 understanding is that: in general, all HARQ processes used by a CG configuration are configured with the same HARQ state (e.g. A or B). No specification impact.”

Agreements via email - from offline 107:

1. uplinkHARQ-DRX-Mode-r17 controls the DRX behaviour of HARQ processes in the same way for configured grants as for dynamic grants.

Agreements online:

1. It is up to network implementation to ensure proper configuration of HARQ feedback (i.e. enabled or disabled) for HARQ processes used by an SPS configuration (no Stage 3 specification impact). FFS if a note in Stage 2 is needed
2. It is up to network implementation to ensure proper configuration of HARQ mode for HARQ processes used by a CG configuration (no Stage 3 specification impact). FFS if a note in Stage 2 is needed
3. For HARQ process(es) configured with HARQ Mode B, blind retransmission relies on UE being in DRX Active Time via other means (i.e. drx-RetransmissionTimerUL is not started).
4. For HARQ process(es) configured with disabled HARQ feedback, blind retransmission relies on UE being in DRX Active Time via other means (i.e. drx-RetransmissionTimerDL is not started).

RAN2 understanding:

1. RAN2 understanding is that: in general, all HARQ processes used by an SPS configuration are configured with the same HARQ feedback enabled/disabled state. No specification impact.
2. RAN2 understanding is that: in general, all HARQ processes used by a CG configuration are configured with the same HARQ state (e.g. A or B). No specification impact

For online discussion

Proposal 1: For HARQ process(es) configured with HARQ Mode B, blind retransmission relies on UE being in DRX Active Time via other means (i.e. drx-RetransmissionTimerUL is not started). (11/17)

* IDC thinks we should agree on this.
* Oppo thinks we could have this configurable as a compromise
* Ericsson there is no need for this
* Oppo thinks there is an issue also for CG
* IDC thinks the configurable option was also on the table before and already discarded
* Agreed

Proposal 2: For HARQ process(es) configured with disabled HARQ feedback, blind retransmission relies on UE being in DRX Active Time via other means (i.e. drx-RetransmissionTimerDL is not started). (11/17)

* Agreed

For further discussion

Proposal 4: RAN2 to further discuss preferred method to extend configuredGrantTimer in NTN.

Options:

1) Value of the configuredGrantTimer is extended by UE-gNB-RTT;

2) Introducing value(s) of configuredGrantTimer larger than 64;

* Continue offline

Proposal 5: RAN2 to further discuss applicability of allowedHARQ-DRX-LCP for CG.

* Continue offline

[R2-2201749](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201749.zip) [offline-107] Other MAC aspects - second round Interdigital discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: configuredGrantTimer length is extended by UE-gNB RTT in NTN.

Rapporteur notes this proposal is motivated by the following observations from Questions 1-3:

Observation 1: While (7/12) agree that extension of CGT by UE-gNB RTT could lead to mismatch between UE and gNB, a large majority (8/11) think this may be handled by existing mechanisms with no further specification impact.

Observation 2: A majority (7/11) do no not think that values in Option 2 can be selected to balance overhead and approximately compensate UE-gNB RTT.

Observation 3: There is near consensus (10/11) that only one option is to be specified.

* Ericsson would like to further discuss P1. This would be a change to how legacy CG works. This has two technical issues. 1) Mismatch between UE and gNB making the UE not transmit when the gNB expects the UE to (UE misses a CG opportunity) or making the gNB not decoding a CG when the UE transmits (This is maybe not a severe issue as it shall not happen frequently). 2) gNB cannot plan the future resource usage as gNB can not know how the UE-gNB RTT will vary in advance. In legacy periodicity times configuredGrantTimer gives the time that the timer will be running. A change to base the running of this timer on the UE-gNB RTT means the gNB do not know in advance when in time a CG will be reused by one UE. It also means that the running time of this timer for different UEs will vary differently depending on where in a cell they are located. The gNB may handle thousands of UEs, and not knowing how a CG-config will be used by the UEs is a new limitation for the gNB that it would need to handle the overhead from. This decreases the possibility for the gNB to use CG for as many users as possible. Using a new field configuredGrantTimer-r17 of 8 bits will not lead to any overhead, as configuredGrantTimer is an optional parameter.
* Continue online

Proposal 2: allowedHARQ-DRX-LCP also applies to CG, and it is up to NW implementation to properly configure allowedHARQ-DRX-LCP and/or allowedCG-List for a LCH (e.g. to avoid conflicting configuration).

* Xiaomi wonders whether network can configure allowedCG-List and allowedHARQ-DRX-LCP at the same time. If so, whether UE checks both conditions or not?
* Oppo thinks p2 simply states that UE follows whatever allowedHARQ-DRX-LCP and/or allowedCG-List that are configured by the NW.
* Continue online

Proposal 3: When HARQ process 0 carries PUSCH transmission scheduled by RAR or PUSCH payload of MsgA, configuration of HARQ mode and allowedHARQ-DRX-LCP is up to NW implementation, and UE always follows it (no specification impact). (9/12)

* Xiaomi would like to know whether network implementation means/includes configuring “no HARQ state” to HP #0 or not? If so, there might be an issue. Because RAN2 has not discussed whether “no HARQ state” is configured per HARQ or per UE. If it is per UE, then configuring HP #0 to no HARQ state may not be an option. If it is per process, dynamic scheduling may not be able to use this HARQ process since DRX RTT timer cannot be extended by RTT. If network implementation only includes configuring HARQ state A or B, it means the LCHs configured with other HARQ state cannot use it even if the RACH is triggered by them due to data arrival. It will greatly increase the delay.
* Oppo thinks p3 simply states that UE follow HARQ #0’s state, if that is configured by the NW.
* Continue online

[R2-2200244](file:///C:\Data\3GPP\Extracts\R2-2200244%20-%20Remaining%20issues%20on%20other%20MAC%20aspects%20in%20NTN.doc) Remaining issues on other MAC aspects in NTN OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200271](file:///C:\Data\3GPP\Extracts\R2-2200271%20%20Remaining%20issues%20related%20to%20HARQ%20retransmission%20state.doc) Remaining issues related to HARQ retransmission state Xiaomi discussion Rel-17

[R2-2200348](file:///C:\Data\3GPP\Extracts\R2-2200348%20Remaining%20issues%20about%20other%20MAC%20aspects.doc) Remaining issues about other MAC aspects Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200444](file:///C:\Data\3GPP\Extracts\R2-2200444%20SPS%20CG.doc) HARQ process for SPS and CG Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core [R2-2109968](file:///C:\Data\3GPP\archive\RAN2\RAN2%23116\Tdocs\R2-2109968.zip)

[R2-2200618](file:///C:\Data\3GPP\Extracts\R2-2200618%20Remaining%20issues%20on%20disabling%20uplink%20HARQ%20retransmission.docx) Remaining issues on disabling uplink HARQ retransmission MediaTek Inc. discussion

[R2-2200619](file:///C:\Data\3GPP\Extracts\R2-2200619%20Round%20trip%20delay%20offset%20for%20configured%20grant%20timer.docx) Round trip delay offset for configured grant timer MediaTek Inc. discussion

[R2-2200628](file:///C:\Data\3GPP\Extracts\R2-2200628%20Discussion%20on%20HARQ%20and%20LCP%20remaining%20issues.doc) Discussion on HARQ and LCP remaining issues Spreadtrum Communications discussion Rel-17

[R2-2200689](file:///C:\Data\3GPP\Extracts\R2-2200689.docx) Left Issues on DL/UL HARQ Aspects CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200787](file:///C:\Data\3GPP\Extracts\R2-2200787%20Remaining%20%20issues%20on%20HARQ%20related%20timer%20handling%20for%20NR%20NTN.docx) Remaining issues on HARQ related timer handling for NR NTN vivo discussion

[R2-2200788](file:///C:\Data\3GPP\Extracts\R2-2200788%20Remaining%20issues%20on%20LCP%20aspects.docx) Remaining issues on LCP aspects vivo discussion

[R2-2200870](file:///C:\Data\3GPP\Extracts\R2-2200870%20Further%20Considerations%20on%20CG%20SPS%20for%20NR%20NTN.docx) Further Considerations on CG/SPS for NR NTN CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200911](file:///C:\Data\3GPP\Extracts\R2-2200911.doc) CG enhancements in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201008](file:///C:\Data\3GPP\Extracts\R2-2201008%20Discussion%20on%20left%20issues%20on%20MAC%20aspects.docx) Discussion on left issues on MAC aspects Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201325](file:///C:\Data\3GPP\Extracts\R2-2201325%20Consideration%20on%20remaining%20issues%20of%20other%20MAC%20aspects.doc) Consideration on remaining issues of other MAC aspects ZTE Corporation, Sanechips discussion Rel-17

[R2-2201364](file:///C:\Data\3GPP\Extracts\R2-2201364_Discussion%20on%20other%20MAC%20aspects.DOCX) Discussion on other MAC aspects LG Electronics Inc. discussion NR\_NTN\_solutions-Core

[R2-2201480](file:///C:\Data\3GPP\Extracts\R2-2201480_CG_SPS_aspect.docx) HARQ State A/B for CG/SPS aspects ITL discussion

[R2-2201629](file:///C:\Data\3GPP\Extracts\R2-2201629%20-%20On%20configured%20scheduling%20DRX%20LCP%20HARQ%20and%20SR%20BSR%20in%20NTNs.docx) On configured scheduling, DRX, LCP, HARQ and SR/BSR in NTNs Ericsson discussion

#### 8.10.2.3 RLC and PDCP aspects

This sub-AI will not be treated at R2-116bis-e. No contributions are expected

[R2-2201194](file:///C:\Data\3GPP\Extracts\R2-2201194_RLC%20t-Reassembly%20timer.docx) RLC t-Reassembly timer NEC Telecom MODUS Ltd. discussion [R2-2110766](file:///C:\Data\3GPP\archive\RAN2\RAN2%23116\Tdocs\R2-2110766.zip)

### 8.10.3 Control Plane

#### 8.10.3.1 General aspects

Including Earth fixed/moving beams related issues, TAC update / reporting and LCS aspects (i.e. UE location information reporting)

[R2-2200879](file:///C:\Data\3GPP\Extracts\R2-2200879_UE%20location%20during%20initial%20access_v03.doc) UE location during initial access THALES discussion Rel-17

Observation 1: RAN2 shall define a solution enabling NG-RAN to determine in which country the UE is located

Observation 2: RAN2 should define a solution that avoids sending unprotected UE location information to the gNB

Proposal 1: RAN2 to decide between

• Option 1: UE reports a protected UE location information (based on GNSS coordinates).

• Option 2: UE determines and reports the TAI in which it is located to NG-RAN.

Proposal 2: RAN2 to discuss in its LS response to SA3 whether to ask SA3 to consider a protection mechanism before AS security is activated as part of release 18 if needed/feasible

[R2-2200987](file:///C:\Data\3GPP\Extracts\R2-2200987.doc) On reporting of UE location information ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: Reconfirm RAN2 decision to allow inclusion of UE coarse GNSS coordinates in msg5.

Proposal 2: Specify that inclusion of UE coarse GNSS coordinates in msg5 can be enabled/disabled by the network via system information.

Proposal 3: Re-discuss whether, from RAN2 perspective, the actual accuracy requirement for the coarse GNSS coordinates can be further relaxed (e.g. ~5 or 10km instead of ~2km) and double-check with other affected groups (SA2, RAN3, SA3-LI).

[R2-2200212](file:///C:\Data\3GPP\Extracts\R2-2200212%20Discussion%20on%20location%20reporting.docx) Discussion on location reporting Intel Corporation discussion Rel-17 NR\_NTN\_solutions-Core

* UE location reporting during initial access

Observation 1: according to SA3’s reply, there is a privacy issue if the unprotected location information and UE ID are sent together during initial access (i.e. before security is activated).

Proposal 1: the agreement on coarse UE location reporting during initial access is withdrawn, and no UE location information is reported to network during initial access (i.e. before security is activated).

Proposal 2: RAN2 to discuss whether to send a LS to RAN3 and inform that it’s not feasible to specify coarse UE location reporting during initial access in RAN2, since there is privacy concern from SA3 on unprotected information.

* UE location reporting in connected mode

Observation 2: A separate NTN specific user consent is needed before gNB can configure the UE to report the UE location information, and SA3 is supposed to work on it.

Proposal 3: RAN2 confirms R16 periodic location triggering/reporting can be reused in NTN.

Proposal 4: Event D1 based UE location reporting can be configured by gNB to obtain UE location update of mobile UEs in RRC\_CONNECTED.

- Mediatek/Huawei support Intel proposal. Huawei thinks that this has SA2 impacts as the initial AMF selection may be wrong

- QC thinks we cannot neglect the implication of not knowing the UE location at the gNB. QC thinks we can stick to RAN2 agreement and send coarse UE location information. If we not solve this in Rel-17 we need to do it in Rel-18, including for registration update.

- VC thinks there are 2 options:

1. we undo the earlier decision but inform other groups of the implications

2. we reconfirm the earlier decision, asking SA3 which granularity level could be less problematic.

* [AT116bis-e][110][NTN] UE location during initial access (Thales)

Scope: discuss a possible reply LS to SA2, RAN3, SA3. Also discuss other possible options, if any, to provide location information to the NG-RAN during initial access in a protected manner.

Intended outcome: offline summary in R2-2201743 and draft reply LS to SA2, RAN3, SA3 in R2-2201744

Deadline (for companies' feedback): Monday 2022-01-24 09:00 UTC

Deadline (for rapporteur's summary and draft LS): Monday 2022-01-24 11:00 UTC

[R2-2201743](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201743.zip) [offline-110] UE location during initial access Thales discussion Rel-17 NR\_NTN\_solutions-Core

* Noted

[R2-2201744](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201744.zip) LS on UE location during initial access in NTN Thales LS out Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH To:SA2, RAN3 Cc: CT1, SA3

- QC thinks that for the registration area update, it is not clear whether the AMF invokes LCS, which can be additional huge signaling overhead or AMF does not need UE location for registration area update. Suggests the following addition in the LS: "Due to possible privacy issues indicated by SA3, RAN2 is likely to decide that UE does not report to the NG-RAN its coarse GNSS coordinates during initial access (before AS security is activated), for example, for service request and registration area update procedures"

- Apple prefers not to add any examples. Also suggests to use the term "NG-RAN" consistently, replacing "5G-AN" with "NG-RAN"

* Replace "5G-AN" with "NG-RAN"
* Add ", for example, for service request and registration area update procedures" to the first sentence of the third paragraph.
* Remove Draft and put RAN2 as Source
* Revised in R2-2201929

[R2-2201929](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201929.zip) LS on UE location during initial access in NTN (Thales) LS out Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH To:SA2, RAN3 Cc: CT1, SA3

* Replace "NG-AN" with "NG-RAN"
* Revised in R2-2201881

[R2-2201881](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201881.zip) LS on UE location during initial access in NTN (Thales) LS out Rel-17 NR\_NTN\_solutions-Core, 5GSAT\_ARCH To:SA2, RAN3 Cc: CT1, SA3

* Approved

[R2-2200245](file:///C:\Data\3GPP\Extracts\R2-2200245%20location%20reporting.doc) Discussion on UE location information reporting OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200289](file:///C:\Data\3GPP\Extracts\R2-2200289%20Discussion%20on%20UE%20location%20reporting.doc) Discussion on UE location reporting Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200445](file:///C:\Data\3GPP\Extracts\R2-2200445%20Coarse%20location.docx) Discussion on coarse UE location report Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200629](file:///C:\Data\3GPP\Extracts\R2-2200629%20Discussion%20on%20TAC%20update%20and%20LCS%20in%20NTN.doc) Discussion on TAC update and LCS in NTN Spreadtrum Communications discussion Rel-17

[R2-2200715](file:///C:\Data\3GPP\Extracts\R2-2200715%20Discussion%20on%20UE%20location%20reporting%20in%20NTN.doc) Discussion on UE location reporting in NTN Xiaomi discussion

[R2-2200748](file:///C:\Data\3GPP\Extracts\R2-2200748%20Discussion%20on%20event%20triggered%20based%20UE%20location%20report.docx) Discussion on event triggered based UE location report ASUSTeK discussion Rel-17 NR\_NTN\_solutions-Core [R2-2111007](file:///C:\Data\3GPP\archive\RAN2\RAN2%23116\Tdocs\R2-2111007.zip)

[R2-2200869](file:///C:\Data\3GPP\Extracts\R2-2200869%20Views%20on%20UE%20Location%20Information%20Reporting%20in%20NTN.docx) Views on UE Location Information Reporting in NTN CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200912](file:///C:\Data\3GPP\Extracts\R2-2200912.doc) Event triggered location reporting in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200960](file:///C:\Data\3GPP\Extracts\R2-2200960_Virtual%20location%20identifier_Fraunhofer_Thales.docx) Reporting virtual location identifier for AMF/PLMN selection and location verification in NTN Fraunhofer IIS; Fraunhofer HHI; Thales discussion

[R2-2201080](file:///C:\Data\3GPP\Extracts\R2-2201080%20On%20LCS%20and%20TAC%20handling%20in%20Rel-17%20NTN.docx) On LCS and TAC handling in Rel-17 NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201178](file:///C:\Data\3GPP\Extracts\R2-2201178%20On%20UE%20location%20reporting%20in%20NTN.docx) On UE location reporting in NTN Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201404](file:///C:\Data\3GPP\Extracts\R2-2201404%20Discussion%20of%20reply%20LS%20on%20TAC%20reporting%20in%20NTN.doc) Discussion of reply LS on TAC reporting in NTN China Telecom discussion

[R2-2201408](file:///C:\Data\3GPP\Extracts\R2-2201408%20Discussion%20on%20left%20issues%20on%20UE%20location%20report.docx) Discussion on left issues on UE location report CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201445](file:///C:\Data\3GPP\Extracts\R2-2201445%20NTN%20TAC%20and%20location.docx) General aspects for NTN Ericsson discussion NR\_NTN\_enh-Core

[R2-2201447](file:///C:\Data\3GPP\Extracts\R2-2201447.docx) Remaining issues on TAC selection and reporting in NTN Samsung R&D Institute UK discussion

[R2-2201579](file:///C:\Data\3GPP\Extracts\R2-2201579.docx) UE location reporting in initial access Samsung Research America discussion

#### 8.10.3.2 Idle/Inactive mode

Focus on system information aspects

[R2-2201731](file:///C:\Data\3GPP\RAN2\Docs\R2-2201731.zip) [Pre116bis-e][102][NTN] Summary of 8.10.3.2 Idle/Inactive mode Huawei discussion Rel-17 NR\_NTN\_solutions-Core

* to be discussed in offline 102
* [AT116bis-e][102][NTN] Idle/Inactive mode aspects (Huawei)

Initial scope: Discuss idle/inactive mode aspects based on the summary in [R2-2201731](file:///C:\Data\3GPP\RAN2\Docs\R2-2201731.zip)

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

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

Initial deadline (for companies' feedback): Tuesday 2022-01-18 0700 UTC

Initial deadline (for rapporteur's summary in R2-2201733): Tuesday 2022-01-18 0900 UTC

Updated scope: Continue the discussion on the remaining idle/inactive mode aspects including the content of possible LSs out regarding the decisions on the new NTN-specific SIBx and the support of Inactive mode.

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

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

Updated deadline (for companies' feedback): Thursday 2022-01-20 2200 UTC

Updated deadline (for rapporteur's summary in R2-2201745): Friday 2022-01-21 0200 UTC

Final scope: Continue the discussion on the remaining idle/inactive mode aspects and draft LS to RAN1 asking to check the agreements on SIBx.

Final 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)

Final deadline (for companies' feedback): Monday 2022-01-24 1500 UTC

Final deadline (for rapporteur's summary in R2-2201756 and draft LS in R2-2201757): Monday 2022-01-24 1700 UTC

Proposals marked "for agreement" in R2-2201756 not challenged until Tuesday 2022-01-25 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue during the GTW session on Tuesday).

[R2-2201733](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201733.zip) [offline-102] Idle/Inactive mode aspects Huawei discussion Rel-17 NR\_NTN\_solutions-Core

For easy agreement

Proposal 1: (19/19) A new NTN-specific SIB is introduced (SIBx), scheduled by SIB1.

* Agreed

Proposal 2: Introduce the following serving cell information to the corresponding SIBx:

1) (20/20) Ephemeris to (18/20) SIBx;

2) (20/20) common TA parameters to (18/20) SIBx;

3) (20/20) validity duration for UL sync information to (18/20) SIBx;

4) (20/20) t-Service to (15/20) SIBx;

5) (20/20) cell reference location to (17/20) SIBx;

6) (18/20) Epoch time to (14/20) SIBx. FFS the details of Epoch time.

- Intel thinks we don't need the FFS on the Epoch time as it is already clear from RAN1

* Agreed in principle. However we will send a LS to RAN1 asking whether some parameters might be sent more frequently

Proposal 11: (20/20) For quasi-earth fixed cell, same as legacy, UE shall perform neighbour cell measurements of “higher priority NR inter-frequency or inter-RAT frequencies” regardless of the remaining serving time.

* Agreed

Proposal 16: (20/20) RRC\_INACTIVE mode is supported for NTN.

* Agreed.
* Continue the discussion on whether to inform other groups of this agreement

For further discussion

Proposal 3: Regarding the update of UL synchronisation information, Option 1 is supported (17/20), FFS for Option 2 (13/20):

- Option 1: Update of ephemeris and common TA information does not affect the value tag and does not trigger SI modification procedure.

- Option 2: The ntnUlSyncValidityDuration applies to the whole SIBX. UE acquires the updated SIBX when the timer expires.

Proposal 4: Introduce the following neighbour cell information to the corresponding SIB:

1) (17/20) DL polarization to (12/20) SIBx;

2) (14/20) reference location to (6/20) SIBx;

3) (12/20) ephemeris to (6/20) SIBx.

Proposal 5: (12/20) The information of the upcoming cell (e.g., frequency and PCI) is broadcast.

Proposal 6: (15/19) Location information can be used to determine when to start measurement.

Proposal 7: If proposal 6 is agreed, agree the following (15/15):

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

Proposal 8: If proposal 6 is agreed, agree the following (15/15):

Location-based measurement initiation is only applied if the cell broadcasts location-related parameters (e.g. a threshold) and by implementation the UE has location information.

Proposal 9: Discuss which option to adopt for location-based reselection:

- Option 1: only neighbour cells with distance shorter than a threshold will be considered during cell reselection; (10/20)

- Option 1b: exclude neighbour cells too far away i.e., distance longer than a threshold will not be considered during cell reselection; (5/20)

- Option 2: distance based ranking is used together with legacy R criteria. (3/20)

Proposal 10: (12/20) No enhancement is introduced for measurement/reselection based on time/location information for moving cell scenarios in Rel-17.

Proposal 12: (15/20) Before the stop-time based measurements are triggered, the UE measurements follow Legacy behaviour (i.e., based on Srxlev/Squal) and there is no measurement relaxation.

Proposal 13: (16/20) Cell stop time is not applied to cell ranking in determining the target cell for reselection.

Proposal 14: (11/20) Time-based and location-based reselection can be configured simultaneously. FFS UE behaviour when configured together.

Proposal 15: (13/20) TN prioritization over NTN is left to NW implementation in Rel-17.

Proposal 17: (7/18) Send an LS to ask RAN4 whether it can be guaranteed that no TN band will ever be defined/ signaled as overlapping band with NTN bands.

Proposal 18: (16/20) Regarding UE-based solution for SMTC adjustments, UE autonomously adjust the SMTCs based on location and ephemeris.

Proposal 19: (11/18) At most 4 SMTCs can be broadcast per frequency.

Agreements:

1. A new NTN-specific SIB is introduced (SIBx), scheduled by SIB1
2. Introduce the following serving cell information to the corresponding SIBx (scheduled by SIB1):

- Ephemeris;

- common TA parameters;

- validity duration for UL sync information;

- t-Service;

- cell reference location;

- Epoch time.

Also send a LS to RAN1 asking whether some parameters might be sent more frequently

1. For quasi-earth fixed cell, same as legacy, UE shall perform neighbour cell measurements of “higher priority NR inter-frequency or inter-RAT frequencies” regardless of the remaining serving time
2. RRC\_INACTIVE mode is supported for NTN

[R2-2201745](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201745.zip) [offline-102] Idle/Inactive mode aspects - second round Huawei discussion Rel-17 NR\_NTN\_solutions-Core

For easy agreement

Proposal 20: (16/22) Stick to the original P1 and P2. The NTN information listed in P2 are included in SIBx which is scheduled by SIB1.

* Agreed

(revised) Proposal 18: Regarding UE-based solution for SMTC adjustments, UE autonomously adjust the SMTCs based on location and ephemeris. FFS whether NW assistance information is provided.

* Agreed

Proposal 22: (20/22) UE can know the NW type implicitly no later than SIB1 reception, there is no explicit NW type indication in SIB1.

* Agreed

Proposal 23: (21/22) No LS is sent to RAN3 on the support of RRC\_INACTIVE.

* Agreed

Agreements via email - from offline 102 - second round:

1. Regarding UE-based solution for SMTC adjustments, UE autonomously adjust the SMTCs based on location and ephemeris. FFS whether NW assistance information is provided.
2. UE can know the NW type implicitly no later than SIB1 reception, there is no explicit NW type indication in SIB1.
3. No LS is sent to RAN3 on the support of RRC\_INACTIVE.

For further discussion

Proposal 3: Regarding the update of UL synchronisation information, Option 1 is supported (17/20), FFS for Option 2 (13/20):

- Option 1: Update of ephemeris and common TA information does not affect the value tag and does not trigger SI modification procedure.

- Option 2: The ntnUlSyncValidityDuration applies to the whole SIBX. UE acquires the updated SIBX when the timer expires.

Proposal 4: Introduce the following neighbour cell information to the corresponding SIB:

1) (17/20) DL polarization to (12/20) SIBx;

2) (14/20) reference location to (6/20) SIBx;

3) (12/20) ephemeris to (6/20) SIBx.

Proposal 5: (12/20) The information of the upcoming cell (e.g., frequency and PCI) is broadcast.

Proposal 6: (15/19) Location information can be used to determine when to start measurement.

Proposal 7: If proposal 6 is agreed, agree the following (15/15):

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

Proposal 8: If proposal 6 is agreed, agree the following (15/15):

Location-based measurement initiation is only applied if the cell broadcasts location-related parameters (e.g. a threshold) and by implementation the UE has location information.

Proposal 9: Discuss which option to adopt for location-based reselection:

- Option 1: only neighbour cells with distance shorter than a threshold will be considered during cell reselection; (10/20)

- Option 1b: exclude neighbour cells too far away i.e., distance longer than a threshold will not be considered during cell reselection; (5/20)

- Option 2: distance based ranking is used together with legacy R criteria. (3/20)

Proposal 10: (12/20) No enhancement is introduced for measurement/reselection based on time/location information for moving cell scenarios in Rel-17.

Proposal 12: (15/20) Before the stop-time based measurements are triggered, the UE measurements follow Legacy behaviour (i.e., based on Srxlev/Squal) and there is no measurement relaxation.

Proposal 13: (16/20) Cell stop time is not applied to cell ranking in determining the target cell for reselection.

Proposal 14: (11/20) Time-based and location-based reselection can be configured simultaneously. FFS UE behaviour when configured together.

Proposal 15: (13/20) TN prioritization over NTN is left to NW implementation in Rel-17.

Proposal 17: (7/18) Send an LS to ask RAN4 whether it can be guaranteed that no TN band will ever be defined/ signaled as overlapping band with NTN bands.

Proposal 19: (11/18) At most 4 SMTCs can be broadcast per frequency.

Proposal 21: Ask RAN1 if they foresee any problem (e.g., due to latency requirement) with proposal 20.

[R2-2201756](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201756.zip) [offline-102] Idle/Inactive mode aspects - third round Huawei discussion Rel-17 NR\_NTN\_solutions-Core

For email agreement

Proposal 21: (9/11) Ask RAN1 if they foresee any problem (e.g., due to latency requirement) with proposal 20.

* Ask RAN1 if they foresee any problem (e.g., due to latency requirement) with proposal 20

Proposal 24: (10/12) Revise the draft LS to accommodate other information introduced to SIBx (i.e., K\_mac, cell-specific Koffset, network enable/disable TA report), and remove “(e.g., due to latency requirement)”.

* Revise the draft LS to accommodate other information introduced to SIBx (i.e., K\_mac, cell-specific Koffset, network enable/disable TA report), and remove “(e.g., due to latency requirement)”.

Proposal 3a: (18/19) Update of ephemeris and common TA information does not affect the value tag and does not trigger SI modification procedure.

* Agreed

Proposal 3b: (16/17) The ntnUlSyncValidityDuration applies to the whole SIBX. UE acquires the updated SIBX when the timer expires. FFS whether to also include it in the LS to RAN1.

* Agreed

Proposal 6: (16/19) Location information can be used to determine when to start measurement.

* Agreed

Proposal 7: (16/19) If proposal 6 is agreed, agree the following:

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

* Agreed

Proposal 8: (16/19) If proposal 6 is agreed, agree the following:

Location-based measurement initiation is only applied if the cell broadcasts location-related parameters (e.g. a threshold) and by implementation the UE has location information.

* Agreed

Proposal 12: (18/21) Before the stop-time based measurements are triggered, the UE measurements follow Legacy behaviour (i.e., based on Srxlev/Squal) and there is no measurement relaxation.

* Agreed

Proposal 13: (18/18) Cell stop time is not applied to cell ranking in determining the target cell for reselection.

* Agreed

Agreements via email - from offline 103 - third round

1. Update of ephemeris and common TA information does not affect the value tag and does not trigger SI modification procedure.
2. The ntnUlSyncValidityDuration applies to the whole SIBX. UE acquires the updated SIBX when the timer expires. FFS whether to also include it in the LS to RAN1.
3. Location information can be used to determine when to start measurement.
4. UE may choose not to perform neighbour cell measurements of “NR intra-freq or inter-freq with equal or lower priority, or inter-RAT freq with lower priority”, if (the distance between UE and serving cell reference location is shorter than a threshold) and (legacy Srxlev/Squal condition is met, i.e., serving cell’s Srxlev/Squal is better than a threshold).
5. Location-based measurement initiation is only applied if the cell broadcasts location-related parameters (e.g. a threshold) and by implementation the UE has location information.
6. Before the stop-time based measurements are triggered, the UE measurements follow Legacy behaviour (i.e., based on Srxlev/Squal) and there is no measurement relaxation.
7. Cell stop time is not applied to cell ranking in determining the target cell for reselection.

For further discussion

Proposal 12a: Capture in the chairman’s note that: The stop-time based measurement triggering aims to make sure UE finds a target cell before the serving cell stops serving the area, instead of saving UE power.

Proposal 4: Introduce the following neighbour cell information to the corresponding SIB:

1) (17/20) DL polarization to (12/20) SIBx;

2) (14/20) reference location to (6/20) SIBx;

3) (12/20) ephemeris to (6/20) SIBx.

Proposal 5: (12/20) The information of the upcoming cell (e.g., frequency and PCI) is broadcast.

Proposal 9: Discuss which option to adopt for location-based reselection:

- Option 1: only neighbour cells with distance shorter than a threshold will be considered during cell reselection; (10/20)

- Option 1b: exclude neighbour cells too far away i.e., distance longer than a threshold will not be considered during cell reselection; (5/20)

- Option 2: distance based ranking is used together with legacy R criteria. (3/20)

Proposal 10: (12/20) No enhancement is introduced for measurement/reselection based on time/location information for moving cell scenarios in Rel-17.

Proposal 14: (11/20) Time-based and location-based reselection can be configured simultaneously. FFS UE behaviour when configured together.

Proposal 15: (13/20) TN prioritization over NTN is left to NW implementation in Rel-17.

Proposal 17: (7/18) Send an LS to ask RAN4 whether it can be guaranteed that no TN band will ever be defined/ signaled as overlapping band with NTN bands.

Proposal 19: (11/18) At most 4 SMTCs can be broadcast per frequency.

R2-2201757 Draft LS on NTN-specific SIB Huawei LS out Rel-17 NR\_NTN\_solutions-Core To:RAN1

[R2-2200215](file:///C:\Data\3GPP\Extracts\R2-2200215%20Discussion%20on%20TN%20prioritization%20over%20NTN%20for%20idle%20mode.docx) Discussion on TN prioritization over NTN for idle mode Intel Corporation discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200216](file:///C:\Data\3GPP\Extracts\R2-2200216%20Discussion%20on%20enhancements%20to%20cell%20reselection.docx) Discussion on enhancements to cell reselection Intel Corporation discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200246](file:///C:\Data\3GPP\Extracts\R2-2200246%20NTN%20SI.doc) Discussion on NTN specific system information OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200290](file:///C:\Data\3GPP\Extracts\R2-2200290%20Discussion%20on%20idle%20mode%20aspects.doc) Discussion on idle mode aspects Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200342](file:///C:\Data\3GPP\Extracts\R2-2200342_SI_parameters.doc) System information to assist cell reselection ITRI discussion NR\_NTN\_solutions-Core

[R2-2200378](file:///C:\Data\3GPP\Extracts\R2-2200378%20Remaining%20issues%20on%20idle%20mode%20mobility.docx) Remaining issues on idle/inactive mode mobility vivo discussion

[R2-2200446](file:///C:\Data\3GPP\Extracts\R2-2200446-cell%20type.doc) Cell type indication Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200447](file:///C:\Data\3GPP\Extracts\R2-2200447%20Idle%20mode.docx) IDLE mode measurements Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200621](file:///C:\Data\3GPP\Extracts\R2-2200621%20Mobility%20for%20TN-NTN%20scenarios.docx) Idle mode mobility for NTN-TN scenarios MediaTek Inc. discussion [R2-2105253](file:///C:\Data\3GPP\archive\RAN2\RAN2%23114\Tdocs\R2-2105253.zip)

[R2-2200630](file:///C:\Data\3GPP\Extracts\R2-2200630%20Acquiring%20the%20ephemeris%20of%20neighbour%20cell.doc) Acquiring the ephemeris of neighbour cell Spreadtrum Communications discussion Rel-17

[R2-2200650](file:///C:\Data\3GPP\Extracts\R2-2200650%20Discussion%20on%20NTN%20Idle%20mode%20measurement%20and%20cell%20reselection.doc) Discussion on NTN Idle mode measurement and cell reselection Transsion Holdings discussion Rel-17

[R2-2200665](file:///C:\Data\3GPP\Extracts\R2-2200665%20Remaining%20idle%20mode%20issues%20in%20NTN.DOC) Remaining idle mode issues in NTN LG Electronics Inc. discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200690](file:///C:\Data\3GPP\Extracts\R2-2200690.docx) Further Discussion on the Leftover Issues of IDLE/INACTIVE CATT discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200716](file:///C:\Data\3GPP\Extracts\R2-2200716%20Discussion%20on%20RRC%20idle%20mode%20issues.doc) Discussion on RRC idle mode issues Xiaomi discussion

[R2-2200766](file:///C:\Data\3GPP\Extracts\R2-2200766%20Ephemeris%20provision%20in%20system%20information%20for%20NTN.docx) Ephemeris provision in system information for NTN Lenovo, Motorola Mobility discussion Rel-17

[R2-2200767](file:///C:\Data\3GPP\Extracts\R2-2200767%20Further%20discussion%20on%20idle%20mode%20mobility%20in%20NTN.docx) Further discussion on idle mode mobility in NTN Lenovo, Motorola Mobility discussion Rel-17

[R2-2200877](file:///C:\Data\3GPP\Extracts\R2-2200877%20Further%20Considerations%20on%20Cell%20Re-selection.docx) Further Considerations on Cell Re-selection CMCC discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200933](file:///C:\Data\3GPP\Extracts\R2-2200933%20SMTC%20Adjustment%20for%20Idle%20and%20Inactive%20UEs%20in%20NTN.docx) SMTC Adjustment for Idle and Inactive UEs in NTN Google Inc. discussion

[R2-2201003](file:///C:\Data\3GPP\Extracts\R2-2201003_System%20information%20for%20NTN%20and%20idle%20mode%20mobility%20for%20intra-NTN%20and%20TN-NTN%20case.docx) System information for NTN and idle mode mobility for intra-NTN and TN-NTN case ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201079](file:///C:\Data\3GPP\Extracts\R2-2201079%20On%20IDLE%20mode%20aspects%20in%20Rel-17%20NTN.docx) On IDLE mode aspects in Rel-17 NTN Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201139](file:///C:\Data\3GPP\Extracts\R2-2201139%20On%20Defining%20a%20New%20SIB%20for%20NTN.docx) On Defining a New NTN-Specific SIB MediaTek Inc. discussion

[R2-2201165](file:///C:\Data\3GPP\Extracts\R2-2201165%20(R17%20NTN%20WI%20AI%208.10.3.2)%20Cell%20reselection.docx) Location-assisted cell reselection InterDigital discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201179](file:///C:\Data\3GPP\Extracts\R2-2201179%20NTN-TN%20idle%20mode%20mobility.docx) NTN-TN idle mode mobility Apple discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201180](file:///C:\Data\3GPP\Extracts\R2-2201180%20NTN%20Ephemeris%20Definition%20and%20Signaling.docx) NTN Ephemeris definition and signaling Apple discussion Rel-17 NR\_NTN\_solutions-Core [R2-2110043](file:///C:\Data\3GPP\archive\RAN2\RAN2%23116\Tdocs\R2-2110043.zip)

[R2-2201195](file:///C:\Data\3GPP\Extracts\R2-2201195_Location-assisted%20%20cell%20reselection.docx) Location-assisted cell reselection NEC Telecom MODUS Ltd. discussion

[R2-2201196](file:///C:\Data\3GPP\Extracts\R2-2201196_NTN%20to%20TN%20in%20Idle%20or%20Inactive%20mode%20mobility.docx) NTN to TN mobility in Idle or Inactive mode NEC Telecom MODUS Ltd. discussion

[R2-2201446](file:///C:\Data\3GPP\Extracts\R2-2201446.docx) Idle mode aspects for NTN Ericsson discussion NR\_NTN\_enh-Core

[R2-2201580](file:///C:\Data\3GPP\Extracts\R2-2201580.docx) Measurements and cell reselection Samsung Research America discussion

[R2-2201615](file:///C:\Data\3GPP\Extracts\R2-2201615.docx) Discussion on system information enhancement for NR NTN Turkcell, BT Plc, Deutsche Telekom, Aselsan discussion Rel-17

#### 8.10.3.3 Connected mode

This sub-AI will not be treated at R2-116bis-e. No contributions are expected

[R2-2200247](file:///C:\Data\3GPP\Extracts\R2-2200247%20NTN%20UE%20capability.doc) Discussion on NTN UE capabilities OPPO discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200666](file:///C:\Data\3GPP\Extracts\R2-2200666%20Connected%20mode%20remaining%20issues%20in%20NTN.DOC) Connected mode remaining issues in NTN LG Electronics Inc. discussion Rel-17 NR\_NTN\_solutions-Core

moved from 8.10.3.1:

[R2-2200765](file:///C:\Data\3GPP\Extracts\R2-2200765%20Remaining%20CHO%20issues%20in%20RRC%20running%20CR%20v1.1.doc) Remaining CHO issues in RRC running CR Lenovo, Motorola Mobility discussion Rel-17

[R2-2200913](file:///C:\Data\3GPP\Extracts\R2-2200913.docx) SMTC enhancement in NTN Sony discussion Rel-17 NR\_NTN\_solutions-Core [R2-2108067](file:///C:\Data\3GPP\archive\RAN2\RAN2%23115\Tdocs\R2-2108067.zip)

[R2-2201004](file:///C:\Data\3GPP\Extracts\R2-2201004_Leftover%20issues%20in%20CHO%20and%20measurements.docx) Leftover issues in CHO and measurements ZTE corporation, Sanechips discussion Rel-17 NR\_NTN\_solutions-Core

### 8.10.4 UE capabilities

Including Features / UE caps developed in RAN2. Note that this AI is complementary to AI 8.0.2. NOTE please don’t input on aspects treated in the email discussion.

Including outcome of:

{Post116-e][111][NTN] UE capabilities (Intel)

[R2-2200040](file:///C:\Data\3GPP\Extracts\R2-2200040%20Report%20of%20email%20discussion%20%5bPost116-e%5d%5b111%5d%5bNTN%5d%20UE%20capabilities%20(Intel).docx) Report of email discussion [Post116-e][111][NTN] UE capabilities (Intel) Intel Corporation discussion NR\_NTN\_solutions-Core

Proposal 1: define one single NR NTN UE capability to encompass essential features to support NTN, and UE can further indicate other optional capabilities.

* Agreed

Proposal 2: gnss-Location-r16 is conditionally mandatory when UE indicates the support of NR NTN access, and update the field description to cover NTN case.

* Agreed

Proposal 3: consider the following differentiation of user plane enhancements as baseline:

Essential sub-features include:

1) the adaptations of RACH;

2) DRX HARQ RTT timer extension;

3) the timer extension to accommodate long RTT for other MAC timers (e.g., extended sr-ProhibitTimer);

4) the timer extension to accommodate long RTT in RLC and PDCP layers (FFS for LEO)

Optional sub-features include:

1) TA reporting (TA reporting during RACH using MAC CE, and Event-triggers for TA reporting in connected mode);

2) disabling HARQ feedback for downlink transmission;

3) new HARQ state for uplink transmission and the corresponding new LCP mapping rule for dynamic grants.

* Agreed

Proposal 4: consider the following differentiation of control plane enhancements as baseline:

Essential sub-features include (for NGSO, FFS for GEO):

1) soft TAC update;

2) SMTC enhancements (event-triggered assistance information reporting, 2 SMTC in parallel);

Optional sub-features include:

1) cell stop-time based neighbour cell measurements;

2) location based cell reselection criteria;

3) SMTC enhancements (4 SMTC in parallel and UE based solution in idle/inactive);

4) CHO enhancements (location based CHO).

FFS if CHO enhancements (time based and Event A4 based CHO) is essential or optional

* Agreed

Proposal 5: Postpone the UE capability discussion on location reporting after RAN2 formally treats SA3’s reply LS.

* Agreed

Proposal 6: the granularities of all the optional RAN2 determined sub-features with capability signalling are per UE.

* Agreed as Working Assumption (further check if anything can be per band)

- HW thinks that some features are not applicable to GEO (e.g. SMTC) and it should be made clear in the running CR. Mediatek agrees. Nokia thinks this would imply the need to differentiate between NGSO and GEO

- QC thinks CHO enhancements should be in the optional features

* If we have different levels of support for NGSO and GEO we need to discuss how to reflect this in the capabilities

Agreements:

1. define one single NR NTN UE capability to encompass essential features to support NTN, and UE can further indicate other optional capabilities.
2. gnss-Location-r16 is conditionally mandatory when UE indicates the support of NR NTN access, and update the field description to cover NTN case.
3. consider the following differentiation of user plane enhancements as baseline:

Essential sub-features include:

1) the adaptations of RACH;

2) DRX HARQ RTT timer extension;

3) the timer extension to accommodate long RTT for other MAC timers (e.g., extended sr-ProhibitTimer);

4) the timer extension to accommodate long RTT in RLC and PDCP layers (FFS for LEO)

Optional sub-features include:

1) TA reporting (TA reporting during RACH using MAC CE, and Event-triggers for TA reporting in connected mode);

2) disabling HARQ feedback for downlink transmission;

3) new HARQ state for uplink transmission and the corresponding new LCP mapping rule for dynamic grants.

4. consider the following differentiation of control plane enhancements as baseline:

Essential sub-features include (for NGSO, FFS for GEO):

1) soft TAC update;

2) SMTC enhancements (event-triggered assistance information reporting, 2 SMTC in parallel);

Optional sub-features include:

1) cell stop-time based neighbour cell measurements;

2) location based cell reselection criteria;

3) SMTC enhancements (4 SMTC in parallel and UE based solution in idle/inactive);

4) CHO enhancements (location based CHO).

FFS if CHO enhancements (time based and Event A4 based CHO) is essential or optional

1. Postpone the UE capability discussion on location reporting

Working Assumption (further check if anything can be per band):

1. the granularities of all the optional RAN2 determined sub-features with capability signalling are per UE.

Proposal 7: the following remaining issues are postponed to next meeting:

1) Whether to define a separate UE capability to indicate that the UE supports the new NTN specific SIB;

2) Whether to define a separate UE capability to indicate that the UE supports multiple measurement gaps for connected mode;

3) Whether to define additional UE capability (or IOT bit) for the existing TN features as they are not tested in NTN environment, e.g., a NTN capable dish-type UE does not support TN;

- Thales thinks that some dish-type UE can support TN. Intel agrees. Nokia agress

- QC thinks that if we don't have IoT bits for the optional features in TN networks

- Huawei thinks this should be a case by case discussion

=> Continue the discussion on the need for IoT bits for features which are optional in TN networks on a case by case.

4) Whether to have separate RAN2-specific TA reporting UE capability, e.g., TA offset threshold based reporting, considering TA reporting is already included in RAN1 feature list;

5) Whether to have two UE capabilities for UL HARQ state B and the new LCP restriction respectively;

6) Whether/how to indicate a UE only supports NGSO or a UE only supports GSO;

7) Whether to use nonTerrestrialNetwork-r17 as the Prerequisite for other optional NR NTN UE capabilities;

8) Whether to have separate UE capability bit if one essential NTN feature can also be used in TN.

[R2-2200041](file:///C:\Data\3GPP\Extracts\R2-2200041%20Draft%20331%20CR%20for%20NR%20NTN%20UE%20capabilities.docx) Draft 331 CR for NR NTN UE capabilities Intel Corporation draftCR Rel-17 38.331 16.7.0 B NR\_NTN\_solutions-Core

[R2-2200042](file:///C:\Data\3GPP\Extracts\R2-2200042%20Draft%20306%20CR%20for%20NR%20NTN%20UE%20capabilities.docx) Draft 306 CR for NR NTN UE capabilities Intel Corporation draftCR Rel-17 38.306 16.7.0 B NR\_NTN\_solutions-Core

[R2-2200213](file:///C:\Data\3GPP\Extracts\R2-2200213%20Discussion%20on%20remaining%20issues%20on%20NR%20NTN%20UE%20capabilities.docx) Discussion on remaining issues on NR NTN UE capabilities Intel Corporation discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200291](file:///C:\Data\3GPP\Extracts\R2-2200291%20Discussion%20on%20UE%20capabilities.doc) Discussion on UE capabilities Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200376](file:///C:\Data\3GPP\Extracts\R2-2200376%20Remaining%20issues%20on%20UE%20capability%20for%20Rel-17%20NR%20NTN.docx) Remaining issues on UE capability for Rel-17 NTN vivo discussion

[R2-2200448](file:///C:\Data\3GPP\Extracts\R2-2200448%20UE%20cpabilities.docx) Discussion on UE capabilities Qualcomm Incorporated discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2200620](file:///C:\Data\3GPP\Extracts\R2-2200620%20On%20UE%20Capabilities%20in%20NR-NTN.docx) On UE Capabilities in NR-NTN MediaTek Inc. discussion

[R2-2201545](file:///C:\Data\3GPP\Extracts\R2-2201545%20L2%20buffer%20AI%208.10.4.docx) L2 buffer calculation and QoS requirement Interdigital, Inc. discussion Rel-17 NR\_NTN\_solutions-Core

[R2-2201632](file:///C:\Data\3GPP\Extracts\R2-2201632%20-%20NR%20NTN%20UE%20capabilities.docx) NR NTN UE capabilities Ericsson discussion

* [AT116bis-e][112][NTN] Capabilities (Intel)

Initial scope: Continue the discussion on NTN capabilities, based on [R2-2200040](file:///C:\Data\3GPP\Extracts\R2-2200040%20Report%20of%20email%20discussion%20%5bPost116-e%5d%5b111%5d%5bNTN%5d%20UE%20capabilities%20(Intel).docx) and possibly other company contributions

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

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

Initial deadline (for companies' feedback): Monday 2022-01-24 1400 UTC

Initial deadline (for rapporteur's summary in R2-2201748): Monday 2022-01-24 1600 UTC

Proposals marked "for agreement" in R2-2201748 not challenged until Tuesday 2022-01-25 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue in the GTW session).

[R2-2201748](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201748.zip) [offline-112] NTN capabilities Intel discussion Rel-17 NR\_NTN\_solutions-Core

* List of proposals for agreement:

Proposal 1: RAN2 to confirm that the RLC timer extension (i.e., t-Reassembly timer) is also essential for NGSO.

* Agreed

Proposal 2: RAN2 to confirm that the PDCP timer extension (i.e., discardTimer and t-Reordering timer) is also essential for NGSO.

* Agreed

Proposal 3: RAN2 to confirm that Multiple TACs feature (i.e., UE should be able derive multiple TACs per PLMN in a cell, and indicate to NAS layer all received TACs per PLMN) is essential for both GSO and NGSO.

* Agreed

Proposal 4: RAN2 to confirm that enhanced SMTC feature (i.e., event-triggered assistance information reporting, 2 SMTC in parallel) is only essential for NGSO.

- QC thinks that before agreeing to P4, we would like to have clarification/confirmation whether handover between GSO and NGSO is supported or not?

- Intel thinks we can discuss HO between GSO and NGSO but the intention here is to consider SMTC enhancements (i.e., event-triggered assistance information reporting, 2 SMTC in parallel) as essential also for GSO.

* Continue online

Proposal 6: define single UE capability to encompass all essential features to support both GSO and NGSO, i.e., when UE indicates it, it means UE supports all the GSO and NGSO essential features.

- vivo notes that P6 says that we will only have a single capability to encompass all essential features to support both GSO and NGSO. In P4, it says that the multiple SMTC is an essential UE feature for NGSO only, but not for GSO. So is the UE feature of multiple SMTC also encompassed by the single capability in P6 (but specifying that it is essential for NGSO only), or do we need to use a separate capability to indicate the Multiple SMTC feature other than the single capability in P6?

- Mediatek agrees with vivo

- Considering that RAN1/4 may define per band UE capabilities for NTN SMTC enhancements, and all other RAN2-determined essential features can be per UE, Intel suggests to consider the following revision for p6:

"Updated Proposal 6a: define single UE capability to encompass all per UE essential features for GSO and all per UE essential features for NGSO, without further specifying if one essential feature is for GSO only or NGSO only."

"Updated Proposal 6b: if RAN1/4 defines SMTC enhancements (i.e., event-triggered assistance information reporting, 2 SMTC in parallel) as per band UE capabilities, define separate UE capabilities for them as conditional mandatory if UE indicates support of nonTerrestrialNetwork-r17, and without further specifying if they are for GSO only or NGSO only."

- vivo thinks this implies keeping P6 at the sacrificing of P4. We’re not sure whether this is also acceptable to all companies. I guess there can be other ways to coordinate them, instead of having to kill one of them

* Continue online

Proposal 9: the support of essential NTN features should be the Prerequisite for optional NR NTN UE capabilities.

* Agreed

Agreements via email - from offline 112:

1. RAN2 confirms that the RLC timer extension (i.e., t-Reassembly timer) is also essential for NGSO.
2. RAN2 confirms that the PDCP timer extension (i.e., discardTimer and t-Reordering timer) is also essential for NGSO.
3. RAN2 confirms that Multiple TACs feature (i.e., UE should be able derive multiple TACs per PLMN in a cell, and indicate to NAS layer all received TACs per PLMN) is essential for both GSO and NGSO.
4. The support of essential NTN features should be the Prerequisite for optional NR NTN UE capabilities.

* List of proposals that require online discussions:

Proposal 5: RAN2 to further discuss whether CHO enhancements (time based and Event A4 based CHO) are essential for both GSO and NGSO, or only for NGSO, or optional.

Proposal 7: UE capabilities for optional CHO enhancements (at least location based CHO) for NTN are per band, which is also in line with R16 CHO design.

Proposal 8: postpone the discussion on granularity of NTN SMTC enhancements and wait for other WG’s further input.

Proposal 10: RAN2 to discuss whether/how to indicate one TN feature can be supported or not in NTN:

Option 1: We discuss case by case, e.g., 2-step RACH in NTN may need a separate IoT bit as legacy 2-step RACH UE capability bit is only for TN.

Option 2: We enable signalling possibility for at least MAC parameters, measurement parameters, SON/MDT, RRC\_INACTIVE to be separately indicated for NTN.

Option 3: Whether optional TN feature can be supported or not in NTN is indicated based on the existing UE capability signalling, e.g., if UE indicates support of 2-step RACH using legacy UE capability bit, 2-step RACH is supported in both TN and NTN.

## 8.12 Reduced Capability

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

Time budget: 1 TU

Tdoc Limitation: 3 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.

Incoming LSs

LSs from RAN1 on higher-layer impacts related to all Rel-17 WIs

[R2-2200095](file:///C:\Data\3GPP\Extracts\R2-2200095_R1-2112977.docx) LS on updated Rel-17 LTE and NR higher-layers parameter list (R1-2112977; contact: Ericsson) RAN1 LS in Rel-17 NR\_feMIMO, NR\_ext\_to\_71GHz, NR\_IIOT\_URLLC\_enh, NR\_NTN\_solutions, NR\_pos\_enh, NR\_redcap, NR\_UE\_pow\_sav\_enh, NR\_cov\_enh, NR\_IAB\_enh, NR\_SL\_enh, NR\_MBS, NR\_DSS, LTE\_NR\_DC\_enh2, NR\_RF\_FR1\_enh, NR\_SmallData\_INACTIVE, NB\_IOTenh4\_LTE\_eMTC6, LTE\_NBIOT\_eMTC\_NTN, LTE\_terr\_bcast\_bands\_part1 To:RAN2, RAN3 Cc:RAN4

* Noted

Capabilities

[R2-2200068](file:///C:\Data\3GPP\Extracts\R2-2200068_R1-2112754.docx) Reply LS on capability related RAN2 agreements for RedCap (R1-2112754; contact: Ericsson) RAN1 LS in Rel-17 NR\_redcap-Core To:RAN2 Cc:RAN4

* Noted

NCD-SSB

[R2-2200075](file:///C:\Data\3GPP\Extracts\R2-2200075_R1-2112802.docx) LS on use of NCD-SSB or CSI-RS in DL BWPs for RedCap UE (R1-2112802; contact: Ericsson) RAN1 LS in Rel-17 NR\_redcap-Core To:RAN2, RAN4

* Noted

[R2-2200131](file:///C:\Data\3GPP\Extracts\R2-2200131_R4-2120327.docx) Reply LS on use of NCD-SSB for RedCap UE (R4-2120327; contact: ZTE) RAN4 LS in Rel-17 NR\_redcap-Core To:RAN1 Cc:RAN2

* Noted. Already treated in the last meeting.

Running CRs

[R2-2201531](file:///C:\Data\3GPP\Extracts\R2-2201531%20-%20Running%20RedCap%20CR%20for%2038300.docx) Running 38300 CR for RedCap Nokia, Nokia Shanghai Bell draftCR Rel-17 38.300 16.8.0 NR\_redcap-Core

[R2-2201549](file:///C:\Data\3GPP\Extracts\R2-2201549%20-%20Running%20304%20CR%20for%20RedCap.docx) Running CR for the RedCap WI Ericsson draftCR Rel-17 38.304 16.7.0 B NR\_redcap-Core

[R2-2201564](file:///C:\Data\3GPP\Extracts\R2-2201564%20-%20Running%20331%20CR%20for%20RedCap.docx) Running RRC CR for the RedCap WI Ericsson draftCR Rel-16 38.331 16.7.0 B NR\_redcap-Core

* Rapporteur confirms they are just lifted to the newest spec version

[R2-2201649](file:///C:\Data\3GPP\RAN2\Docs\R2-2201649.zip) Running MAC CR for RedCap vivo (Rapporteur) draftCR Rel-17 38.321 16.7.0 B NR\_redcap-Core

* Offline discussions will be kicked off later during the meeting to update the running CRs based on new agreements and possibly to endorse the new versions

### 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 discussion on possible "fallback operation"

Fallback operation

[R2-2200189](file:///C:\Data\3GPP\Extracts\R2-2200189%20Support%20for%20fallback%20operation%20for%20RedCap%20UEs.docx) Support for fallback operation by RedCap UEs Qualcomm Incorporated discussion Rel-17 NR\_redcap-Core

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

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

Observation 3. Allowing a RedCap UE to access legacy cells in which it is capable of operating as a non-RedCap UE in a spec-compliant manner can help improve its service coverage.

Proposal 1. Support fallback operation for RedCap, with which a RedCap UE is allowed to camp on or access a legacy cell as a spec-compliant non-RedCap UE when no RedCap-supporting cells are available.

Proposal 2. RedCap UEs capable of fallback operation always prioritize RedCap-supporting cells over legacy cells in cell re-/selection, irrespective of cell barring status.

Proposal 3. When a cell indicates RedCap UEs being barred, a RedCap UE capable of fallback operation should not attempt access to this cell as a non-RedCap UE.

Proposal 4. To support fallback operation with the existing UE signaling framework, apply the following capability reporting rules for all RedCap UEs:

- Capabilities that are mandatory in legacy but optional for RedCap should be reported in the NCE of UE radio capability container;

- Capabilities that are optional for both legacy and RedCap should be reported separately in both the legacy and the NCE part of UE radio capability container.

Proposal 5. During handover for a RedCap UE, if the source cell supports RedCap,

- it should select a target cell for the UE only among RedCap-supporting neighbor cells, unless no such cells are available;

- Otherwise, it should handover the UE to a legacy cell to which the UE can access as non-RedCap. FFS whether this handover is based on an indication in handover command or by UE implementation.

Proposal 6. If a legacy source cell handover a RedCap UE to another legacy cell, it is up to UE implementation whether/when to reselect to a RedCap-supporting cell (e.g. by RRC re-establishment).

Observation 4. In the current framework, network is not able to identify a RedCap UE accessing network through a legacy cell using fallback. That can cause issues for core network and RAN on procedures such as charging or service restriction.

Proposal 7. A RedCap UE should inform core network when it is accessing network through a legacy cell, during either initial access or handover.

Proposal 8. Send a LS to SA2/CT1 to ask them to work on the necessary changes in core network.

* QC thinks the signalling towards the CN could be left to SA2/CT1
* The paper is noted.

[R2-2201434](file:///C:\Data\3GPP\Extracts\R2-2201434%20-%20RedCap%20cell%20selection%20and%20cell%20reselection.docx) RedCap cell selection and cell reselection BT Plc, Nokia, Nokia Shanghai Bell, Turkcell, Deutsche Telekom, Orange, Telecom Italia S.p.A. discussion Rel-17

Observation 1: When cellBarred field in MIB is set to “barred”, RedCap UEs have the same behaviour than legacy UEs.

Observation 2: Only a very limited number of NR bands, most of them sub-1 GHz, support up to 20 MHz for any SCS.

Observation 3: A high number of RedCap UEs may cause control channel congestion in FR1 bands up to 20 MHz bandwidth.

Observation 4: Customers transferring their plans to other operators may end with RedCap UEs not capable to access into the network anymore.

Observation 5: Legacy cells have no mechanisms to identify a RedCap UE.

Observation 6: RAN2 has already inform RAN3 that a RedCap UE should not attempt to camp or access in legacy cells. Neither handed over.

Observation 7: Complexity to solve a hypothetical misalignment in RedCap environment is too high for the remaining time to complete Rel-17 RedCap.

Proposal 1 RedCap UEs will not camp in a non-RedCap cell, will not attempt to attach into non-RedCap cells and RedCap UEs will not be handover from RedCap cells to non-RedCap cells.

* QC, vivo would like to continue to discuss this
* Ericsson, as a rapporteur, would like to focus on the key remaining aspects and then drop other not necessary enhancements
* The paper is noted.
* VC thinks it's not likely that this will be discussed again in Rel-17

[R2-2200798](file:///C:\Data\3GPP\Extracts\R2-2200798%20-%20RedCap%20UE%20access%20in%20legacy%20gNB.docx) RedCap UE access in legacy gNB Ericsson discussion Rel-17 NR\_redcap-Core

[R2-2200248](file:///C:\Data\3GPP\Extracts\R2-2200248%20RedCap%20fallback.doc) Discussion on RedCap UE's fallback operation OPPO discussion Rel-17 NR\_redcap-Core

[R2-2200350](file:///C:\Data\3GPP\Extracts\R2-2200350.docx) Discussion on allowing RedCap UEs to be served as normal UEs NEC Corporation discussion

[R2-2200596](file:///C:\Data\3GPP\Extracts\R2-2200596_Discussion%20on%20UE%20type%20and%20reduced%20capbilities%20for%20RedCap%20UEs.doc) Discussion on UE type and reduced capabilities for RedCap UEs vivo, Guangdong Genius discussion Rel-17 NR\_redcap-Core

[R2-2200685](file:///C:\Data\3GPP\Extracts\R2-2200685.docx) Discussion on supporting fallback operation for Redcap UEs CATT discussion Rel-17 NR\_redcap-Core

[R2-2201206](file:///C:\Data\3GPP\Extracts\R2-2201206%20Discussion%20on%20fallback%20operation%20of%20RedCap%20UEs.docx) Discussion on fallback operation of RedCap UEs LG Electronics UK discussion Rel-17

[R2-2201231](file:///C:\Data\3GPP\Extracts\R2-2201231%20RedCap1.docx) Support for fallback operation by RedCap UEs Sierra Wireless. S.A. discussion

number of DRBs

[R2-2201114](file:///C:\Data\3GPP\Extracts\._R2-2201114_Redcap-8DRB.docx) Optional support of more than 8 DRB for RedCap Apple, Facebook Inc discussion NR\_redcap-Core [R2-2110093](file:///C:\Data\3GPP\archive\RAN2\RAN2%23116\Tdocs\R2-2110093.zip)

* Revised in [R2-2201671](file:///C:\Data\3GPP\RAN2\Docs\R2-2201671.zip)

[R2-2201671](file:///C:\Data\3GPP\RAN2\Docs\R2-2201671.zip) Optional support of more than 8 DRB for RedCap Apple, Facebook Inc, T-Mobile USA discussion NR\_redcap-Core

Observation 1: Some Redcap devices operate with use-cases comparable to the legacy NR devices, the number of DRBs used by these services should also be comparable.

Observation 2: Current RAN2 agreement does not preclude the support of >8DRB for RedCap

Proposal 1: RedCap UE can optionally support 16 DRBs qualified with a capability.

* HW thinks this would have impacts on the network
* Apple thinks we can also say that by default RedCap UEs support 16 DRBs and if they cannot they signal the support only for 8
* RedCap UE can optionally support 16 DRBs qualified with a capability.

Agreements:

1. RedCap UE can optionally support 16 DRBs qualified with a capability.

Other open issues

[R2-2200286](file:///C:\Data\3GPP\Extracts\R2-2200286%20Open%20issues%20on%20RedCap%20capabilities.docx) Open issues on RedCap capabilities Intel Corporation discussion Rel-17 NR\_redcap

Proposal 1: ANR feature is optional for RedCap UE;

Proposal 2: CHO related capabilities are applicable for RedCap UEs (understanding that CHO is already defined as an optional feature). “FFS on CHO” can be removed.

Proposal 5: RAN2 confirms RAN1 agreement to introduce explicit bit to indicate the support of RedCap. The capability will be captured in Capability Rapporteur’s Mega CRs;

Proposal 6: To add “Support of early indication of RedCap UE in Msg.1 for 4-step RACH” 'as part of the basic component of RedCap UE in 4.2.xx RedCap Parameters of TS38.306 running CR;

Proposal 7: RAN2 confirms RAN1 agreement to introduce capability bit to indicate the support of Half-duplex FDD operation type A. The capability will be captured in Capability Rapporteur’s Mega CRs;

Proposal 8: Change the field description of “maxNumberMIMO-LayersPDSCH” from “If absent, the UE does not support MIMO on this carrier.” To “If absent, the UE supports 1 MIMO layer on this carrier.”

Proposal 9: To add capability limitation on BW, Rx/Tx branches and UL/DL MIMO layers as part of the basic component of RedCap UE in 4.2.xx RedCap Parameters of TS38.306 running CR

Proposal 10: Existing field “maxNumberMIMO-LayersPDSCH ” is reused, i.e. it is still per FSPC for RedCap UE;

[R2-2200553](file:///C:\Data\3GPP\Extracts\R2-2200553%20Definition%20and%20reduced%20capabilities%20for%20RedCap%20UE.doc) Definition and reduced capabilities for RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

Proposal 5: To clarify in the field description of shortSN and am-WithShortSN that, RedCap UE should always report ”1” in TS 38.306 section 4.2.4 and 4.2.5.

Proposal 7: For the LTE to NR handover, if the RedCap UE finds the target NR cell is a legacy cell, the UE should trigger RRC re-establishment procedure. FFS on the spec impact.

* [AT116bis-e][105][RedCap] Capabilities (Intel)

Initial scope: Continue the discussion on open issues for RedCap capabilities, based on e.g. [R2-2200286](file:///C:\Data\3GPP\Extracts\R2-2200286%20Open%20issues%20on%20RedCap%20capabilities.docx) and [R2-2200553](file:///C:\Data\3GPP\Extracts\R2-2200553%20Definition%20and%20reduced%20capabilities%20for%20RedCap%20UE.doc)

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

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

Initial deadline (for companies' feedback): Wednesday 2022-01-19 1300 UTC

Initial deadline (for rapporteur's summary in R2-2201737): Wednesday 2022-01-19 1500 UTC

Updated scope: Continue the discussion on open issues for RedCap capabilities based on [R2-2201737](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201737.zip)

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

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

Updated deadline (for companies' feedback): Friday 2022-01-21 1400 UTC

Updated deadline (for rapporteur's summary in R2-2201750): Friday 2022-01-21 1600 UTC

Proposals marked "for agreement" in R2-2201750 not challenged until Monday 2022-01-24 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue in the GTW session).

[R2-2201737](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201737.zip) [offline-105] RedCap capabilities Intel discussion Rel-17 NR\_redcap-Core

For agreement:

Proposal 3.1-1: [For agreement] [16/19] ANR feature is optional for RedCap UE;

* Agreed

Proposal 3.2-1: [For agreement] [19/19] CHO related capabilities are applicable for RedCap UEs (understanding that CHO is already defined as an optional feature). “FFS on CHO” can be removed. ;

* Agreed

Proposal 3.3-1a: [For agreement] [17/19] RAN2 confirms RAN1 agreements, i.e. introduce explicit bit to indicate the support of RedCap; To be captured in Mega CR;

* Agreed

Proposal 3.3-1b: [For agreement] [16/17] RAN2 confirms RAN1 agreements, i.e. the RedCap UE capability is per UE;

* vivo would like to keep this open for now and wait for RAN1
* Intel suggest to revise as "RAN2 confirms to follow RAN1 agreements on UE feature granularity for ~~, i.e.~~ the RedCap UE capability ~~is per UE;~~"
* Continue online
* Vivo thinks it is up to RAN1 to decide. Mediatek/E/// are not happy with stating this, wonder what this really means
* QC is fine with the rewording.
* Mediatek suggests to put this as a Working assumption: the RedCap UE capability is per UE. Can come back to this based on RAN1 decisions
* Continue offline

Proposal 3.4-1: [For agreement] [18/18] RAN2 confirms RAN1 agreements, i.e. introduce capability bit on Half-duplex FDD operation type A for RedCap UEs; To be captured in Mega CR.

* Agreed

Proposal 3.6-2: [For agreement] [17/17] RAN2 confirms that for RedCap UEs, “maxNumberMIMO-LayersPDSCH ” is still per FSPC although per band is enough.

* Agreed

Proposal 3.7-1: [For agreement] [18/18] Clarify in the field description of shortSN and am-WithShortSN that, RedCap UE should always report ”1” in TS 38.306 section 4.2.4 and 4.2.5.

* Agreed

Proposal 3.8-1: [For agreement] [16/18] For the LTE to NR handover, in case the target NR cell is a legacy cell, rely on existing solution, the RedCap UE should trigger RRC re-establishment procedure. No specification impact;

* BT has concerns on this proposal: do not agree on it unless RAN2 ensures the following “4> if the UE is unable to comply with (part of) the configuration included in the MobilityFromEUTRACommand message; or” no matter the frequency and no matter the RedCap UE capabilities. Other case, we may end up with RedCap UEs using non-RedCap cells.
* HW have the similar concern as BT. Proposal 3.8-1 can be split into two parts, while the 1st part is agreeable. If we can agree on the 1st part, then the 2nd part is somehow minor issue, which can be clarified in next meeting.

1) For the LTE to NR handover, in case the target NR cell is a legacy cell, the RedCap UE should trigger RRC re-establishment procedure.

2) FFS rely on current specification. (e.g. FFS no spec impact, or some clarification in spec, or some new solution).

HW suggests to reword as "For the LTE to NR handover, in case the target NR cell is a legacy cell, the RedCap UE should trigger RRC re-establishment procedure. FFS any specification impact."

* Continue online
* Intel is fine with rewording.
* ZTE is fine with HW/BT's proposal, trigger re-establishment immediately if the UE finds out the target cell is legacy cell, understand the proposal is to avoid a RedCap to access a 20MHZ legacy NR cell
* HW clarifies that the discussion here is about legacy gNBs
* Apple thinks we could leave this to implementation
* For the LTE to NR handover, in case the target NR cell is a legacy cell, the RedCap UE should trigger RRC re-establishment procedure. FFS any specification impact or purely leave to implementation

Agreements via email - from offline 105:

1. ANR feature is optional for RedCap UE;
2. CHO related capabilities are applicable for RedCap UEs (understanding that CHO is already defined as an optional feature). “FFS on CHO” can be removed.
3. RAN2 confirms RAN1 agreements, i.e. introduce explicit bit to indicate the support of RedCap; To be captured in Mega CR;
4. RAN2 confirms RAN1 agreements, i.e. introduce capability bit on Half-duplex FDD operation type A for RedCap UEs; To be captured in Mega CR.
5. RAN2 confirms that for RedCap UEs, “maxNumberMIMO-LayersPDSCH ” is still per FSPC although per band is enough.
6. Clarify in the field description of shortSN and am-WithShortSN that, RedCap UE should always report "1" in TS 38.306 section 4.2.4 and 4.2.5.

Agreements online:

1. For the LTE to NR handover, in case the target NR cell is a legacy cell, the RedCap UE should trigger RRC re-establishment procedure. FFS any specification impact or purely leave to implementation
2. "1 DL MIMO" vs "no MIMO" will no longer be discussed in RAN2

Online discussion:

Proposal 3.3-2: [Online discussion] RAN2 to discuss whether “Support of RedCap early indication for RACH” should be captured in the field description of RedCap UE capability (proposed in Proposal 3.3-1a);

Proposal 3.5-1: [Online discussion] [15/19] RAN2 confirms 1 DL MIMO means no MIMO, no specification impact.

* HW agrees there is no specification impact and suggests not to take the agreement and not to discuss this again
* "1 DL MIMO" vs "no MIMO" will no longer be discussed in RAN2

Proposal 3.6-1: [Online discussion] RAN2 to discuss whether to capture the limitation on BW, Rx and MIMO as

- The maximum bandwidth is 20 MHz for FR1, and is 100 MHz for FR2; - UE features and corresponding capabilities related to UE bandwidths wider than 20 MHz in FR1 or wider than 100 MHz in FR2 are not supported by RedCap UEs;

- 1 DL MIMO layer if 1 Rx branch is supported, and 2 DL MIMO layers if 2 Rx branches are supported. UE features and corresponding capabilities related to more than 2 UE Rx branches and more than 2 DL MIMO layers, as well as UE features and capabilities related to more than 2 UE Tx branches and more than 2 UL MIMO layers are not supported by RedCap UEs;

[R2-2201750](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201750.zip) [offline-105] RedCap capabilities - second round Intel discussion Rel-17 NR\_redcap-Core

For agreement:

Proposal 5.1-1: [For agreement] [12/14] From RAN2 perspective, the capability “support of RedCap” is per UE capability. RAN2 can come back to this based on RAN1 decisions;

* vivo has some concern with proposal 5.1-1, as the current proposal is somehow mis-leading potential discussion in RAN1. Normally, RAN1 will anyway provide feature list with granularity for all WIs to RAN2. This feature (28-1) is already considered/listed by RAN1, which we assume RAN1 will provide our final decision.
* Intel thinks that RAN2 did not agree “fall back” case, and therefore RAN2 do not see the motivation to have finer granularity than per UE. The proposal is made from RAN2 perspective and we can change if RAN1 have different understanding. Should not we already open the door for RAN1 based on “RAN2 can come back to this based on RAN1 decisions;”?
* vivo thinks the finer granularity is not only related to “fallback”. In some bands with BW<=20MHz, we don’t think there is difference between normal UEs and RedCap UEs with the same hardware capabilities as normal UEs. Finer granularity reporting could be helpful for the commercial of RedCap, especially when network has not full deployment to support RedCap. In this way, we still have motivation for finer granularity.
* Intel thinks the motivation to have finer granularity is indeed related to “fallback”
* QC thinks we don't need to rush and capture it as an agreement. We can just wait for RAN1’s final decision and then capture it accordingly
* Continue online
* WA: the capability “support of RedCap” is per UE capability. Take a final agreement in the next meeting based on possible further feedback from RAN1

Proposal 5.1-2: [For agreement] [14/14] Capture “Support of RedCap early indication based on Msg1, MsgA and Msg3 for RACH” in the field description of capability bit “support of RedCap”;

* Agreed

Proposal 5.2-2: [For agreement] [14/15] Capture the limitation on BW, Rx and MIMO in 4.2.xx RedCap Parameters of TS38.306 running CR as:

- The maximum bandwidth is 20 MHz for FR1, and is 100 MHz for FR2; UE features and corresponding capabilities related to UE bandwidths wider than 20 MHz in FR1 or wider than 100 MHz in FR2 are not supported by RedCap UEs;

- 1 DL MIMO layer if 1 Rx branch is supported, and 2 DL MIMO layers if 2 Rx branches are supported. UE features and corresponding capabilities related to more than 2 UE Rx branches and more than 2 DL MIMO layers, as well as UE features and capabilities related to more than 2 UE Tx branches and more than 2 UL MIMO layers are not supported by RedCap UEs;

* Agreed

Agreements via email - via offline 105 second round:

1. Capture “Support of RedCap early indication based on Msg1, MsgA and Msg3 for RACH” in the field description of capability bit “support of RedCap”;

2. Capture the limitation on BW, Rx and MIMO in 4.2.xx RedCap Parameters of TS38.306 running CR as:

- The maximum bandwidth is 20 MHz for FR1, and is 100 MHz for FR2; UE features and corresponding capabilities related to UE bandwidths wider than 20 MHz in FR1 or wider than 100 MHz in FR2 are not supported by RedCap UEs;

- 1 DL MIMO layer if 1 Rx branch is supported, and 2 DL MIMO layers if 2 Rx branches are supported. UE features and corresponding capabilities related to more than 2 UE Rx branches and more than 2 DL MIMO layers, as well as UE features and capabilities related to more than 2 UE Tx branches and more than 2 UL MIMO layers are not supported by RedCap UEs;

Working Assumption:

1. The capability “support of RedCap” is per UE capability. Take a final agreement in the next meeting based on possible further feedback from RAN1

#### 8.12.2.2 Identification, access and camping restrictions

Focus on system information aspects (common aspects related to RACH partitioning shall be submitted to 8.18)

Also including discussion on "NCD-SSB"

NCD-SSB / Initial BWP aspects

[R2-2201732](file:///C:\Data\3GPP\RAN2\Docs\R2-2201732.zip) [Pre116bis-e][103][RedCap] Summary of NCD-SSB / Initial BWP aspects Ericsson discussion Rel-17 NR\_redcap-Core

Confirmation of proposals endorsed at RAN#94-e

Proposal 1 A RedCap UE in idle/inactive mode monitors paging in an initial BWP associated with CD-SSB, i.e., not in a separate initial BWP associated with NCD-SSB, and perform cell (re-)selection and measurements on the CD-SSB.

* VC suggests to revise as follows:

Proposal 1rev A RedCap UE in idle/inactive mode monitors paging in an initial BWP associated with CD-SSB, i.e., ~~not~~ either in the default initial BWP or in a separate initial BWP still associated with ~~N~~CD-SSB, and performs cell (re-)selection and measurements on the CD-SSB.

* Apple is ok with original p1, as initial BWP should be intended as RedCap specific initial BWP
* Mediatek thinks we should add "…only monitors paging…"
* Huawei, vivo prefer original p1
* ZTE, Denso think it's not only the RedCap specific initial BWP
* A RedCap UE in idle/inactive mode monitors paging only in an initial BWP (default or RedCap specific) associated with CD-SSB and performs cell (re-)selection and measurements on the CD-SSB

Proposals related to idle/inactive UEs

Proposal 20 If a RedCap-specific initial UL BWP is configured for RACH, RedCap UEs shall use only the RedCap-specific initial UL BWP to perform RACH.

* Agreed

Proposal 15 Discuss how configuration, e.g., search space, selection of RACH resources, should be provided when there is a separate initial UL BWP with no CD-SSB and NCD-SSB configured for random access.

* ZTE thinks that the intention is that if the NW configures a separate BWP that does not contain the CD-SSB the UE needs to read the configuration from initial BWP to monitor paging, RAR, OSI, etc.
* Continue offline

Proposal 16 Discuss whether a RedCap UE performs cell (re)selection measurements based on CD-SSB when there is a separate initial UL BWP with no CD-SSB and NCD-SSB configured for random access.

* VC wonders if this is already covered by P1(rev)
* Huawei also thinks this is already agreed/covered by P1
* Further discuss offline

Proposal 17 If RedCap UEs are configured with a separate initial UL BWP for RACH, discuss if it is up to UE implementation whether to perform new RSRP measurement on CD-SSB in the non-RedCap initial DL BWP before a Msg1/A retransmission.

* VC suggests to revise as follows:

Proposal 17rev: If RedCap UEs are configured with a separate initial UL BWP for RACH, discuss ~~if~~ whether

* + it is up to UE implementation whether to perform new RSRP measurement on CD-SSB in the non-RedCap initial DL BWP before a Msg1/A retransmission, or
  + the UE should always perform new RSRP measurement on CD-SSB in the non-RedCap initial DL BWP before a Msg1/A retransmission, or
  + other?
* QC indicates that in RAN4 spec there is a timing requirement. With RedCap specific initial BWP there is an issue so either the timing should be relaxed or left to UE implementation. We can send an LS to RAN4 on this.
* ZTE thinks we can ask RAN1 to consider to make NDC-SSB visible in idle/connected and ask the UE to perform measurements on NCD-SSB before msg1/A transmission
* Continue offline

Proposal 18 Discuss whether field description of rach-ConfigCommon is updated that network may configure SSB-based RA in a RedCap-specific UL BWP whose linked DL BWP may not contain any SSB, i.e., in that case, UE uses the CD-SSB transmitted by the serving cell for RO selection.

Proposal 19 Discuss whether RedCap-specific two-step RACH (if configured) and four-step RACH are always configured in the same BWP.

Proposals related to connected UEs

Proposal 2 In RRC connected mode, NCD-SSB may be configured for a RedCap UE in dedicated DL BWP.

Proposal 3 In Rel-17, for connected mode operation NCD-SSB has the same properties (e.g., ssb-PositionsInBurst, PCI, ssb-periodicity, ssb-PBCH-BlockPower) as the corresponding CD-SSB.

Proposal 4 The network may provide absoluteFrequencySSB, ssb-PositionsInBurst, and ssb-periodicity explicitly for NCD-SSB, i.e., other properties such as PCI, ssb-PBCH-BlockPower are configured with the same values from serving cell's CD-SSB.

Proposal 5 The periodicity of NCD-SSB shall be not less than the periodicity of serving cell’s CD-SSB.

Proposal 6 If NCD-SSB is configured in a dedicated DL BWP, RedCap UE should assume that the “SSB” in QCL-Info IE and “ssb-Index” in RadioLinkMonitoringRS IE refers to the beam with the same index in the NCD-SSB configured in that BWP.

Proposal 7 If NCD-SSB is configured in a dedicated DL BWP whose paired UL BWP is configured with RACH-ConfigDedicated, RACH-ConfigCommon or BeamFailureRecovery Config, then the SSB in that RACH configuration (e.g., in CFRA-SSB-Resource IE or in PRACH-ResourceDedicatedBFR IE) refers to the NCD-SSB configured in that DL BWP.

Proposal 8 In connected mode neighbor cell measurements based on NCD-SSB is not support for RedCap UEs.

Proposal 9 For serving cell measurement based on NCD-SSB, discuss whether:

Option 1: MeasObjectId is configured for each NCD-SSB

Option 2: MeasObjectNR is extended to include ssbFrequency for each NCD-SSB.

Proposal 10 For RedCap UEs in connected mode, UE’s serving cell measurement object is the ssbFrequency associated with the NCD-SSB of its active BWP.

Proposal 11 Discuss whether the RAN1 working assumption regarding the use of CSI-RS in connected mode is acceptable from RAN2 standpoint.

Proposal 12 Discuss whether a RedCap UE, which does not support CSI-RS, can report “Not need NCD-SSB” as an optional UE capability.

Proposal 13 Discuss whether NCD-SSB can be used to trigger handover procedure, i.e., whether SSB indicated in absoluteFrequencySSB of frequencyInfo-DL IE in handover command must be CD-SSB.

Proposal 14 Discuss whether non-RedCap UEs may use NCD-SSB instead of CD-SSB with an optional capability.

Agreements:

1. A RedCap UE in idle/inactive mode monitors paging only in an initial BWP (default or RedCap specific) associated with CD-SSB and performs cell (re-)selection and measurements on the CD-SSB
2. If a RedCap-specific initial UL BWP is configured for RACH, RedCap UEs shall use only the RedCap-specific initial UL BWP to perform RACH.

* [AT116bis-e][106][RedCap] NCD-SSB and Initial BWP aspects (Ericsson)

Initial scope: Continue the discussion based on [R2-2201732](file:///C:\Data\3GPP\RAN2\Docs\R2-2201732.zip) and the outcome of the online discussion

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 2022-01-19 1800 UTC

Initial deadline (for rapporteur's summary in R2-2201738): Wednesday 2022-01-19 2200 UTC

Updated scope: Continue the discussion on the remaining proposals in [R2-2201738](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201738.zip)

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

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

Updated deadline (for companies' feedback): Monday 2022-01-24 1000 UTC

Updated deadline (for rapporteur's summary in R2-2201753): Monday 2022-01-24 1100 UTC

Final scope: Draft reply LS to RAN1 and new LS to RAN4

Final intended outcome: LSs to RAN1 and RAN4

Final deadline (for companies' feedback): Tuesday 2022-01-25 1400 UTC

Final deadline (for LSs in R2-2201759 and R2-2201760): Tuesday 2022-01-25 1600 UTC

[R2-2201738](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201738.zip) [offline-106] NCD-SSB and Initial BWP aspects Ericsson discussion Rel-17 NR\_redcap-Core

Proposal 1 If a RedCap UE in idle/inactive mode is configured with a separate initial BWP associated with no SSB (CD or NCD) for RACH, measurements are based on CD-SSB for initial RACH resource selection.

* Agreed

Proposal 2 If a RedCap UE in idle/inactive mode is configured with a separate initial BWP associated with no SSB (CD or NCD) for RACH, PDCCH-ConfigCommon of the separate initial DL BWP includes common search space configuration for RAR.

* Agreed

Proposal 3 If a RedCap UE in idle/inactive mode is configured with a separate initial BWP associated with no SSB (CD or NCD) for RACH, it is up to UE implementation to perform new RSRP measurement in a DL BWP associated with CD-SSB before Msg1/A retransmission.

* ZTE thinks we need to confirm with RAN4 before making a decision, and if this is agreed, we want to clarify whether it will be captured in spec, or purely rely on RAN4 requirements?
* Agreed as: "From RAN2 perspective, if a RedCap UE in idle/inactive mode is configured with a separate initial BWP associated with no SSB (CD or NCD) for RACH, it is up to UE implementation to perform new RSRP measurement in a DL BWP associated with CD-SSB before Msg1/A retransmission"

Proposal 5 RedCap-specific two-step RACH, if configured, and four-step RACH are always configured in the same BWP.

* Agreed

Proposal 6 In RRC connected mode NCD-SSB may be configured for a RedCap UE in dedicated DL BWP.

* Agreed

Proposal 7 For connected mode operation NCD-SSB has the same properties (e.g., ssb-PositionsInBurst, PCI, ssb-periodicity, ssb-PBCH-BlockPower) as the corresponding CD-SSB.

* HW thinks p7 should be discussed with p8, since it also need the offset property
* Ericsson thinks that if the intention is to discuss whether RAN2 should introduce a new property for NCD-SSB, it would be better if we revise Proposal 7 as follows and keep Proposal 8 as it is: "For connected mode operation NCD-SSB has the same properties (e.g., ssb-PositionsInBurst, PCI, ssb-periodicity, ssb-PBCH-BlockPower) as the corresponding CD-SSB. FFS if an additional property needs to be specified."
* Agreed as: "For connected mode operation NCD-SSB has the same properties (e.g., ssb-PositionsInBurst, PCI, ssb-periodicity, ssb-PBCH-BlockPower) as the corresponding CD-SSB. FFS if an additional property needs to be specified."

Proposal 10 For connected mode operation if NCD-SSB is configured in a dedicated DL BWP, RedCap UE assumes that “SSB” in QCL-Info IE and “ssb-Index” in RadioLinkMonitoringRS IE refer to the beam with the same index in the NCD-SSB configured in that BWP.

* Agreed

Proposal 11 For connected mode operation if NCD-SSB is configured in a dedicated DL BWP whose paired UL BWP is configured with RACH-ConfigDedicated, RACH-ConfigCommon or BeamFailureRecovery Config, SSB in that RACH configuration (e.g., in CFRA-SSB-Resource IE or in PRACH-ResourceDedicatedBFR IE) refers to the NCD-SSB configured in that DL BWP.

* Agreed

Proposal 12 In connected mode neighbor cell measurements based on NCD-SSB is supported for RedCap UEs.

* HW is not convinced on the motivation of supporting neighbor cell measurements based on NCD-SSB.
* Ericsson thinks this is already supported since Rel-15. So not agreeing on this implies removing an existing functionality for RedCap UEs. Is this the intention?
* HW thinks that in case the proposal could be: "In R17, RAN2 will not pursue any standard effort on neighbor cell measurements based on NCD-SSB for RedCap UEs in connected mode”
* Continue offline

Proposal 13 For serving cell measurement based on NCD-SSB in connected mode MeasObjectId is configured for each NCD-SSB.

* ZTE would like to flag p13. It is unclear what P13 really means and the consequence. Does it mean the network should configure a separate measObjectNR for NCD-SSB? And what's the purpose of the configured MO? Is it to provide separate cell derivation thresholds? Or it is also used for intra-frequency neighbour cell measurements? And whether a separate "servingCellMO" should be introduced to link to the new MO id? As we commented during offline, RAN2 needs to first discuss the high level RRM issues, then we can further discuss if any modification is needed and how to do it. Without clear picture of whole RRM mechanism on NCD-SSB, it is unclear why MeasObjecId is configured for NCD-SSB.
* HW thinks this is to configure the MO of serving cell. As we will agree that the absoluteFrequencySSB will be configured for each NCD-SSB on the serving cell. Then UE needs to know the servingCellMO of each BWP/NCD-SSB. Our understanding on the P13 is that we need to add more MeasObjectId to the servingCellMO, where each MO will include the absoluteFrequencySSB of one NCD-SSB. Anyway, the ASN.1 details are FFS
* ZTE thinks then it's better to use "the NCD-SSB" (not each), as only one NCD-SSB will be configured for RedCap, right? Regarding the comment: "Then UE needs to know the servingCellMO of each BWP/NCD-SSB.", there are further questions: 1) If the intention is to let UE know which SSB should be used for serving cell measurement, then the same rule as P10/P11 can be applied. Which means as long as the active BWP contains NCD-SSB, not CD-SSB, the UE can refer to NCD-SSB for serving cell measurement. (the ARFCN of NCD-SSB can be provided per-cell, not per-MO, as many operations (e.g. RLM/BFD) will refer to it) 2) If the intention is to provide separate RRM parameters (e.g. cell quality derivation threshold, L3 filters) for serving cell measurement on NCD-SSB, then a new MO is needed, but this also means that the UE is required to measure other neighbour cells on that frequency. 3) If network must configure a MO on NCD-SSB frequency, and link it to servingCellConfig. Then what is the expected UE behavior? Will UE dynamically change the serving MO and corresponding parameters upon BWP switching? And also change intra-frequency neighbour cells dynamically?
* Continue offline

Proposal 14 It is up to RAN4 to decide whether RAN1 working assumption regarding the use of CSI-RS in connected mode is acceptable.

* Mediatek wonders why are we kicking this back over to RAN4? RAN4 have already informed us that ‘It is RAN4 understanding that CSI-RS are not used as a standalone mechanism for RRM measurements and the existing requirements rely on the presence of SSB signals’. So, we either say that this is not feasible from RAN2’s perspective (since the associated SSB cannot be monitored), or RAN2 needs to discuss and introduce some procedure that would enable a RedCap UE to monitor the SSB, in order to perform CSI-RS based RRM.
* Continue offline

Agreements via email - from offline 106:

1. If a RedCap UE in idle/inactive mode is configured with a separate initial BWP associated with no SSB (CD or NCD) for RACH, measurements are based on CD-SSB for initial RACH resource selection.
2. If a RedCap UE in idle/inactive mode is configured with a separate initial BWP associated with no SSB (CD or NCD) for RACH, PDCCH-ConfigCommon of the separate initial DL BWP includes common search space configuration for RAR.
3. From RAN2 perspective, if a RedCap UE in idle/inactive mode is configured with a separate initial BWP associated with no SSB (CD or NCD) for RACH, it is up to UE implementation to perform new RSRP measurement in a DL BWP associated with CD-SSB before Msg1/A retransmission.
4. RedCap-specific two-step RACH, if configured, and four-step RACH are always configured in the same BWP.
5. In RRC connected mode NCD-SSB may be configured for a RedCap UE in dedicated DL BWP.
6. For connected mode operation NCD-SSB has the same properties (e.g., ssb-PositionsInBurst, PCI, ssb-periodicity, ssb-PBCH-BlockPower) as the corresponding CD-SSB. FFS if an additional property needs to be specified.
7. For connected mode operation if NCD-SSB is configured in a dedicated DL BWP, RedCap UE assumes that “SSB” in QCL-Info IE and “ssb-Index” in RadioLinkMonitoringRS IE refer to the beam with the same index in the NCD-SSB configured in that BWP.
8. For connected mode operation if NCD-SSB is configured in a dedicated DL BWP whose paired UL BWP is configured with RACH-ConfigDedicated, RACH-ConfigCommon or BeamFailureRecovery Config, SSB in that RACH configuration (e.g., in CFRA-SSB-Resource IE or in PRACH-ResourceDedicatedBFR IE) refers to the NCD-SSB configured in that DL BWP.

Proposals for further discussion

Proposal 4 Discuss whether RAN2 sends an LS to RAN4 to inform that it is up to UE implementation to perform new RSRP measurement in a DL BWP associated with CD-SSB before Msg1/A retransmission if a RedCap UE in idle/inactive mode is configured with a separate initial BWP associated with no SSB (CD or NCD) for RACH.

Proposal 8 The network may provide absoluteFrequencySSB and ssb-periodicity explicitly for NCD-SSB, i.e., other properties such as PCI, ssb-PBCH-BlockPower, ssb-PositionsInBurst are configured with the same values from serving cell's CD-SSB.

Proposal 9 The periodicity of NCD-SSB shall be not less than the periodicity of serving cell’s CD-SSB.

Proposal 15 Discuss whether a RedCap UE, which does not support CSI-RS, should be able to report “Not need NCD-SSB” as an optional UE capability.

Proposal 16 Discuss whether it should be possible to use NCD-SSB to trigger the handover procedure.

Proposal 17 Postpone the discussion on whether a non-RedCap UE should be able to use NCD-SSB instead of CD-SSB with an optional capability in this meeting.

[R2-2201753](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201753.zip) [offline-106] NCD-SSB and Initial BWP aspects - second round Ericsson discussion Rel-17 NR\_redcap-Core

Proposals for agreement:

Proposal 8 The network may provide absoluteFrequencySSB and ssb-periodicity explicitly for NCD-SSB, i.e., other properties such as PCI, ssb-PBCH-BlockPower, ssb-PositionsInBurst are configured with the same values from serving cell's CD-SSB.

* HW would like to add FFS for time offset
* The network may provide absoluteFrequencySSB and ssb-periodicity explicitly for NCD-SSB, i.e., other properties such as PCI, ssb-PBCH-BlockPower, ssb-PositionsInBurst are configured with the same values from serving cell's CD-SSB. FFS for the time offset (feedback from RAN1 might also be received)

Proposal 9 The periodicity of NCD-SSB shall be not less than the periodicity of serving cell’s CD-SSB.

* Apple would like to keep the periodicity the same, they understand there is a note in RAN1 but think we could resolve it in RAN2
* Ericsson thinks that both RAN1/RAN4 think p9 is possible. Ericsson thinks this would limit the NW flexibility and lead to the possibility than no NCD-SSB is supported at all.
* Intel can accept this although prefers single periodicity
* QC would prefer the same periodicity as well and thinks the overhead would not be too much.
* Samsung/Mediatek share QC view.
* Huawei/CATT thinks this is already supported by RAN1
* WA: The periodicity of NCD-SSB shall be not less than the periodicity of serving cell’s CD-SSB

Proposal 14 The use of CSI-RS for cell/beam RLM and measurements is supported from RAN2 signaling standpoint as indicated earlier. RAN4 has informed RAN2 and RAN1 that CSI-RS cannot be used as a standalone mechanism for RRM measurements and existing requirements rely on the presence of SSB signals. RAN2 does not intend to introduce a new mechanism that would enable a RedCap UE to perform CSI-RS based RRM measurements and think that it is up to RAN4 to decide whether RAN1 working assumption regarding the use of CSI-RS in connected mode is acceptable based on the information provided above.

* Send a reply LS to RAN1 (cc RAN4) according to the text above

Proposal 4 Discuss whether RAN2 sends an LS to RAN4 to inform that it is up to UE implementation to perform new RSRP measurement in a DL BWP associated with CD-SSB before Msg1/A retransmission if a RedCap UE in idle/inactive mode is configured with a separate initial BWP associated with no SSB (CD or NCD) for RACH.

* Xiaomi wonders what is meant by UE implementation
* QC thinks that the UE may or may not measure the SSB in another BWP. QC would like to sned an LS
* ZTE also thinks we should send a Ls, with RAN1 in CC
* Intel wonders if there is any impact to RAN2.
* Send a separate LS to inform RAN4 on this (cc: RAN1) and ask them to check if they need to do anything in their specs.

Agreements:

1. The network may provide absoluteFrequencySSB and ssb-periodicity explicitly for NCD-SSB, i.e., other properties such as PCI, ssb-PBCH-BlockPower, ssb-PositionsInBurst are configured with the same values from serving cell's CD-SSB. FFS for the time offset (feedback from RAN1 might also be received)
2. Send a reply LS to RAN1 (cc: RAN4) indicating that "The use of CSI-RS for cell/beam RLM and measurements is supported from RAN2 signaling standpoint as indicated earlier. RAN4 has informed RAN2 and RAN1 that CSI-RS cannot be used as a standalone mechanism for RRM measurements and existing requirements rely on the presence of SSB signals. RAN2 does not intend to introduce a new mechanism that would enable a RedCap UE to perform CSI-RS based RRM measurements and think that it is up to RAN4 to decide whether RAN1 working assumption regarding the use of CSI-RS in connected mode is acceptable based on the information provided above."

3. Send a LS to RAN4 (Cc: RAN1) to inform that "it is up to UE implementation to perform new RSRP measurement in a DL BWP associated with CD-SSB before Msg1/A retransmission if a RedCap UE in idle/inactive mode is configured with a separate initial BWP associated with no SSB (CD or NCD) for RACH." and ask them to check if they need to do anything in their specs.

Working Assumption:

1. The periodicity of NCD-SSB shall be not less than the periodicity of serving cell’s CD-SSB

Proposals for further discussion

Proposal 12 In connected mode neighbour cell measurements based on NCD-SSB is supported for RedCap UEs.

* Continue in the next meeting

Proposal 13 For serving cell measurement based on NCD-SSB in connected mode MeasObjectId is configured for each NCD-SSB.

* Continue in the next meeting

Proposal 15 Discuss whether a RedCap UE, which does not support CSI-RS, should be able to report “Not need NCD-SSB” as an optional UE capability.

* Continue in the next meeting

Proposal 16 Discuss whether it should be possible to use NCD-SSB to trigger the handover procedure.

* Continue in the next meeting

Proposal 17 Discuss whether a non-RedCap UE should be able to use NCD-SSB instead of CD-SSB with an optional capability in this meeting.

* Continue in the next meeting

[R2-2200831](file:///C:\Data\3GPP\Extracts\R2-2200831%20-%20%5bDRAFT%5d%20Reply%20LS%20on%20the%20use%20of%20NCD-SSB%20or%20CSI-RS%20in%20DL%20BWPs%20for%20RedCap%20UEs.docx) [DRAFT] Reply LS on the use of NCD-SSB or CSI-RS in DL BWPs for RedCap UEs Ericsson LS out Rel-17 NR\_redcap-Core To:RAN1 Cc:RAN4

* Revised in R2-2201759 to reflect the meeting agreements

R2-2201759 Reply LS on the use of NCD-SSB or CSI-RS in DL BWPs for RedCap UEs (Ericsson) LS out Rel-17 NR\_redcap-Core To:RAN1 Cc:RAN4

R2-2201760 LS on RSRP measurement before Msg1/A retransmission (Ericsson) LS out Rel-17 NR\_redcap-Core To:RAN4 Cc:RAN1

[R2-2200190](file:///C:\Data\3GPP\Extracts\R2-2200190%20Discussions%20on%20RedCap-specific%20BWPs.docx) Discussions on RedCap-specific BWPs Qualcomm Incorporated discussion Rel-17 NR\_redcap-Core

[R2-2200287](file:///C:\Data\3GPP\Extracts\R2-2200287%20Early%20identification-camping%20restrictions-NCD-SSB.docx) Open issues on Early identification, camping restrictions and NCD-SSB Intel Corporation discussion Rel-17 NR\_redcap

[R2-2200401](file:///C:\Data\3GPP\Extracts\R2-2200401.docx) BWP configuration for RedCap UE DENSO CORPORATION discussion Rel-17 NR\_redcap-Core

[R2-2200597](file:///C:\Data\3GPP\Extracts\R2-2200597_Remaining%20issues%20on%20NCD%20SSB,%20identification%20and%20access%20for%20RedCap.docx) Remaining issues on NCD SSB, identification and access for RedCap vivo, Guangdong Genius discussion Rel-17 NR\_redcap-Core

[R2-2200608](file:///C:\Data\3GPP\Extracts\R2-2200608%20Discussion%20on%20separate%20initial%20BWP%20and%20NCD-SSB%20for%20RedCap%20UE.docx) Discussion on separate initial BWP and NCD-SSB for RedCap UE ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2200830](file:///C:\Data\3GPP\Extracts\R2-2200830%20-%20Using%20NCD-SSB%20or%20CSI-RS%20in%20DL%20BWPs%20for%20RedCap%20UEs.docx) Using NCD-SSB or CSI-RS in DL BWPs for RedCap UEs Ericsson discussion Rel-17 NR\_redcap-Core

[R2-2200862](file:///C:\Data\3GPP\Extracts\R2-2200862%20Discussion%20on%20use%20of%20NCD-SSB%20or%20CSI-RS%20in%20DL%20BWPs%20for%20RedCap%20UE.docx) Discussion on use of NCD-SSB or CSI-RS in DL BWPs for RedCap UE CMCC discussion Rel-17 NR\_redcap-Core

[R2-2201113](file:///C:\Data\3GPP\Extracts\._R2-2201113-recap-reselect.docx) RedCap UE power-saving aspects at cell re-selection Apple discussion NR\_redcap-Core

[R2-2201461](file:///C:\Data\3GPP\Extracts\R2-2201461%20-%20Aspects%20related%20to%20use%20of%20NCD-SSB.docx) Aspects related to use of NCD-SSB MediaTek Inc. discussion Rel-17 NR\_redcap-Core

Other aspects

[R2-2200554](file:///C:\Data\3GPP\Extracts\R2-2200554%20%20Identification%20and%20access%20restriction%20of%20RedCap%20UE,%20and%20NCD-SSB%20related%20issues.docx) Identification and access restriction of RedCap UE, and NCD-SSB related issues Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

* [AT116bis-e][103][RedCap] Identification and access restriction (Huawei)

Initial scope: Discuss identification and access restriction aspects based on submitted contributions

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

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

Initial deadline (for companies' feedback): Wednesday 2022-01-19 1300 UTC

Initial deadline (for rapporteur's summary in R2-2201734): Wednesday 2022-01-19 1500 UTC

Updated scope: Continue the discussion on identification and access restriction aspects based on [R2-2201734](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201734.zip)

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

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

Updated deadline (for companies' feedback): Friday 2022-01-21 1400 UTC

Updated deadline (for rapporteur's summary in R2-2201751): Friday 2022-01-21 1600 UTC

Proposals marked "for agreement" in R2-2201751 not challenged until Monday 2022-01-24 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue in the GTW session).

[R2-2201734](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201734.zip) [offline-103] identification and access restriction aspects Huawei discussion Rel-17 NR\_redcap-Core

Proposals for agreement

Proposal 2: [Easy] Msg3 early identification is mandatorily supported by RedCap UE.

* vivo has concerns with this.
* Continue online
* vivo thinks companies have different understanding on the need for this
* vivo would like to understand the UE behaviour in case msg1 early identification is configured.
* Also when msg1 early identification is configured, new dedicated LCID is used for CCCH identification
* Working assumption: Msg3 early identification is mandatorily supported by RedCap UE

Proposal 3a: [Easy] In MAC perspective, a RedCap UE uses MsgA PRACH early identification when it transmits preamble for CBRA if MsgA PRACH early identification is configured for RedCap by NW.

* Agreed

Proposal 3b: [Easy] For MsgA PRACH early identification, RAN2 confirms both dedicated ROs and dedicated PRACH preamble can be supported from signalling point of view.

* Agreed

Proposal 3c: [Easy] For RedCap, MsgA PRACH early identification is enabled/disabled implicitly by the presence of dedicated RACH configuration for MsgA PRACH early identification.

* Agreed

Proposal 5: [Easy] As in legacy, in case the cell is barred due to being unable to acquire the MIB, intra-frequency cell reselection is considered by RedCap UE as “allowed”.

* Agreed

Proposal 8: [Easy] For the cell barring in SIB1, RAN2 agree to use two mandatory sub-IEs with {barred, notBarred} values included in one optional parent IE cellBarredRedCap-r17.

* TMUS has concerns with proposals 8, 9 and 10. This adds unnecessary complexity to wearable use case were the only deviation from MBB requirements is the use of single antenna/RX chain in a band that requires 2RX chains i.e. n25. This is a homogeneous deployment that doesn’t require any barring capability for a particular band. UAC is a viable solution for barring and is currently supported. REDCAP need to support a wide range of deployments without burdening the less complex deployments with all of the functionality needed to support early barring and number of RX chains.
* Continue offline

Proposal 9: [Easy] The cell supporting RedCap should always present the intraFreqReselectionRedCap in SIB1.

* TMUS: If this IE is present the UE uses legacy methods/ IE’s
* CATT suggest to add an "FFS whether the Release 17 or after release cell not supporting Redcap can also present the intraFreqReselectionRedCap in SIB1."
* Continue offline

Proposal 10: [Easy] Working assumption: RAN2 support the RedCap specific cell (re)selection parameter.

* Mediatek has concerns with this: From the proponents’ responses, there seems to be no common ground on which parameters we are referring to. Some companies refer to different cell-edge criteria (Qqualmin/rxlevmin), while others refer to different reselection thresholds or even different priorities. The proposed working assumption is overly broad and is a blank cheque stating that we will support new parameters, without knowing what new parameters we’re supporting here. If anything is needed, our suggestion is: FFS on the need for RedCap specific cell (re)selection parameters. Oppo agrees
* TMUS: Can accept this if it’s optional for the UE to support.
* Continue offline

Proposal 11: [Easy] System information should provide information on which cells/frequencies accept RedCap UE access (e.g. by considering whether supporting RedCap).

* BT has some concerns about Proposal 11: RedCap is not agreed that will be supported homogenously so we prefer to relax this and instead should, may seems more reasonable. It will be beneficial to clarify the meaning of “cells/frequencies”. Does it mean “and”, “or”, “and/or”. If both are included, “and” or “and/or”, we need to clarify which one has priority.
* TMUS: For the wearable use case this isn’t needed
* HW is fine to revise as "System information may provide information on which cells and/or frequencies accept RedCap UE access (e.g. by considering whether supporting RedCap)."
* Continue offline

Agreements via email - from offline 103:

1. In MAC perspective, a RedCap UE uses MsgA PRACH early identification when it transmits preamble for CBRA if MsgA PRACH early identification is configured for RedCap by NW.
2. For MsgA PRACH early identification, RAN2 confirms both dedicated ROs and dedicated PRACH preamble can be supported from signalling point of view.
3. For RedCap, MsgA PRACH early identification is enabled/disabled implicitly by the presence of dedicated RACH configuration for MsgA PRACH early identification.
4. As in legacy, in case the cell is barred due to being unable to acquire the MIB, intra-frequency cell reselection is considered by RedCap UE as “allowed”.

Agreements online:

1. In MAC perspective, RedCap UE uses the dedicated LCID for Msg3 early identification, when the Msg3 includes the CCCH data (no other precondition)
2. Also when msg1 early identification is configured, new dedicated LCID is used for CCCH identification

Working assumption:

1. Msg3 early identification is mandatorily supported by RedCap UE

Proposals that require online discussions

Proposal 1: [Discussion] In MAC perspective, RedCap UE uses the dedicated LCID for Msg3 early identification, when the Msg3 includes the CCCH data and Msg3 early identification is enabled by NW.

* Oppo doesn't see the need for the configurability. Samsung/Nokia share the same view. If the NW supports RedCap the network supports the new LCID
* In MAC perspective, RedCap UE uses the dedicated LCID for Msg3 early identification, when the Msg3 includes the CCCH data (no other precondition)

Proposal 4: [Discussion] In case the cell is barred due to not supporting RedCap, intra-frequency cell reselection considered by RedCap UE is agreed as option 1:

Option 1: as “allowed”, i.e. allow/up to UE implementation to consider intra-frequency cell;

Option 3: follow the IFRI in MIB;

Proposal 7: [Discussion] In case the cell is barred due to being unable to acquire the SIB1, intra-frequency cell reselection considered by RedCap UE is agreed as option 1:

Option 1: as “allowed”

Option 2: follow IFRI in MIB.

Proposal 6: [Discussion] If the cellBarred field in MIB is set to barred, RedCap UE should:

Option 1: follow the legacy IFRI in MIB.

Option 2: continue to read SIB1 of the barred cell and follow the intraFreqReselectionRedCap indicated in SIB1. [Majority]

[R2-2201751](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201751.zip) [offline-103] identification and access restriction aspects - second round Huawei discussion Rel-17 NR\_redcap-Core

Proposals For Agreement

Proposal 2: [Easy] For the cell barring in SIB1, RAN2 agree to use two mandatory sub-IEs with {barred, notBarred} values included in one optional parent IE cellBarredRedCap-r17.

* Agreed

Proposal 3: [Easy] Working assumption: RAN2 support the RedCap specific cell (re)selection parameter, limited the selection within below in next meeting:

- Alt.1: the ‘minimum required signal strength/quality level’ (i.e. Qrxlevmin/Qqualmin from the cell selection criterion S);

- Alt.2: priority for cell reselection in SIB2&4;

- QC suggests to revise as: "Working assumption: RAN2 support RedCap specific cell (re)selection parameters, ~~limited the selection within below in next meeting~~ FFS whether one or both of the following parameters can be supported: …."

- Samsung supports QC proposal. ZTE and DENSO also agree

- HW then suggest to revise as "Working assumption: RAN2 support RedCap specific cell (re)selection parameters, limited the selection to support one or two within below in next meeting:"

- Ericsson would like to challenge p3 and p4: Having seen the variety of preferences for the intended mechanisms provided already at such high level discussion and considering that these mechanisms are in fact optimizations, we think it is clear that further discussion and therefore time is required. We have one more meeting left and from WI rapporteur’s standpoint we think we should rather spend the remaining time in this meeting and the next one in February to conclude the essential open issue to close the WI on time.

* Continue online

- Oppo agrees with Ericsson in principle but still this would not take much time

- Samsung thinks this is important

- Apple suggests to discuss p4 and agree that one at least

* No conclusion (it’s still possible to come back in the next meeting)

Proposal 4: [Easy] System information can provide information on which frequencies accept RedCap UE access (e.g. by considering whether supporting RedCap).

* vivo does not object but would like to clarify proposal 4. During the discussion, it seems (16/19) companies have no concern on the proposal. 3 companies prefer to include “cells”, while 2 companies prefer not to or have concern to include “cells”. Can we suggest to try the original proposal with “cells”, i.e. "System information may provide information on which cells and/or frequencies accept RedCap UE access (e.g. by considering whether supporting RedCap)"?
* Oppo agrees with vivo
* ZTE also prefers to support finer granularity of indication (e.g. per-cell, or per-cell range), based on companies' comments during offline, we understand that "pre-freq" level has gained more support. But in our view, it does not mean "cell level" option is completely ruled out. So instead of changing P4 back to original version(which seems to keep both options FFS). we suggest to explicitly add an FFS to "cell level" option: "System information can provide information on which frequencies accept RedCap UE access (e.g. by considering whether supporting RedCap), FFS if finer granularity (e.g. per-cell, per-cell range) can also be supported."
* Denso agrees with ZTE's rewording
* Nokia suggests to add the FFS as a p4a. Huawei agrees
* Continue online
* Ericsson thinks this is not essential
* TMUS also thinks this is not needed
* Nokia supports this proposals and thinks it's simple to specify and implement
* WA: System information can provide information on which frequencies accept RedCap UE access (e.g. by considering whether supporting RedCap).

Agreements via email - from offline 103 second round

1. For the cell barring in SIB1, RAN2 agree to use two mandatory sub-IEs with {barred, notBarred} values included in one optional parent IE cellBarredRedCap-r17

Working Assumption:

1. System information can provide information on which frequencies accept RedCap UE access (e.g. by considering whether supporting RedCap).

Proposals That Require Online Discussions

Proposal 1a: [Discussion] In case the cell is barred due to not supporting RedCap, intra-frequency cell reselection considered by RedCap UE is agreed as option 1:

Option 1: as “allowed”, i.e. allow/up to UE implementation to consider intra-frequency cell; [Majority]

Option 3: follow the IFRI in MIB;

Proposal 1b: [Discussion] In case the cell is barred due to being unable to acquire the SIB1, intra-frequency cell reselection considered by RedCap UE is agreed as option 1:

Option 1: as “allowed” [Majority]

Option 2: follow IFRI in MIB.

Proposal 1c: [Discussion] If the cellBarred field in MIB is set to barred, RedCap UE should continue to read SIB1 of the barred cell and follow the intraFreqReselectionRedCap indicated in SIB1, if present. If absent, RedCap UE then follows the legacy IFRI in MIB.

* For p1a, p1b and p1c: continue in the next meeting.

[R2-2200208](file:///C:\Data\3GPP\Extracts\R2-2200208_Cell%20barring%20aspects.doc) Cell barring aspects Samsung Electronics Co., Ltd discussion Rel-17 NR\_redcap-Core

[R2-2200249](file:///C:\Data\3GPP\Extracts\R2-2200249%20RedCap%20identification%20and%20access%20restriction.doc) Discussion on RedCap UE's identification and camping restrictions OPPO discussion Rel-17 NR\_redcap-Core

[R2-2200332](file:///C:\Data\3GPP\Extracts\R2-2200332.docx) Cell (re)selection details for RedCap UEs Samsung Electronics discussion Rel-17 NR\_redcap-Core

[R2-2200343](file:///C:\Data\3GPP\Extracts\R2-2200343_KDDI_redcap.docx) System Information and supporting for RedCap UEs KDDI Corporation discussion Rel-17 [R2-2111150](file:///C:\Data\3GPP\archive\RAN2\RAN2%23116\Tdocs\R2-2111150.zip)

[R2-2200468](file:///C:\Data\3GPP\Extracts\R2-2200468%20%20Discussion%20on%20UE%20access%20restrictions%20for%20Redcap%20devices.doc) Discussion on UE access restrictions for Redcap devices Beijing Xiaomi Mobile Softwar discussion

[R2-2200469](file:///C:\Data\3GPP\Extracts\R2-2200469%20%20Discussion%20on%20early%20Identification%20for%20Redcap%20devices.doc) Discussion on early Identification for Redcap devices Beijing Xiaomi Mobile Softwar discussion

[R2-2200568](file:///C:\Data\3GPP\Extracts\R2-2200568%20Camping%20restrictions%20of%20RedCap%20UE.doc) Camping restrictions of RedCap UE Fujitsu discussion Rel-17 NR\_redcap-Core

[R2-2200609](file:///C:\Data\3GPP\Extracts\R2-2200609%20Identification,%20access%20and%20camping%20restrictions%20for%20RedCap%20UE.docx) On Access and Camping Restrictions ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2200616](file:///C:\Data\3GPP\Extracts\R2-2200616_AC.docx) Further considerations on access restrictions NEC discussion Rel-17 NR\_redcap-Core

[R2-2200639](file:///C:\Data\3GPP\Extracts\R2-2200639%20Discussion%20on%20the%20open%20issues%20of%20identification%20and%20access%20restrictions%20for%20RedCap%20UE.doc) Discussion on the open issues of identification and access restrictions for RedCap UE Spreadtrum Communications discussion Rel-17

[R2-2200686](file:///C:\Data\3GPP\Extracts\R2-2200686.docx) Discussion on the remaining issues of early identification and IFRI CATT discussion Rel-17 NR\_redcap-Core

[R2-2200725](file:///C:\Data\3GPP\Extracts\._R2-2200725%20(R17%20RedCap%20WI%20AI%208.12.2.2)%20Corrections%20for%20cellBarred%20in%20MIB%20handling%20for%20RedCap%20UE.doc) Corrections for cellBarred in MIB handling for RedCap UE InterDigital, Europe, Ltd. discussion Rel-17

[R2-2200797](file:///C:\Data\3GPP\Extracts\R2-2200797%20-%20Early%20indication%20and%20access%20restriction%20for%20RedCap%20UEs.docx) Early indication & access restriction for RedCap UEs Ericsson discussion Rel-17 NR\_redcap-Core

[R2-2200836](file:///C:\Data\3GPP\Extracts\R2-2200836.docx) NR-REDCAP access restriction/allowance indication to ease mobility THALES discussion

[R2-2200861](file:///C:\Data\3GPP\Extracts\R2-2200861%20Discussion%20on%20access%20restrictions%20and%20early%20identification.docx) Discussion on access restrictions and early identification CMCC discussion Rel-17 NR\_redcap-Core

[R2-2201207](file:///C:\Data\3GPP\Extracts\R2-2201207%20Discussion%20on%20identification%20and%20access%20restrictions%20for%20RedCap%20UEs.docx) Discussion on identification and access restrictions for RedCap UEs LG Electronics UK discussion Rel-17

[R2-2201232](file:///C:\Data\3GPP\Extracts\R2-2201232%20RedCap2.docx) Early identification and camping restrictions for RedCap UE Sierra Wireless. S.A. discussion

[R2-2201237](file:///C:\Data\3GPP\Extracts\R2-2201237.docx) Neighbour cell information and cell (re)selection for RedCap UE DENSO CORPORATION discussion Rel-17 NR\_redcap-Core [R2-2109646](file:///C:\Data\3GPP\archive\RAN2\RAN2%23116\Tdocs\R2-2109646.zip)

[R2-2201435](file:///C:\Data\3GPP\Extracts\R2-2201435%20-%20Support%20and%20network%20behaviour%20for%20RedCap%20early%20indication.docx) Support and network behaviour for RedCap early indication messages BT Plc, Deutsche Telekom AG, Telecom Italia S.p.A., TurkCell, CMCC, NTT DOCOMO INC., Orange, Vodafone discussion Revised

[R2-2201587](file:///C:\Data\3GPP\Extracts\R2-2201587%20Further%20details%20of%20identification,%20access,%20and%20camping%20restrictions.docx) Further details of identification, access, and camping restrictions Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2201623](file:///C:\Data\3GPP\Extracts\R2-2201623%20-%20Support%20and%20network%20behaviour%20for%20RedCap%20early%20indication.docx) Support and network behaviour for RedCap early indication messages BT Plc, Deutsche Telekom AG, Telecom Italia S.p.A., TurkCell, CMCC, NTT DOCOMO INC., Orange, Vodafone, KDDI discussion Rel-17 [R2-2201435](file:///C:\Data\3GPP\Extracts\R2-2201435%20-%20Support%20and%20network%20behaviour%20for%20RedCap%20early%20indication.docx)

### 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.

This sub-AI will not be treated at R2-116bis-e. No contributions are expected

#### 8.12.3.2 RRM relaxations

Measurement-based stationarity criterion and related not-at-cell-edge criterion, for RRC Inactive, Idle and Connected.

Main focus on the "FFS: whether UE Assistance Information or legacy measurement reporting framework should be used by UE to report its relaxation status" (with the intention to close the discussion and not come back to this in February meeting)

[R2-2200549](file:///C:\Data\3GPP\Extracts\R2-2200549.doc) RRM measurement relaxation in RedCap Samsung discussion Rel-17

* [AT116bis-e][104][RedCap] RRM relaxations (Samsung)

Initial scope: Discuss RRM relaxation aspects based on submitted contributions

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

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

Initial deadline (for companies' feedback): Wednesday 2022-01-19 1300 UTC

Initial deadline (for rapporteur's summary in R2-2201735): Wednesday 2022-01-19 1500 UTC

Updated scope: Continue the discussion on p1, p4 and p5 in [R2-2201735](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201735.zip)

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

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

Updated deadline (for companies' feedback): Friday 2022-01-21 1400 UTC

Updated deadline (for rapporteur's summary in R2-2201752): Friday 2022-01-21 1600 UTC

Proposals marked "for agreement" in R2-2201752 not challenged until Monday 2022-01-24 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue in the GTW session).

[R2-2201735](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201735.zip) [offline-104] RRM relaxations Samsung discussion Rel-17 NR\_redcap-Core

For email agreement:

Proposal 2. [Easy] (19/20) If UAI-based report is adopted, 1-bit indication (i.e., whether UE meets stationary criterion or not) is sufficient for UE to report its relaxation status.

* Agreed

Proposal 3. [Easy] (18/19) UE reports are triggered only if relaxation status (i.e., whether relaxation criterion is met or not) toggles.

* FW would like to point out that if we are to agree on Proposal 3,a point about an initial relaxation status is missing (and not discussed before). Essentially, for the very first report, the UE needs to assume an initial relaxation status in order to determine whether a toggle has occurred or not. We think it is reasonable for the UE to assume the initial relaxation status as “not met”, so that the UE submits its first report only when the status becomes “met”.
* QC also has some concerns as it violates how UAI works so far –network and UE do not need to keep states for UAI messages. For example, when UAI is used for power saving, UE can send any preference irrespective of what it has sent before. In other words, there is no restriction on whether an indication in UAI has to be different from what’s in the previous one. This principle, which is good for both network and UE, should be kept for RRM relaxation as well.
* DENSO understands that even in the existing UAI framework, UE needs to check if the current status is different from the previous one or not to trigger UAI for some purposes, e.g. IDC, delay budget, etc (of course, not all of the UAI purposes). So, there seems to be no issues on Proposal 3. Clarification on the initial status sounds reasonable though.
* Vivo agrees to add some restriction on P3 simply, e.g. “Except for the first report,”
* Intel agrees with vivo. For QC’s comments, agree it is not same as current UAI, but we have to introduce mechanism to avoid frequent reporting. This cannot be left to UE implementation.
* Samsung suggests to revise as " Except for the first report, UE reports are triggered only if relaxation status (i.e., whether relaxation criterion is met or not) toggles. UE triggers the first report when relaxation criterion is met."
* Continue online
* Except for the first report, UE reports are triggered only if relaxation status (i.e., whether relaxation criterion is met or not) toggles. UE triggers the first report when relaxation criterion is first met since configured (further check if there is anything to fix when drafting the running CR)

Proposal 6. [Easy] (20/20) Define a Rel-17 indicator similar to combineRelaxedMeasCondition-r16. This indication is used to differentiate two cases 1) only stationary criterion is met and 2) both criteria (stationary and not-at-cell-edge) are met, when both criteria are configured.

* Agreed

Proposal 7. [Easy] (18/20) Do not configure whether UE to use SSB-based or CSI-RS-based measurement for stationary criterion in RRC\_CONNECTED.

* HW would like to clarify/confirm the intention is “RedCap UE cannot used CSI-RS-based measurement for stationary criterion”, if this add it's ok otherwise want to flag P7.
* HW suggests to revise as "Do not configure whether UE to use SSB-based or CSI-RS-based measurement for stationary criterion in RRC\_CONNECTED. RedCap UE cannot use CSI-RS-based measurement for stationary criterion in RRC\_CONNECTED."
* Continue online
* RedCap UE cannot use CSI-RS-based measurement for stationary criterion in RRC\_CONNECTED.

Proposal 8. [Easy] (19/20) RRC Release message is not used to configure RRM relaxation for IDLE/INACTIVE UE.

* Agreed

Proposal 9. [Easy] (18/20) Do not discuss the issue related to CGI reading requirement.

* Agreed

Proposal 10. [Easy] (20/20) Introduce a separate reference Srxlev value, SrxlevRef-Stationary, for evaluating the R17 stationary criterion.

* Agreed

Proposal 11. [Easy] (19/20) No need to specify any restriction (e.g., not evaluate stationary criterion / not report relaxation status) in specification, in case SpCell RSRP is not lower than s-MeasureConfig. It is left to UE implementation.

* Agreed

Agreements via email - from offline 104:

1. If UAI-based report is adopted, 1-bit indication (i.e., whether UE meets stationary criterion or not) is sufficient for UE to report its relaxation status.
2. Define a Rel-17 indicator similar to combineRelaxedMeasCondition-r16. This indication is used to differentiate two cases 1) only stationary criterion is met and 2) both criteria (stationary and not-at-cell-edge) are met, when both criteria are configured.
3. RRC Release message is not used to configure RRM relaxation for IDLE/INACTIVE UE.
4. Do not discuss the issue related to CGI reading requirement.
5. Introduce a separate reference Srxlev value, SrxlevRef-Stationary, for evaluating the R17 stationary criterion.
6. No need to specify any restriction (e.g., not evaluate stationary criterion / not report relaxation status) in specification, in case SpCell RSRP is not lower than s-MeasureConfig. It is left to UE implementation.

Agreements online:

1. Except for the first report, UE reports are triggered only if relaxation status (i.e., whether relaxation criterion is met or not) toggles. UE triggers the first report when relaxation criterion is first met since configured (further check if there is anything to fix when drafting the running CR)
2. RedCap UE cannot use CSI-RS-based measurement for stationary criterion in RRC\_CONNECTED.

For online discussion:

Proposal 1. [Discussion] (14/20) UAI is used for UE to report its relaxation status.

Proposal 4. [Discussion] (12/20) If UAI is used to report relaxation status, no prohibit timer is needed.

Proposal 5. [Discussion] (16/20) Rel-17 RRM relaxation can apply to any Rel-17 UE.

[R2-2201752](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201752.zip) [offline-104] RRM relaxations - second round Samsung discussion Rel-17 NR\_redcap-Core

For more discussion:

Proposal 2-1. [Discussion] (14/20) UAI is used for UE to report its relaxation status.

* Agreed

Proposal 2-2. [Discussion] (16/20) If UAI is used to report relaxation status, no prohibit timer is needed.

* Nokia thinks we would still need a prohibit timer. Ericsson initially had the same view as Nokia but now thinks this is no longer needed based on the decisions that UE reports are triggered only if relaxation status toggles
* Continue in the next meeting

Proposal 2-3. [Discussion] (16/20) Rel-17 RRM relaxation can apply to any Rel-17 UE.

* Huawei wonders about impacts on other WIs
* Continue in the next meeting

Agreements:

1. UAI is used for UE to report its relaxation status

[R2-2200191](file:///C:\Data\3GPP\Extracts\R2-2200191%20Remaining%20issues%20on%20RRM%20relaxations.docx) Remaining issues on RRM relaxation Qualcomm Incorporated discussion Rel-17 NR\_redcap-Core

[R2-2200250](file:///C:\Data\3GPP\Extracts\R2-2200250%20-%20Discussion%20on%20RRM%20relax.doc) Discussion on RRM relax OPPO discussion Rel-17 NR\_redcap-Core

[R2-2200288](file:///C:\Data\3GPP\Extracts\R2-2200288%20Open%20issues%20on%20RRM%20measurement%20relaxation.docx) Open issues on RRM measurement relaxation Intel Corporation discussion Rel-17 NR\_redcap

[R2-2200467](file:///C:\Data\3GPP\Extracts\R2-2200467%20%20Discussion%20on%20RRM%20measurement%20relaxation%20for%20redcap.doc) Discussion on RRM measurement relaxation for redcap Beijing Xiaomi Mobile Softwar discussion

[R2-2200555](file:///C:\Data\3GPP\Extracts\R2-2200555%20RRM%20measurement%20relaxation%20for%20RedCap%20UE.doc) RRM measurement relaxation for RedCap UE Huawei, HiSilicon discussion Rel-17 NR\_redcap-Core

[R2-2200598](file:///C:\Data\3GPP\Extracts\R2-2200598_RRM%20relaxation%20for%20neighboring%20cell.docx) RRM relaxation for neighboring cell vivo, Guangdong Genius discussion Rel-17 NR\_redcap-Core

[R2-2200610](file:///C:\Data\3GPP\Extracts\R2-2200610%20Further%20discussion%20on%20RRM%20relaxation%20for%20RedCap%20UE.docx) Further discussion on RRM relaxation for RedCap UE ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[R2-2200667](file:///C:\Data\3GPP\Extracts\R2-2200667%20Remaining%20issues%20in%20RRM%20relaxation.DOC) Remaining issues in RRM relaxation LG Electronics Inc. discussion Rel-17 NR\_redcap-Core

[R2-2200687](file:///C:\Data\3GPP\Extracts\R2-2200687.doc) Further Discussion on RRM Relaxations CATT discussion Rel-17 NR\_redcap-Core

[R2-2201088](file:///C:\Data\3GPP\Extracts\R2-2201088%20On%20the%20need%20for%20a%20separate%20reference%20Srxlev%20value%20for%20evaluating%20R17%20stationary%20criterion%20for%20RRM%20relaxation.docx) On the need for a separate reference Srxlev value for evaluating R17 stationary criterion for RRM relaxation Futurewei Technologies discussion Rel-17 NR\_redcap-Core

[R2-2201101](file:///C:\Data\3GPP\Extracts\R2-2201101%20On%20a%20timing%20issue%20when%20both%20R16%20low%20mobility%20and%20R17%20stationary%20criteria%20are%20configured%20on%20a%20UE.docx) On a timing issue when both R16 low mobility and R17 stationary criteria are configured for a UE Futurewei Technologies discussion Rel-17 NR\_redcap-Core

[R2-2201239](file:///C:\Data\3GPP\Extracts\R2-2201239%20RRM%20relaxation%20for%20RedCap%20UEs.docx) RRM relaxation in RRC\_CONNECTED for RedCap UEs Sharp discussion [R2-2110287](file:///C:\Data\3GPP\archive\RAN2\RAN2%23116\Tdocs\R2-2110287.zip)

[R2-2201337](file:///C:\Data\3GPP\Extracts\R2-2201337.docx) Open issues on RRM relaxations DENSO CORPORATION discussion Rel-17 NR\_redcap-Core

[R2-2201493](file:///C:\Data\3GPP\Extracts\R2-2201493%20On%20RRM%20relaxation%20for%20REDCAP%20UE.docx) On RRM relaxations for REDCAP Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2201494](file:///C:\Data\3GPP\Extracts\R2-2201494%20On%20RRM%20relaxation%20in%20CONNECTED.docx) On RRM relaxations in CONNECTED Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_redcap-Core

[R2-2201558](file:///C:\Data\3GPP\Extracts\R2-2201558%20-%20Details%20on%20RRM%20relaxation.docx) Details on RRM relaxation Ericsson other Rel-17 NR\_redcap-Core

## 8.19 Coverage Enhancements

(NR\_cov\_enh-Core; leading WG: RAN1; REL-17; WID: [RP-211566](file:///C:\Data\3GPP\archive\RAN\RAN%2392\Tdocs\RP-211566.zip))

Time budget: 0.5

Tdoc Limitation: 1 tdoc

Common aspects related to RACH indication (in MSG1) / RACH partitioning shall be submitted to 8.18

### 8.19.1 Organizational

Rapporteur input, incoming LS etc.

LSs from RAN1 on higher-layer impacts related to all Rel-17 WIs

[R2-2200095](file:///C:\Data\3GPP\Extracts\R2-2200095_R1-2112977.docx) LS on updated Rel-17 LTE and NR higher-layers parameter list (R1-2112977; contact: Ericsson) RAN1 LS in Rel-17 NR\_feMIMO, NR\_ext\_to\_71GHz, NR\_IIOT\_URLLC\_enh, NR\_NTN\_solutions, NR\_pos\_enh, NR\_redcap, NR\_UE\_pow\_sav\_enh, NR\_cov\_enh, NR\_IAB\_enh, NR\_SL\_enh, NR\_MBS, NR\_DSS, LTE\_NR\_DC\_enh2, NR\_RF\_FR1\_enh, NR\_SmallData\_INACTIVE, NB\_IOTenh4\_LTE\_eMTC6, LTE\_NBIOT\_eMTC\_NTN, LTE\_terr\_bcast\_bands\_part1 To:RAN2, RAN3 Cc:RAN4

Running CRs

[R2-2200515](file:///C:\Data\3GPP\Extracts\R2-2200515_Running%2038300%20CR%20for%20NR%20coverage%20enhancements.docx) Running 38300 CR for NR coverage enhancements China Telecom draftCR Rel-17 38.300 16.8.0 B NR\_cov\_enh-Core

* LGE thinks the CR has some information on CFRA both in the normative part and in the editor's note. The part in the normative text needs to be removed. HW agrees
* offline discussion to check and endorse the CR

[R2-2200602](file:///C:\Data\3GPP\Extracts\R2-2200602%20Running%2038.321%20CR%20for%20NR%20coverage%20enhancement.docx) Running 38321 CR for NR coverage enhancements ZTE Corporation draftCR Rel-17 38.321 16.7.0 B NR\_cov\_enh-Core

* ZTE reports that only the handling of the contention resolution time is covered and wonders about the inclusion of TPs suggested in other contributions.
* VC confirms that applicable TPs can be added to the running CR.
* offline discussion to check and endorse the CR

[R2-2201616](file:///C:\Data\3GPP\Extracts\R2-2201616%20RRC%20running%20CR%20for%20CE.docx) RRC running CR for CE Huawei, HiSilicon draftCR Rel-17 38.331 16.7.0 B NR\_cov\_enh-Core

* vivo thinks the running CR also covers the RACH partitioning aspects but they should be removed and put in the running CR for common RACH aspects. Ericsson and ZTE agree.
* offline discussion to check and endorse the CR

### 8.19.2 General

RAN2 impact tech proposals.

Note: Agreements from RACH indication and partitioning session:

1. CE will also be considered as part of the feature combination for each RACH partition. The eligibility criteria for CE will be determined before the RACH partition selection is performed. [CB need to confirm that it is compatible with the CE agreements]
2. FFS Switching from non-CE to CE is not allowed if both are not configured (NOTE that the UE cannot switch between RACH feature partitioning)

[R2-2200192](file:///C:\Data\3GPP\Extracts\R2-2200192%20Issues%20on%20coverage%20enhancements.docx) Issues on coverage enhancements Qualcomm Incorporated discussion Rel-17 NR\_cov\_enh-Core

- Fallback

Proposal 1. From CE’s perspective, UE can switch to coverage-enhanced RACH after failing a configured number of Msg3 transmissions using legacy CBRA, if it meets the latter’s RSRP requirement.

* Xiaomi thinks feature selection is performed after BWP selection otherwise we don't need to further discuss this
* Huawei thinks that from CE perspective there is some benefit to provide fallback and we should discuss how to handle this in the common RACH session.
* Ericsson thinks can be beneficial but tricky to make consistent in the overall approach discussed in the common RACH session and would then be fine not to have it.
* IDC does not support this due to the complexity to support this and also doubts about the benefits. LGE/CATT agree. Also Nokia agrees.
* ZTE understand QC point to make a decision only considering the CE aspects but this is very difficult to implement this in MAC so we can avoid enhancements for this (corner) case.
* Non-CE to CE fallback is not supported in Rel-17.

Proposal 2. After UE fallbacks to coverage-enhanced RACH, FFS whether UE is limited to the remaining number of Msg1 retransmissions or start a fresh new RACH.

Proposal 3. From UE’s perspective, if UE’s active BWP does not contain resources for CE-RACH, then UE is not allowed to fallback from legacy CBRA to CE-RACH configured in another BWP.

Proposal 4. If UE starts a RACH procedure with Msg3 repetition, then no fallback to other type of RACH is allowed.

Proposal 5. UE can fallback from CFRA or 2-step RACH to CE-RACH, if CE-RACH is configured in the same BWP and UE meets the RSRP requirement of CE-RACH.

* vivo thinks p5 should not be agreed if p1 is not agreed.
* QC thinks that in fallback from CFRA or 2-step RACH to CBRA, RSRP threshold evaluation is considered, what would we do in this case? ZTE thinks that given the decision in the common RACH session that we don't have CE and non-CE RACH resources in a given RACH partition this proposal cannot work.
* UE cannot fallback from CFRA or 2-step RACH to CE-RACH.

- Joint channel estimation

Observation 1. Joint channel estimation (JCE) for PUSCH Tx, together with time domain window (TDW), is configured by RRC.

Observation 2. Network may configure multiple TDWs for a PUSCH repetition.

Observation 3. Within a TDW, UE needs to maintain consistent Tx power level and phase continuity within TDWs of a PUSCH transmissions enabled with JCE.

Proposal 6. When UE in a TDD system is configured with JCE and TDW(s), UE applies the following behaviors for DRX RTT timer and DRX reTx timer:

- UE starts DRX RTT timer only when a time domain window ends;

- UE starts DRX reTx timer upon expiry of DRX RTT timer, only if no TDW is active;

- UE stops DRX RTT timer or DRX reTx time, if running, when a TDW starts.

Agreements:

1. Non-CE to CE fallback is not supported in Rel-17
2. UE cannot fallback from CFRA or 2-step RACH to CE-RACH

[R2-2200603](file:///C:\Data\3GPP\Extracts\R2-2200603%20Remaining%20issues%20on%20Msg3%20repetition%20in%20CE.docx) Remaining issues on Msg3 repetition in CE ZTE Corporation, Sanechips discussion Rel-17 NR\_cov\_enh-Core

- Switch from non-CE to CE

Observation 1: If RACH common session decides to consider CE as part of the feature combination of RACH partitioning, then it is up to RACH common session to decide whether switch from non-CE to CE (e.g. RACH partition change) can be supported.

Observation 2: Supporting switch from non-CE to CE (based on CE RSRP threshold evaluation during each Msg1 retransmission) contradicts to the previous RAN2 agreement, because UE does not compare Msg3 repetition threshold with SSB’s RSRP.

Proposal 1: From CE perspective, switch from non-CE to CE upon Msg1 retransmission is not supported. If non-CE 4-step RA is selected, then the decision doesn’t change during the entire RACH procedure (i.e. until RACH failure).

Observation 3: RACH common session haven’t concluded the order of RACH-type selection and CE determination. Only if RACH-type selection is performed ahead of CE determination, there is need to discuss whether UE can evaluate CE when fallbacks from 2-step RA to 4-step due to reach msgA-TransMax.

Proposal 2: In case RACH common session concludes that RACH-type selection is performed ahead of CE determination, from CE perspective, UE can perform CE selection when after switching to 4-step RA upon reaching msgA-TransMax.

- CE only BWP

Observation 4: If only CE RACH resources are configured for a BWP, it means the network wants to the UE to only trigger CE RACH when the BWP is activated, in this case, Msg3 repetition RSRP threshold is not needed.

Proposal 3: RAN2 to select one of following options for CE RACH configuration:

• Option 1: Dedicated BWP with only CE RACH resources is not supported. When configures RACH resources in dedicated BWP, it must include RACH resources for non-CE.

• Option 2: Dedicated BWP with only CE RACH resources is supported, in this case, Msg3 repetition RSRP threshold is not configured, and UE should always trigger CE RACH when this BWP is activated.

- UE capability

Observation 5: RAN1 already defines 1 bit capability for indicating the support of Msg3 repetition.

[R2-2201598](file:///C:\Data\3GPP\Extracts\R2-2201598%20On%20msg3%20repetitions.docx) On Type A PUSCH repetitions for Msg3 Ericsson discussion Rel-17 NR\_cov\_enh

- CFRA related proposals

Proposal 3 CFRA for Msg3 (PUSCH scheduled by RAR) is only applicable to reconfiguration with sync.

Proposal 4 CFRA for Msg3 (PUSCH scheduled by RAR) can be enabled by the network signalling how the UE shall interpret RAR in the CFRA/RACH-ConfigDedicated configuration.

Proposal 5 Introduce a flag in CFRA configuration on how RAR shall be interpreted for CFRA.

Proposal 6 Take the RRC excerpt as a baseline for introducing Msg3 repetitions for CFRA.

[R2-2201617](file:///C:\Data\3GPP\Extracts\R2-2201617%20Remaining%20issues%20for%20CE.docx) Remaining issues on RAN2 support of Msg3 PUSCH repetition Huawei, HiSilicon discussion Rel-17 NR\_cov\_enh-Core

- CFRA issues

Proposal 1: From RAN2 perspective, Msg3 repetition is not applicable to 4-step CFRA.

Proposal 2: When CE RA is triggered for 4-step CBRA, during the RACH resource procedure, the UE shall bypass the 4-step CFRA resource selection and follow 4-step CBRA resource selections.

- Switch between CE RA and non-CE RA

Proposal 3: RAN2 confirms that it is feasible to configure either CE RACH resources only or non-CE RACH resources only on the selected UL BWP.

Proposal 4: In case only the CE RACH resource is configured on the selected UL BWP, the UE shall perform CE RA without evaluating RSRP.

Proposal 5: In case both CE and non-CE RACH resources are configured on the active UL BWP, if non-CE is selected, the UE is allowed to switch to CE RACH on selected UL BWP after several attempt failures, similar to 2-step to 4-step switch.

- Separate thresholds

Proposal 6: A new RSRP threshold is needed for the Msg3 repetition capable UE to perform carrier selection when NUL supports Msg3 repetition.

Proposal 7: The new RSRP threshold for the Msg3 repetition capable UE to perform carrier selection is configured per BWP, but the value applies to all the BWPs.

Proposal 8: The RSRP threshold for requesting Msg3 repetition should be configured per BWP, and is only present if both CE RACH resources and non-CE RACH resources are configured for the BWP.

Proposal 9: The separate SSB selection threshold for the UE who decides to requesting Msg3 repetition should be configured per BWP and is only configured for the BWP with CE RACH resources.

- Msg3 bundling transmission

Proposal 10: The bundling operation is applicable to Msg3 repetition, and the repetition number is determined from lower layer, similar to bundling of dynamic grant and configured grant.

* [AT116bis-e][111][CovEnh] general aspects (Qualcomm)

Initial scope: Continue the discussion on the remaining proposals in the submitted contributions

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

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

Initial deadline (for companies' feedback): Thursday 2022-01-20 2200 UTC

Initial deadline (for rapporteur's summary in R2-2201747): Friday 2022-01-21 0200 UTC

Updated scope: Continue the discussion on the remaining proposals in [R2-2201747](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201747.zip)

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

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

Updated deadline (for companies' feedback): Monday 2022-01-24 2000 UTC

Updated deadline (for rapporteur's summary in R2-2201758): Monday 2022-01-24 2200 UTC

Proposals marked "for agreement" in R2-2201758 not challenged until Tuesday 2022-01-25 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue during the GTW session on Tuesday).

[R2-2201747](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201747.zip) [offline-111] CovEnh general aspects Qualcomm discussion Rel-17 NR\_cov\_enh-Core

Proposals for agreements:

Proposal 3. (14/14) From CE perspective, it is confirmed that the eligibility criteria for CE is determined before the RACH partition selection is performed.

* HW thinks this inconsistent with the corresponding question: The question is about the order between RA type selection (i.e. not RACH partitioning) and CE determination. And our understanding is RA type selection is not RA partitioning selection, and it is performed in the selected RACH partition. Actually we think it is the common understanding in RACH partition discussions as summarized in P9 in R2-2200049 (to be confirmed). In order to avoid ambiguity, we may think it can be up to common RACH session or we can revert the proposal to reflect Option 2 that CE determination is performed before RA type selection (Proposal 9: RA-type selection can happen like today (i.e. after the carrier and BWP selection) based on the RACH parameters signalled in the selected RACH partition)
* ZTE shares the same view as HW, but tend to agree the current P3 is technically correct, the question(Q3) is asking "RA type selection", and RA-type selection is different from RACH partition selection, so it is better to align the wording in P3 and Q3 as in: " From CE perspective, it is confirmed that the eligibility criteria for CE is determined before the RA-type ~~RACH partition~~ selection is performed."
* QC thinks that most companies either prefer to leave the discussion to the common RACH session or think option 2 is aligned with what has been agreed in the common RACH session. And since the common RACH session needs our confirmation on the order of CE selection, I thought it would be more direct if the proposal can provide that confirmation. If there are objections P3 can capture the preference by the majority, i.e. leave the discussion to the common RACH session, as follows: "The order between CE selection and RA-type selection should be discussed in the common RACH session."
* Continue offline

Proposal 4. (12/15) CE-capable UEs use the legacy threshold, rsrp-ThresholdSSB-SUL, in its selection of UL carrier for RACH.

* HW still believe it is beneficial to have a separate threshold for flexible NW implementation, but we are fine with the majority given that it is also relevant to common RACH partitioning.
* Agreed

Proposal 5. (11/14) Working assumption: From RAN2’s perspective, a dedicted UL BWP can be configured with only CE RACH resources. Its feasibility is to be confirmed by RAN1.

* Agreed

Proposal 6. (13/13) Msg3 repetition is modelled in the same way as dynamically scheduled bundles in the MAC spec.

* Agreed

Proposals for further discussions:

Proposal 1. (7/15) Discuss further whether CFRA with Msg3 repetition should be supported from RAN2’s perspective.

* For P1/P2, ZTE is not sure RAN2 should continue the discussion, because RAN1 did not ask RAN2 to confirm the necessity. Considering the Working Assumption is made in RAN1, and RAN1 is still discussing the remaining issues, we prefer to leave the discussion to RAN1 (as commented by many companies). If anything needs to be done in RAN2, RAN1 will inform us by LS.
* Regarding P1/P2, Ericsson thinks this should be discussed in RAN2 also based on what is captured in RAN1 feature lead notes: "The current situation is the majority support to confirm the working with the understanding that no RAN1 impact and RAN1 optimization. Whether/how it would impact RAN2 specification can be discussed in RAN2. On the other hand, a couple of companies prefer not confirm now. Based on current situation, FL would like to pause the discussion for now to wait a bit for the discussion in RAN2 and also other open issues."
* Continue offline

Proposal 2. (7/14) Postpone discussion on method(s) for enabling CFRA with Msg3 repetition.

* Continue offline

Proposal 7. (8/14) Configuration granularity of the RSRP threshold for requesting Msg3 repetition should be discussed in the common RACH session.

* HW thinks almost all the companies agree with the intention that the RSRP threshold for requesting Msg3 repetition can be configured per carrier, and the concern is mainly about the granularity that can be basis of RACH partition, not BWP. Given that common RACH partitioning is supposed to discuss the configurations, we think it would be beneficial to indicate our understandings on how this threshold can be used from CE perspective. With that being said, we think the proposal can be revised to something like: "The RSRP threshold for requesting Msg3 repetition can be configured per carrier, but configuration granularity of the RSRP threshold for requesting Msg3 repetition should be discussed in the common RACH session."
* ZTE thinks the addition on P7 suggested by HW may not be needed, because RAN2 already made the following agreement in last RAN2 meeting: "Confirm Msg3 repetition is supported on both NUL and SUL, and network can configure different RSRP thresholds for requesting Msg3 repetition on NUL and SUL."
* For P7/P8, ZTE also thinks that the common RACH session will only discuss the design for initial access on initial BWP, they will not discuss RACH procedures on dedicated BWP (because no RACH partition is needed on dedicated BWP), but CE can be triggered on dedicated BWP. So even if RACH common session makes decision, we think in CE session, we still need to discuss whether a common or per-BWP level threshold will be configured for dedicated BWPs. But we are fine to postpone the discussion after RACH common session makes conclusion.
* QC disagrees with ZTE comment above: we understand that RACH partition can be configured and used in dedicated BWP as well (e.g. slicing + CE). There should be no restriction that they are only used for initial access.
* Continue offline

Proposal 8. (8/14) SSB selection threshold for UE to request Msg3 repetition should be discussed in the common RACH session.

* Continue offline

Agreements via email - from offline 111:

1. CE-capable UEs use the legacy threshold, rsrp-ThresholdSSB-SUL, in its selection of UL carrier for RACH.
2. Msg3 repetition is modelled in the same way as dynamically scheduled bundles in the MAC spec.

Working assumption:

1. From RAN2’s perspective, a dedicated UL BWP can be configured with only CE RACH resources. Its feasibility is to be confirmed by RAN1.

[R2-2201758](file:///C:\Data\3GPP\RAN2\Inbox\R2-2201758.zip) [offline-111] CovEnh general aspects - second round Qualcomm discussion Rel-17 NR\_cov\_enh-Core

Proposals for agreement

Proposal 2. From CE’s perspective, it does not matter whether UE first selects RA type or CE when initiating a RACH procedure.

* Agreed

Proposal 3. From CE’s perspective, it is confirmed that the eligibility criteria for CE is determined before the selection of RACH partition.

* Agreed

Proposal 4. From CE’s perspective, the RSRP threshold for requesting Msg3 repetition can be configured per BWP on both NUL and SUL.

* Agreed

Proposal 5. When CE is configured in RACH partitions, the configuration granuality for the RSRP threshold for requesting Msg3 repetition should be decided by the common RACH session.

* Agreed

Proposal 6. From CE’s perspective, CE RACH can be configured with a separate RSRP threshold for SSB selection and this threshold can be configured per BWP.

* Agreed

Proposal 7. When CE is configured in RACH partitions, the configuration granularity for the RSRP threshold for SSB selection in a CE RACH procedure should be decided by the common RACH session.

* Agreed

Agreements via email - from offline 111 - second round

1. From CE’s perspective, it does not matter whether UE first selects RA type or CE when initiating a RACH procedure.
2. From CE’s perspective, it is confirmed that the eligibility criteria for CE is determined before the selection of RACH partition.
3. From CE’s perspective, the RSRP threshold for requesting Msg3 repetition can be configured per BWP on both NUL and SUL.
4. When CE is configured in RACH partitions, the configuration granuality for the RSRP threshold for requesting Msg3 repetition should be decided by the common RACH session.
5. From CE’s perspective, CE RACH can be configured with a separate RSRP threshold for SSB selection and this threshold can be configured per BWP.
6. When CE is configured in RACH partitions, the configuration granularity for the RSRP threshold for SSB selection in a CE RACH procedure should be decided by the common RACH session.

Proposals for further discussion

Proposal 1. Further discuss from RAN2’s perspective whether CFRA with Msg3 repetition should be supported in R17.

* Apple is not sure RAN2 can make any progress on this one. To save time, we think RAN2 can just wait for RAN1 final decision.
* Continue online

[R2-2200251](file:///C:\Data\3GPP\Extracts\R2-2200251%20CE.doc) Discussion on CE’s impact on UL carrier selection OPPO discussion Rel-17 NR\_cov\_enh-Core

[R2-2200269](file:///C:\Data\3GPP\Extracts\R2-2200269.docx) Considerations on requesting Msg3 repetition NEC Corporation discussion Rel-17 NR\_cov\_enh-Core

[R2-2200272](file:///C:\Data\3GPP\Extracts\R2-2200272%20%20Remaining%20issues%20related%20to%20coverage%20enhancement.doc) Remaining issues related to coverage enhancement Xiaomi discussion Rel-17

[R2-2200421](file:///C:\Data\3GPP\Extracts\R2-2200421%20Consideration%20on%20RAN2%20impacts%20of%20Msg3%20repetition.docx) Consideration on RAN2 impacts of Msg3 repetition CATT discussion Rel-17 NR\_cov\_enh-Core

[R2-2201177](file:///C:\Data\3GPP\Extracts\R2-2201177%20Further%20Discussion%20on%20RAN2%20Impacts%20of%20Msg3%20Repetition.docx) Further Discussion on RAN2 Impacts of Msg3 Repetition vivo discussion Rel-17 NR\_cov\_enh

[R2-2201426](file:///C:\Data\3GPP\Extracts\R2-2201426%20Remaining%20issues%20for%20supporting%20Msg3%20repetition.docx) Remaining issues for supporting Msg3 repetition LG Electronics Inc. discussion Rel-17 NR\_cov\_enh-Core

[R2-2201590](file:///C:\Data\3GPP\Extracts\R2-2201590%20RAN2%20aspects%20for%20Coverage%20Enhancement.docx) RAN2 aspects for Coverage Enhancement Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_cov\_enh-Core

## Summary

Agreed CRs

TBD

Approved LSs out

TBD

[POST116bis-e] Email discussions

* [Post116bis-e][101][RedCap] Stage 2 running CR (Nokia)

Scope: Update the Stage 2 running CR

Intended outcome: Endorsed Stage 2 running CR

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][102][RedCap] RRC running CR and list of open issues (Ericsson)

Scope: Update the RRC running CR and define the list of RRC open issues

Intended outcome: Endorsed RRC running CR and list of open issue

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][103][RedCap] 38.304 running CR and list of open issues (Ericsson)

Scope: Update the 38.304 running CR and define the list of 38.304 open issues

Intended outcome: Endorsed RRC running CR and list of open issue

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][104][RedCap] MAC running CR and list of open issues (vivo)

Scope: Update the MAC running CR and define the list of MAC open issues

Intended outcome: Endorsed RRC running CR and list of open issue

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][105][RedCap] 38.306 running CR and list of open issues (Intel)

Scope: Update the 38.306 running CR and define the list of open issues regarding UE capabilities

Intended outcome: Endorsed 38.306 running CR and list of open issues regarding UE capabilities

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][106][NTN] Stage 2 running CR (Thales)

Scope: Update the Stage 2 running CR

Intended outcome: Endorsed Stage 2 running CR

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][107][NTN] RRC running CR and list of open issues (Ericsson)

Scope: Update the RRC running CR and define the list of RRC open issues

Intended outcome: Endorsed RRC running CR and list of open issue

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][108][NTN] 38.304 running CR and list of open issues (ZTE)

Scope: Update the 38.304 running CR and define the list of 38.304 open issues

Intended outcome: Endorsed RRC running CR and list of open issue

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][109][NTN] MAC running CR and list of open issues (Interdigital)

Scope: Update the MAC running CR and define the list of MAC open issues

Intended outcome: Endorsed RRC running CR and list of open issue

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][110][NTN] 38.306 running CR and list of open issues (Intel)

Scope: Update the 38.306 running CR and define the list of open issues regarding UE capabilities

Intended outcome: Endorsed 38.306 running CR and list of open issues regarding UE capabilities

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][111][CovEnh] Stage 2 running CR (China Telecom)

Scope: Update the Stage 2 running CR

Intended outcome: Endorsed Stage 2 running CR

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][112][CovEnh] RRC running CR and list of open issues (Huawei)

Scope: Update the RRC running CR and define the list of RRC open issues

Intended outcome: Endorsed RRC running CR and list of open issue

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

* [Post116bis-e][113][CovEnh] MAC running CR and list of open issues (ZTE)

Scope: Update the MAC running CR and define the list of MAC open issues

Intended outcome: Endorsed RRC running CR and list of open issue

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2