3GPP TSG-RAN WG2 Meeting #123 [R2-2308962](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308962.zip)

Toulouse, France, August 21-25, 2023

Source: RAN2 Vice Chairman (Nokia)

Title: Agenda

## Organizational

Rel-18 CR Handling

- Current Plan: Rel-18 R2 Functional Freeze is Q4 2023, i.e. Rel-18 TSes need to be created at latest at this point in time.

- CRs for all Rel-18 WIs to be agreed at RAN2#124 (November 2023). Running Draft CRs need to be updated to be real CRs.

- Previously in-principle-agreed Rel-18 CRs (e.g. for TEI18 or WIs ending before November 2023) need to be updated towards the latest TS version and submitted for final CR agreement at RAN2#124 (CR editor / proponent need to do this).

- Such CRs do not need to be resubmitted to intermediate meetings before RAN2#124.

- Such CR may be superseded by revision due to correction, which is in-principle agreed (see bullet below). CR editor / proponent should be ready to handle such revisions.

- For WG meetings until functional freeze (including this) it is possible to maintain and revise Rel-18 CRs, also in-principle-agreed Rel-18 CRs, also for WIs with no TU budget (they are kept in the agenda for this purpose). It is better to fix issues now rather than wait for ASN.1 review.

- For revision proposals for Rel-18 CRs/DraftCRs, use TPs attached to discussion documents or DraftCRs (Includes current running Rel18 CRs or update of in-principle agreed Rel-18 CRs)

- CR editors / Rapporteurs are requested to continue even after close of their respective WIs to support maintenance related to their respective CR / WI.

Rel-18 RRC parameters and MAC CEs

- RRC parameters, including those requested by other groups, e.g. RAN1, are covered by WI-specific RRC CRs.

- MAC CE parameters, including those requested by other groups, e.g. RAN1, are covered by WI-specific MAC CRs

- For information see also [R2-2306732](C:\\Users\\terhentt\\Documents\\Tdocs\\RAN2\\RAN2_123\\R2-2306732.zip), LS on Signalling alternatives, from R2#122.

Rel-18 UE capabilities

- Handling in RAN2 is expected similar to Rel-17.

- For information see also [R2-2306810](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2306810.zip) Further Guidelines on UE capability definitions LS out, from R2#122.

Expected Outcomes

- EUTRA UE capabilities are covered in WI-specific CRs.

- NR UE capabilities are covered in Rel-18 common MegaCRs (38306 and 38331) covering all rel-18 WIs (end outcome).

- UE capabilities in LPP 37355 are covered in CR for the Positioning WI.

During the work on NR UE caps:

- In a Common Rel-18 Agenda Item (AI): RAN1 and RAN4 features are handled jointly under a common AI, with some explicit exceptions. Running UE cap MegaCRs are maintained for the parts handled in the common AI.

- In WI-specific Rel-18 Agenda Items: RAN2 features are handled per WI. Case-by-case, for selected WIs, RAN1 and RAN4 features handled specifically per WI. The outcomes are covered in WI-specific Running CRs (draft CRs). It is expected that WI-specific UE cap running CRs will be merged with the Running Mega CRs only at/after RAN2#124.

Tdoc limitations

Tdoc limitations doesn’t apply to Rapporteur Input, i.e.

- Assigned summary rapporteur input of the summary.

- Email / offline discussions outcomes by discussion rapporteur,

- WI rapporteurs input for WI planning etc,

- TS rapporteur input for TS maintenance.

- Contact Company of a LSin that triggers RAN2 action may submit one tdoc to facilitate the LS reply. This only applies to one of the contact companies in case there are several (default the first).

Tdoc limitations doesn’t apply to Input created at the meeting, revisions, assigned documents etc.

Tdoc limitations doesn’t apply to shadow / mirror CRs (Cat A), or In-Principle Agreed CRs.

Tdoc limitations applies to all other submitted tdocs (e.g. discussion tdoc and CR tdoc are counted as two).

RAN2 election

Chair, 1st Vice Chair, and 2nd Vice Chair are to be elected.

- See 3GPP web page, where Candidate Nomination information is posted.

- Elections are handled in the Main Room and by electronic voting, and is done in the following order: Chair, 1st Vice Chair, 2nd Vice Chair.

- Nominations may be made up to the point when an election takes place.

Chair election:

- Chair Candidate nominations are confirmed Monday Morning. If more than one candidate is nominated (at present there are two candidates), voting for Chair will take place starting Tuesday, pl see the schedule

1st Vice Chair election:

- Once Chair has been elected (likely Tuesday), 1st Vice Chair Candidate Nominations are confirmed. If more than one candidate is nominated (at present there is only one candidate), voting will take place starting Wednesday. In case only one candidate stands he/she can be elected immediately by acclamation.

2nd Vice Chair election:

- Once 1st Vice Chair has been elected, 2nd Vice Chair Candidates Nominations are confirmed. If more than one candidate is nominated (at present there are three candidates), voting will take place starting Wednesday.

- If further voting rounds for Vice Chair are needed, they will take place Thursday and will be added to the schedule.

- See also the Meeting Schedule, and particular instructions for the voting tool.

**Deadline 1 (discussions for Thu online)**

* **Comment deadline:** Thursday W1, 0900 local time (for collecting views)
* **Rapporteur proposed outcome:** Thursday, 1200 local time (proposed outcome)
* **Document deadline:** 1h before session (discussion report)

**Deadline 2 (LS/CR approval via email):**

* **Comment deadline:** Friday, 0800 local time (for wording proposals)
* **Rapporteur proposed outcome:** EOM (approved LS or agreed CR)

**Organizational**

* [AT123][200] Organizational – LTE legacy, XR, QoE and MUSIM (RAN2 VC)

Scope:

* + - Share plans for the meetings and list of ongoing email discussions for the sessions
    - Share meetings notes and agreements for review and endorsement
    - Flag LSs and in-principle agreed CRs for discussion

      Intended outcome:

* + - General information sharing about the sessions

**Post-meeting email discussions**

**AT-meeting offline (F2F) discussions (none started before online session)**

**Dates and deadlines – Technical Meeting (see also RP-230050)**

Friday August 11th 1000 UTC **General Tdoc Submission Deadline**.

**Elections**

Elections are handled in the Main Room and by electronic voting, and is done in the following order: Chair, 1st Vice Chair, 2nd Vice Chair. Nominations may be made up to the point when an election takes place.

**- Chair election:** Chair Candidate nominations are confirmed Monday Morning. If more than one candidate is nominated (at present there are two candidates), voting for Chair will take place on Tuesday, one or two rounds, see the schedule below (in the unlikely case of > two candidates, a third round may be added to the schedule at Wednesday morning coffee break if needed).

**- 1st Vice Chair election:** Once Chair has been elected (likely: Tuesday), 1st Vice Chair Candidate Nominations are confirmed. If more than one candidate is nominated (at present there is only one candidate), voting will take place on Wednesday. In case only one candidate stands he/she can be elected immediately by acclamation.

**- 2nd Vice Chair election:** Once 1st Vice Chair has been elected, 2nd Vice Chair Candidates Nominations are confirmed. If more than one candidate is nominated (at present there are three candidates), voting will take place starting Wednesday.

- If further voting rounds for Vice Chair are needed, they will take place Thursday and will be added to the schedule.

**RAN2-122 Session Schedule**

NOTE that this schedule may be modified on short notice.

Some Expectations: Details may be added every day. The Schedule for CBs on Thursday (and Friday) will be updated on Wednesday, and the schedule for CBs on Friday will be further updated on Thursday.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Main room** | **Brk 1 room** | **Brk 2 room** | **Brk 3 room** |
| **Monday August 21** | | | | |
| 09:00 – 10:30 | [1], [2], [2.5] Elections  [3],  [7.0] R18 common:  - UE caps and RRC  20-35 min  NR1516 CP (Johan)  - Common  - [5.1.1] Stage-2  - [5.1.3.1] RRC  - [5.1.3.2] UE cap  - [5.1.3.3] Other  NR17 (Johan)  - Common  - [6.1.3.2] UE cap  If time (not much expected) will continue NR17 common in the following order:  [6.1.1][6.1.3.1][6.1.3.3]  General, SDT, Redcap, IIOTURLLC, MGE, MBS, feMIMO, 71GHz, QoE, CovEnh, ePowSav, Slicing | Breakout to start after formal opening of meeting in main room  NR18 fCovEnh [0.5] (Eswar) | Breakout to start after formal opening of meeting in main room:  NRLTE1516 Pos (Nathan)  - 5.3.1, 5.3.3  NR17 Pos (Nathan)  - 6.4.1, 6.4.2  Pos TEI18 (Nathan)  - 7.24.1, 7.24.2 |  |
| 11:00 – 13:00 | NR18 XR [2] (Tero), could possibly start earlier TBD  - 7.5.1: Organizational (LSs, work plan, SA2/4 status, running CRs)  - 7.5.4.1: DSR details (e.g. [R2-2307942](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307942.zip), [R2-2307197](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307197.zip)), BSR table details (e.g. [R2-2308587](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308587.zip), [R2-2307789](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307789.zip))  - 7.5.4.3: CG impacts (e.g. [R2-2308672](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308672.zip), [R2-2307790](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307790.zip))  - 7.5.3: SFN wrap-around (e.g. [R2-2307077](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307077.zip)) |
| 14:30 – 16:30 | NR18 Closed WIs early items  IDC (Yi)  - [R2-2307651](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307651.zip) (P1 uwb), [R2-2308225](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308225.zip) (sidelink), [R2-2307767](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307767.zip) (LS to CT1)  NCR(Sasha)  - [R2-2307469](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307469.zip)  - Corrections to be handled via respective AT-meeting email diskussions  NR17 (Johan)  - Common Continuation (but postpone UP related parts to not conflict w Dianas session). | NR151617 UP (Diana)  NR18 MT-SDT [0.5] (Diana)  7.18.1 Organizational  7.18.2 Control plane (focus on critical open issues)  7.18.3 User Plane (focus on critical open issues)  UE capabilities | NRLTE1516 V2X/SL (Kyeongin)  NR17 SL (Kyeongin) |
| 17:00 – 19:00 | NR18 MIMO evo [0.75] (Erlin)  - 7.20.1  - 7.20.2 (starting from [R2-2307317](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307317.zip))  - 7.20.3 | 17:00-17:30 EUTRA17+ (Tero)  - 4.1: NB-IoT ([R2-2307514](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307514.zip)), *altFreqPriorities* ([R2-2308760](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308760.zip), [R2-2308762](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308762.zip)), UAV ([R2-2307631](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307631.zip)),  17:30-19:00 MUSIM  - 7.17.1: Running CRs  - 7.17.2: Early indication (e.g. [R2-2308243](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308243.zip), [R2-2307450](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307450.zip)), reactive/proactive procedures (e.g. [R2-2307774](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307774.zip), [R2-2307691](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307691.zip)), using timers (e.g. [R2-2308789](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308789.zip), [R2-2307691](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307691.zip))  - 7.17.4: Gap priority handling (e.g. [R2-2308790](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308790.zip), [R2-2307452](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307452.zip)) | NR18 SL evolution [1] (Kyeongin) |
| **Tuesday August 22** | | | | |
| 08:30 – 10:30 | NR18 feMob [2] (Johan)  - [7.4.1] LTM parts  - [7.4.2] LTM | NR18 eQoE [1] (Tero)  - 7.14.1: Work plan, running CRs, LS from SA4 ([R2-2307074](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307074.zip))  - 7.14.3: Buffer-level based RVQoE (e.g. [R2-2307835](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307835.zip), [R2-2308233](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308233.zip)), QoS flow IDs for all metrics (e.g. [R2-2307747](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307747.zip))  - 7.14.2: MBS QoE (e.g. [R2-2308354](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308354.zip), [R2-2308871](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308871.zip))  - 7.14.4: QoE for NR-DC (e.g. [R2-2307474](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307474.zip), [R2-2307968](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307968.zip))  IF time allows:  - 7.14.5: UE capabilities (e.g. [R2-2308073](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308073.zip), [R2-2308351](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308351.zip)) | NR17 (Nathan)  Pos  - 6.4.1 overflow if needed  SL Relay  - 6.2.1 CP (rapporteur summary)  - 6.2.2 UP |  |
| 11:00 – 13:00 | NR18 Mobile IAB [0.5] (Johan)  12 :00 :  NR17 NTN Maint (Sergio) | NR18 XR [2] (Tero)  - 7.5.2: UL jitter (e.g. [R2-2308330](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308330.zip), [R2-2308544](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308544.zip)), PSER measurement, (e.g. [R2-2307164](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307164.zip)), UL traffic periodicity signalling (e,g, [R2-2307472](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307472.zip)), BAT signalling (e.g [R2-2307346](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307346.zip))  - 7.5.4.2: PDU set discard details ([R2-2307349](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307349.zip)), PSI-based discard (e.g. [R2-2307953](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307953.zip))  - 7.5.5: UE capabilities (e.g. [R2-2308073](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308073.zip), [R2-2308351](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308351.zip)) | NR18 Pos [2] (Nathan)  - 7.2.1 Organisational  - 7.2.2 Sidelink positioning (email discussion, AI summary)  - 7.2.3 RAT-dependent integrity (start if possible) |
| 14:30 - | [2.5] Elections (*Voting for Chair: voting tool open 12:30 - 14:00*) |  |  |
| – 16:30 | NR18 LP WUS [0.5] (Johan)  - Short: Early items for offline prep.  NR17 Common (Johan), continuation (incl earlier postponed part) | Start after common session:  NR18 NTN enh [1] (Sergio) | Start after common session:  NR18 Pos [2] (Nathan)  - 7.2.3 RAT-dependent integrity  - 7.2.4 LPHAP (email discussion, AI summary)  - 7.2.5 RAN1 objectives |
| 17:00 | [2.5] Elections, if needed (*Voting for Chair 2nd round: voting tool open 15:30 - 16:55*) |  |  |
| – 19:00 | NR18 Other [2] (Johan)  - [7.25.1] | Start after common session:  NR18 UAV [1] (Diana)  - 7.8.1 Organizational  - 7.8.2 measurement reporting (focus on stage 3 details)  - 7.8.3 flight path reporting  - 7.8.5 BRID/DAA – LS from SA2 and related issues | Start after common session:  NR17 (Nathan)  - 6.2.1, 6.2.2 overflow if needed  NR18 SL relay [1.5] (Nathan)  - 7.9.1 Organisational  - 7.9.4 Multi-path (email discussion, AI summary) |
| **Wednesday August 23** | | | | |
| 08:30 – 10:30 | NR18 feMob [2] (Johan)  - [7.4.4]  - [7.4.3]  - [7.4.1] continue | NR18 Network Energy Saving [1] (Diana)  - 7.3.1 Organizational  - 7.3.2 DTX/DRX  -7.3.3 SSB-less | NR 18 MBS [0.75] (Dawid) |  |
| 11:00 – 13:00 | NR17  - Common (Johan), continuation.  NR18 TBD | NR18 Network Energy Saving [1] (Diana)  -7.3.4 Cell Reselection  - 7.3.5 Connected mode mobility  NR18 URLLC [0.5] (Diana) | NR17 SONMDT (HuNan) |
| 14:30 | [2.5] Elections (*Voting for Vice Chair: voting tool open 12:30 - 14:00)* |  |  |
| – 16:30 | NR18 Other [2] (Johan)  - [7.25.3]  - [7.25.2]  - [7.25.1] continuation | Start after common session:  NR18 RedCap [1] (Mattias) | Start after common session:  NR18 SONMDT [1] (HuNan) |
| 17:00 | [2.5] Elections (*Voting for Vice Chair: voting tool open 15:30 - 16:55)* |  |  |
| – 19:00 | NR18 AIML [1] (Johan) | Start after common session:  R18 IoT-NTN [1] (Sergio) | Start after common session:  NR18 SL relay [1.5] (Nathan)  - 7.9.2 UE-to-UE (AI summary)  - 7.9.3 Service continuity  - 7.9.5 DRX |
| **Thursday August 24** | | | | |
| 08:30 – 10:30 | CB NR151617 (Johan) | CB Tero 0830-09:30  R18 QoE  -7.14.4: NR-DC (continued)  - 7.14.5: UE capabilities (e.g. [R2-2308073](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308073.zip), [R2-2308351](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308351.zip))  CB Diana 09:30-10:30 | CB Kyeongin |  |
| 11:00 – 13:00 | NR18 TEI [1] (Johan, TBD Nathan) | CB Diana | CB Kyeongin |
| 14:30 – 16:30 | CB NR17 (Johan) | CB Sergio  (including AI 7.25.4)  R18 XR:  - Outcome of [201] (DSR MAC CE, [R2-2309002](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309002.zip))  - Outcome of [202] (LS on CG, [R2-2309005](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309005.zip))  - Outcome of [205] (PSI-based discard, [R2-2309003](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309003.zip))  - 7.5.3: Correction to agreements, DRX details (e.g. )  - 7.5.5: UE capabilities (e.g. [R2-2308073](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308073.zip), [R2-2308351](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308351.zip)) | CB Nathan |
| 17:00 – 19:00 | CB NR17 (Johan)  CB NR18 (Johan) | CB Tero  R18 MUSIM  - 7.17.4: Draft LS from [203] ([R2-2309001](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309001.zip))  - 7.17.2: Timer for capability restrictions (e.g. [R2-2308789](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308789.zip))  - 7.17.3: UE capability restrictions (e.g. [R2-2307540](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307540.zip), [R2-2307692](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307692.zip))  IF time allows:  - 7.17.4: Feature interactions (e.g. [R2-2308090](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308090.zip), [R2-2307542](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307542.zip)) | CB Nathan |
| **Friday August 25** | | | | |
| 08:30 – 10:30 | NR18 MIMO evo [0.75] (Erlin)  - late items and CBs.  CB Dawid | CB Mattias TBD | CB Nathan, Kyeongin TBD |  |
| 11:00 – 13:00 | CB Johan, Eswar TBD | CB Sergio | TBD  CB NR18 IDC [0] (Yi) |
| 14:30 – 16:00 | CB Johan | CB Tero  CB NR18 NCR [0] (Sasha) | CB HuNan |
| 16:00 – 17:00 | CB and conclusion (Johan) |  |  |  |

**Breaks**

Morning coffee: 10:30 to 11:00

Lunch: 13:00 to 14:30

Afternoon coffee: 16:30 to 17:00

**List of Offline Face to Face discussions**

Number Title Day/Time Place Coordinator

# 4 EUTRA Rel-17 and earlier

Only essential corrections. No documents should be submitted to 4. Please submit to 4.x

## 4.1 EUTRA corrections Rel-17 and earlier

(NB\_IOTenh4\_LTE\_eMTC6-Core; leading WG: RAN1; REL-17; WID: RP-211340)

(UPIP\_EN-DC\_UE; leading WG: RAN3; REL-17; WID: RP‑213669)

(LTE TEI17)

Essential corrections to LTE Rel-17 topics not covered by other agenda items.

(NB\_IOTenh3-Core; leading WG: RAN1; REL-16; started: Jun 18; Completed: June 20; WID: RP-200293); REL-15 and Earlier NB-IoT WIs are in scope but not listed explicitly (long list).

(LTE\_eMTC5-Core; LTE\_eMTC5-Core; leading WG: RAN1; REL-16; started: Jun 18; Completed: June 20; WID: RP192875;), REL-15 and Earlier eMTC WIs are in scope but not listed explicitly (long list).

(LTE\_feMob-Core; leading WG: RAN2; REL-16; started: Jun 18; Completed: June 20; WID: RP-190921);

(LTE\_terr\_bcast-Core, LTE\_DL\_MIMO\_EE-Core, LTE\_high\_speed\_enh2-Core; LTE TEI16 Non-positioning);

REL-15 and Earlier EUTRA WIs are in scope but not listed explicitly (long list), Except V2X and Sidelink WIs and Positioning WIs, which are adressed by AIs below.

NOTE that LTE corrections related to NR WIs or Joint NR LTE WIs should be submitted to NR AIs below.

NOTE that LTE corrections which are the same as an NR correction should be submitted to the respective NR AI (so the NR CR and LTE CR can be treated together).

This Agenda Item is treated in the EUTRA Breakout session

Online (Monday) (1) – MAC correction for IoT

Rel-14 NB-IoT MAC correction:

[R2-2307514](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307514.zip) MAC correction on drx-InactivityTimer for eMTC and NB-IOT UE Xiaomi CR Rel-17 36.321 17.5.0 1568 - F NB\_IOTenh4\_LTE\_eMTC6-Core

- Huawei is fine with the 2nd change but the 1st change is not what the highlighted agreement intends to do and would change UE behaviour.

- Samsung thinks the 1st change is not needed and there may already be UEs implemented using this. The end result is just UEs waking up too early.

- QC thinks the intent of 2nd change is correct but it can be interpreted in many ways. MTK also thinks the CR is not needed and has sympathy for QC view.

- Xiaomi thinks the sentence is not correct so we should fix it. 2nd change is Rel-16.

- ZTE is not sure we need to fix this as we have similar sentences.

* Not critical (for 1st change, nothing is broken but UE may have slightly worse power consumption), intent of 2nd change is correct but not enough support to do anything.
* 1st change is not pursued
* 2nd change can be considered in MAC rapporteur CR (Rel-16 onwards) in the next meeting.
* Postponed

Rel-16 cell reselection: Handling of altFreqPriorities at SI changes

[R2-2308760](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308760.zip) Correction on alternative cell reselection priority Google Inc. CR Rel-16 36.331 16.12.0 4949 - F TEI16

*1) In section 5.2.2.10 and 5.2.2.12, specify that an UE will check the altFreqPriorities is available or not and may apply the alternative cell reselection priority after it receives the SystemInformationBlocType3 and the SystemInformationBlockType5.*

*2) In section 5.3.8.7, specify that the UE will release the stored altFreqPriorities while it configured with dedicated cell reselection priority.*

- Lenovo thinks that for the 1st change , UE always checks store SI information at any subsequent SI updates. So the change is not needed. The 2nd change may be valid but not sure this is the right way to do this.

- Samsung agrees with Lenovo on 1st change. Thinks the scenario is no longer valid since it was for EN-DC cell reselection for the 2nd change.

- Ericsson thinks UE goes to CONNECTED in RNA anyway. For the 1st change, procedural text is already clear and it is intended to be stored. Lenovo thinks the field description already implies UE shall use the alternative frequency priorities.

* Not pursued (no support)

[R2-2308762](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308762.zip) Correction on alternative cell reselection priority Google Inc. CR Rel-17 36.331 17.5.0 4950 - A TEI16

* Not pursued (no support)

LTE Rel-15 UAV changes related to the NR Rel-18 UAV work:

[R2-2307631](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307631.zip) Correction to enable flightPathInfoAvailable indication when connected to 5GC Qualcomm Incorporated discussion Rel-15 LTE\_Aerial-Core

Chair question: Is this LTE TEI18 or related to the Rel-18 LTE-part of UAV WI?

- Nokia thinks this is not really Rel-15, it’s an extension. It’s also not in the scope of the Rel-18 LTE UAV WI. Huawei agrees. Samsung agrees. QC is fine with TEI18.

- NEC wonders if this is TEI18 since it relates to CN functionality.

- Lenovo thinks the flag could be also in ReconfigComplete and ResumeComplete – are those missing? QC clarifies these are not needed.

- Lenovo wonders if this is mandatory for UEs supporting UAV? QC clarifies it’s up to NW whether to query these and can discuss capability later.

* There is support to do this as LTE TEI18. CRs can be brought to next meeting. Should discuss how the UE capabilities are handled.

# 7 Rel-18

## 7.5 XR Enhancements for NR

(NR\_XR\_enh-Core; leading WG: RAN2; REL-18; WID: [RP-230786](https://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_99/Docs/RP-230786.zip))

Time budget: 2 TU

Tdoc Limitation: 6 Tdocs

### 7.5.1 Organizational

Including LSs and any rapporteur inputs (e.g. work plan, SA2/SA4 progress reports)

Running CR rapporteurs of MAC (Qualcomm), PDCP (LGE) and RRC (Huawei) specifications are requested to provide first versions running CRs as rapporteur input (which are not counted against the Tdoc limits), with the intent to have first endorsed versions of Stage-3 CRs after the meeting.

Online (Monday) (2) – LSs in “To”

RAN1 LS on capacity enhancements (i.e. work on multi-PUSCH etc.):

[R2-2307014](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307014.zip) LS on XR capacity enhancements (R1-2306233; contact: Ericsson) RAN1 LS in Rel-18 NR\_XR\_enh-Core To:RAN2

* Noted – details discussed together with contributions under 7.5.4.3

SA2 reply on use of TSCAI for non-GBR XR services:

[R2-2307064](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307064.zip) LS reply on TSCAI for XR (S2-2308197; contact: vivo) SA2 LS in Rel-18 XRM, NR\_XR\_enh-Core To:RAN2, RAN3

*Question: RAN2 has discussed the provision of assistance information from CN to RAN for XR services and is wondering whether TSCAI can be provided for both GBR and non-GBR QoS flows in case of XR.*

*SA2 Answer: for either GBR or non-GBR QoS flow, TSCAI can be provided to the RAN.*

* Noted – details discussed together with contributions under 7.5.2

Online (Monday) (3) – LSs in “Cc”

SA4 reply on XR awareness:

[R2-2307065](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307065.zip) Reply LS on the N6 PDU Set Identification (S2-2308199; contact: OPPO) SA2 LS in Rel-18 XRM To:SA4 Cc:RAN1, RAN2, RAN3

* Noted (RAN2 in CC, no actions)

[R2-2307066](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307066.zip) LS Reply on Design of RTP Header Extension for PDU Set handling (S2-2308248; contact: Huawei) SA2 LS in Rel-18 XRM, 5G\_RTP To:SA4, RAN3 Cc:RAN2

- LGE notes that QoS flow only includes PDU or PDU set but not both.

* Noted (RAN2 in CC, no actions)

[R2-2307067](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307067.zip) Non-homogeneous deployment of PDU Set based handling (S2-2308252; contact: Qualcomm) SA2 LS in Rel-18 XRM To:RAN3, CT4 Cc:RAN2

* Noted (RAN2 in CC, no actions)

Online (Monday) (1) – Work plan

Work plan:

[R2-2308334](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308334.zip) Work Plan for Rel-18 WI on XR Enhancements for NR Nokia, Qualcomm (Rapporteurs); Ericsson (RAN1 FL) Work Plan Rel-18 NR\_XR\_enh-Core

- Nokia notes that RAN1 is finishing in this meeting and RAN3 is starting their work in this meeting.

* Endorsed

Online (Monday) (2) – SA2/SA4 status

SA2/SA4 work status for XR:

[R2-2308335](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308335.zip) SA2 Status for XR Nokia, Qualcomm (Rapporteurs) discussion Rel-18 NR\_XR\_enh-Core

- OPPO wonders what SA2 decision on PSI-based PDCP discard means. Nokia clarifies this is only for gNB behaviour so no impact to RAN2 specs.

* Noted

[R2-2308336](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308336.zip) SA4 Status for XR Nokia, Qualcomm (Rapporteurs) discussion Rel-18 NR\_XR\_enh-Core

- LGE wonders why EDB uses 3 bits? Nokia clarifies that SA4 may not have taken RAN2 outcome into account, might change it afterwards to 1 bit. But only 1 value should be enough for Rel-18.

- Futurewei wonders if the 100 Mbps is the upper limit also for uplink, and it could be lower than for downlink? Also wonders if pose with 1 kbps is compatible with 10ms delay bound since UE might buffer up to 10 packets, so it’s not clear how the remaining time is defined.

* Noted

Online (Monday) (4) – Running CRs

Running CRs (Stage-2, MAC, RRC, PDCP):

[R2-2308337](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308337.zip) Stage 2 Overview of XR Enhancements Nokia, Qualcomm (Rapporteurs) draftCR Rel-18 38.300 17.5.0 B NR\_XR\_enh-Core

* Companies are encouraged to provide comments on the CR to rapporteur(s) already during the meeting (i.e. before any post-meeting email discussion)
* Two-week post-meeting email discussion to handle updates to the running CR

[R2-2307076](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307076.zip) TS 38321 running CR for XR enhancements Qualcomm Incorporated discussion Rel-18 NR\_XR\_enh-Core

* Companies are encouraged to provide comments on the CR to rapporteur(s) already during the meeting (i.e. before any post-meeting email discussion)
* Two-week post-meeting email discussion to handle updates to the running CR

[R2-2308696](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308696.zip) Introduction of XR to PDCP LG Electronics Inc. draftCR Rel-18 38.323 17.5.0 NR\_XR\_enh-Core

* Companies are encouraged to provide comments on the CR to rapporteur(s) already during the meeting (i.e. before any post-meeting email discussion)
* Two-week post-meeting email discussion to handle updates to the running CR

[R2-2308352](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308352.zip) Introduction of XR enhancements into TS 38.331 (running CR) Huawei, HiSilicon draftCR Rel-18 38.331 17.5.0 B NR\_XR\_enh-Core

* Companies are encouraged to provide comments on the CR to rapporteur(s) already during the meeting (i.e. before any post-meeting email discussion)
* Two-week post-meeting email discussion to handle updates to the running CR

Online (Monday) (1) – WI open issue list

[R2-2308353](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308353.zip) RRC CR open issues for XR enhancements Huawei, HiSilicon discussion Rel-18 NR\_XR\_enh-Core

* Noted (editor’s notes are already covered in the RRC CR)

Post-meeting email discussions (XR) (4) – Running CR(s)

* [Post123][211][XR] Stage-2 running CR for XR (Nokia)

Scope: Update 38.300 running CR based on this meeting’s agreements.

Intended outcome: Endorsed running CR

Deadline: Short (2 weeks)

* [Post123][212][XR] MAC running CR for XR (Qualcomm)

Scope: Update 38.321 running CR based on this meeting’s agreements.

Intended outcome: Endorsed running CR

Deadline: Short (2 weeks)

* [Post123][213][XR] PDCP running CR for XR (LGE)

Scope: Update 38.323 running CR based on this meeting’s agreements.

Intended outcome: Endorsed running CR

Deadline: Short (2 weeks)

* [Post123][214][XR] RRC running CR for XR (Huawei)

Scope: Update 38.331 running CR based on this meeting’s agreements.

Intended outcome: Endorsed running CR

Deadline: Short (2 weeks)

### 7.5.2 XR awareness

Including discussion on the contents of UAI for XR traffic assistance information from UE to network (e.g. jitter signalling details, whether periodicity is needed, PSI signalling, etc.)

Including discussion on use of TSCAI for XR (e.g. as per SA2 LS [S2-2308197](https://www.3gpp.org/ftp/tsg_sa/WG2_Arch/TSGS2_157_Berlin_2023-05/Docs/S2-2308197.zip)) and whether there are any RAN2 impacts

Including discussion on how/what network configures for the UE on XR awareness (e.g. PSI/PSIHI, UAI framework, etc.) and how network uses the UE information (e.g. padding BSR to detect EoDB etc.)

Online (Tuesday) (2) – Jitter signalling from UE

[R2-2308330](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308330.zip) Remaining Issues on XR awareness for UL Traffic CMCC discussion Rel-18 NR\_XR\_enh-Core

*Observation 1: in DL, only one of the parameters Burst Arrival Time or N6 Jitter Information may be provided for a given Traffic Flow, although the periodicity in included in the BAT parameter.*

*Observation 2: the UL BAT parameter is specified to notified to gNB via TSCAI from CN as the DL, which means that the BAT parameter is not always present and there will be some overlapping information between the BAT and the jitter related information.*

*Proposal 1: it is proposed that the UL jitter is defined as Jitter information associated with the Periodicity in uplink, although the UL jitter information is transmitted via UAI, not the TSCAI.*

- Samsung agrees with CMCC on P1. OPPO disagrees on periodicity since in normal cases gNB will get the information from CN. If UE reports the information there could be mismatch on the reported information. Intel agrees with P1 since it aligns with SA2 as well.

- Nokia agrees with P1. NEC supports P1 but wonders if BAT will be reported if no jitter information is reported? MTK supports the proposal and thinks UE should be able to report information elements independently. CMCC agrees information should be independent and we already agreed that.

- ZTE thinks jitter is not useful without BAT. vivo thinks that if we agree using BAT, why do we need the periodicity? Huawei thinks the information is semi-static and doesn’t change often. Thinks periodicity changes are not frequent and happen on AL anyway. Jitter is always needs BAT.

- Vodafone thinks periodicity comes from CN to RAN, and UE also gets it from CN. MTK thinks all the information are needed for different cases. CMCC thinks SA2 thinks N6 jitter will not be transferred when BAT is transferred. So gNB does not always have the information available. Lenovo agrees with MTK. Intel thinks the definitions need to be clear.

TS 23.501 -Table 5.27.2-1 on TSC Assistance Information (TSCAI)

|  |  |
| --- | --- |
| Assistance Information | Description |
| Flow Direction | The direction of the TSC flow (uplink or downlink). |
| Periodicity | It refers to the time period between start of two data bursts. |
| Burst Arrival Time (optional) | The latest possible time when the first packet of the data burst arrives at either the ingress of the RAN (downlink flow direction) or the egress of the UE (uplink flow direction). |
| Survival Time (optional) | Survival Time, as defined in TS 22.261 [2], refers to the time period an application can survive without any data burst. |
| Burst Arrival Time Window (BAT Window) (optional)  (NOTE 1) (NOTE 2) | Indicates the acceptable earliest and latest arrival time of the first packet of the data burst at either the ingress of the RAN (downlink flow direction) or the egress of the UE (uplink flow direction). |
| Capability for BAT adaptation (optional) (NOTE 1) | Indicates that the AF will adjust the burst sending time according to the network provided Burst Arrival Time offset (see clause 5.27.2.5). |
| N6 Jitter Information (optional)  (NOTE 3) | Jitter information associated with the Periodicity in downlink (see clause 5.378.1). |
| Periodicity Range (optional) (NOTE 4) | It indicates that the AF will adjust the periodicity and provides the acceptable range (which is formulated as lower bound and upper bound of the Periodicity) or acceptable Periodicity value(s) (which is formulated as a list of values for the Periodicity). |
| NOTE 1: Only one of the parameters (BAT Window or Capability for BAT adaptation) can be provided.  NOTE 2: The parameter can only be provided together with Burst Arrival Time.  NOTE 3: Only one of the parameters Burst Arrival Time or N6 Jitter Information may be provided for a given Traffic Flow.  NOTE 4: The Periodicity Range can only be provided together with Periodicity when Burst Arrival Time and Burst Arrival Time Window are present. | |

“*The DL periodicity associated N6 jitter indicates the positive or negative deviation of the arrival time of first packet of a Data Burst compared to the* ***ideal Data Burst start time*** *which is be determined based on the DL periodicity*”.

- Vodafone thinks UE shouldn’t report information that is not strictly speaking necessary or is not already provided. BT supports Vodafone. Wonders if UE is mandated to report or is the periodicity only optional? Intel thinks we should ask SA2 guidance one this. CMCC thinks UL depends on RAN2.

* 1: UE reports Burst Arrival time and Jitter associated with the UL data burst periodicity in uplink using UAI.
* UE reports UL data burst periodicity in uplink using UAI.
* All UAI fields for XR are optional fields in RRC. FFS how to handle persistency of signalled information (e.g. UE reports BAT first, then jitter).

*Proposal 2: the UL Jitter information can be defined as BAT offset, i.e., variation of burst arrival time for UL traffic resulting from UL jitter which value can be positive or negative.*

*Proposal 3: the range of UL Jitter information is better to be set as [-4, +4].*

* Consider exact jitter range later on (e.g. via email discussion)

*Proposal 4: the UL Jitter information can be optional, in case of the UL pose/control traffic.*

* UE can also report there is no jitter (e.g. for pose).

*Proposal 5: how to use the information of padding BSR to detect EoDB is gNB’s implementation and there is no need to define a new trigger for this purpose.*

[R2-2308544](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308544.zip) XR awareness InterDigital discussion Rel-18 NR\_XR\_enh-Core

*Proposal 1: RAN2 to discuss the following options for reporting of UL jitter range:*

*1) Periodic jitter reporting, where the UE is configured with a periodicity value.*

*2) Event triggered reporting, where the UE is configured with a threshold value which when exceeded triggers the UE to report the UL jitter range.*

- LGE thinks jitter is semi-static so we can just rely on sending the information once. OPPO agrees but thinks event-triggered could be fine. QC thinks periodic doesn’t make sense. We use UAI so it’s up to UE when to update the network. Intel agrees and thinks there could be some prohibit timers as well.

- Vodafone thinks the use case is about WLAN/BT being used in tethered mode. So the phone can move and the jitter can vary a lot so it’s not static. Network needs to know the jitter so a threshold-based reporting could be considered.

- CMCC agree with Vodafone and periodic is not useful but event-triggered could be fine. We can use UAI to update the jitter.

- IDT thinks we should define prohibit timer if we leave it up to UE implementation. Huawei

* Reuse UAI framework, e.g. network can configure when UE is allowed to report UAI. Exact triggering upon being configured and change of UAI is up to UE implementation. Network can configure prohibit timer for the reporting.

[R2-2308350](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308350.zip) Discussion on XR assistance information for UL Huawei, HiSilicon discussion Rel-18 NR\_XR\_enh-Core

* Jitter and data burst arrival time:*

*- UAI formats:*

*Proposal 1: Jitter range is reported using a single value. It should be possible to indicate at least the jitter range of [-1, 1] ~ [-8, 8] ms.*

*Proposal 2: Jitter range is reported with the granularity of 1ms.*

*Proposal 3: A choice structure comprising ReferenceTime IE and reference SFN/slot is designed for BAT reporting.*

*- Trigger conditions:*

*Proposal 4: A UE capable of providing jitter range may provide the information upon being configured and upon change of the measured jitter range.*

*Proposal 5: A UE capable of providing BAT may provide the information upon being configured and upon change of the BAT.*

*Proposal 6: A UE capable of providing BAT may provide the updated information when the gap between the newly measured BAT and the previous reported value exceeds a threshold configured by the network.*

*Proposal 7: Prohibit timers can be introduced for UL jitter and BAT report.*

* Other assistance information for UL:*

*Proposal 8: The traffic periodicity information is not included in the assistance information reported by the UE.*

Online (Tuesday) (1) – PSER measurement at UE

[R2-2307164](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307164.zip) PSER measurement and feedback CANON Research Centre France discussion Rel-18 NR\_XR\_enh-Core

*Observation 1: As the PDU Set identification information is not provided “in-band”, a gNB (i.e., the receiver for uplink) does not have access to the PDU Set identification information for uplink transmission of QoS flows.*

*Observation 2: A gNB cannot measure the PSER for a QoS flow transmission in uplink.*

*Observation 3: For PSER measurement at a UE, the reception status reports which are currently available at MAC, RLC, and PDCP layers may not be sufficient.*

*Proposal 1: UEs may be in charge of measuring the PSER for uplink transmission of QoS flows.*

*Proposal 2: Information related to uplink PSER measurement by a UE shall be provided to the gNB.*

*Proposal 3: For PSER measurement at a UE, the gNB may provide PDCP status reports to the UE.*

*Proposal 4: a PDCP status report for uplink PSER measurement may be generated and transmitted at an appropriate rate to facilitate PSER measurement and to limit the induced overhead.*

*Proposal 5: The network may configure a UE performing PSER measurement to provide feedback to the gNB at an appropriate rate.*

- QC thinks we haven’t needed this so far. We use PDU set information only. Not sure why this is useful. Apple thinks UE doesn’t report PER either.

- vivo thinks SA2 concluded this is useful. Can be used to evaluate whether the current service is performing well. CATT thinks the functionality is useful for gNB to monitor the performance. Thinks we need to address the issue somehow. gNB cannot monitor PSER in uplink. CMCC thinks that if we do some discarding, the peer entity will know anyway. Nokia thinks the only issue is in discard but we need to discuss the discard first.

* Noted

Online (Tuesday) (1) – UL traffic periodicity signalling from UE?

[R2-2307472](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307472.zip) Discussion on remaining issues of XR awareness NEC discussion Rel-18 NR\_XR\_enh-Core

*Observation 1 RAN may have knowledge on the periodicity for UL and DL traffic of the QoS Flow provided via TSCAI/TSCAC.*

*Observation 2 For DL, RAN may have knowledge on traffic jitter information (e.g., jitter range) associated with each periodicity of the QoS flow provided via TSCAI/TSCAC.*

*Proposal 1 RAN2 agree to include the periodicity of the UL traffic in the UL assistance information reported per QoS flow from UE.*

*Proposal 2 RAN2 agree to include UE assistance information available in the RRCSetUpComplete message*

*Proposal 3 RAN2 agree to configure a prohibition timer for UL assistance information provision.*

*Proposal 4 RAN2 agree to update RRC UAI framework to support one-shot report of UL PSI entry number and PSIHI per QoS flow for XR.*

Online (Tuesday) (1) – BAT signalling from UE

[R2-2307346](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307346.zip) Leftover issues on XR awareness CATT discussion Rel-18 NR\_XR\_enh-Core

*Observation 1: Padding BSR is not 100% reliable to detect EoDB*

*Observation 2: UTO-UCI provides an unambiguous indication that the EoDB has been reached for the current burst.*

*Proposal 1: In the case where CN does not provide the UL periodicity information to RAN for a QoS flow, RAN should be able to request the UE to measure it and report this information to RAN.*

*Proposal 2: The reported burst arrival time is the average arrival time of the traffic bursts and is defined in UAI by reusing the start time of a CG Type 1 configuration, namely: timeReferenceSFN, timeDomainOffset, startSymbol.*

*Proposal 3: The reported burst periodicity is the average periodicity of the traffic bursts and is defined in rational number.*

*Proposal 4: The reported jitter parameter is defined by the lower and upper bounds of the variation around its average value of the traffic burst periodicity, [-tmin, +tmax].*

*Proposal 5: Introduce a new field pduSetDiscarding in the IE PDCP-Config and, when configured:*

*• UE implements the enhanced PDCP timer for PDU Set discard*

*• UE discards all PDUs of a PDU Set when (any of) the PDCP discard timer(s) of the PDU Set expires*

*Proposal 6: Introduce a new field psi-basedDiscard in the IE PDCP-Config to activate PSI-based discarding in the UE and provide the PSI threshold to distinguish high and low importance PSIs.*

*Proposal 7: Capture in stage-2 that UTO-UCI of multi-PUSCH can be used as an implicit End of Data Burst indication in UL.*

*Proposal 8: When pduSetDiscarding is set/configured, UE informs gNB via PDCP control PDU every time it discards a PDU Set.*

[R2-2308874](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308874.zip) Discussion on XR awareness China Unicom discussion NR\_XR\_enh-Core

[R2-2308338](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308338.zip) Jitter and End of Data Burst Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_XR\_enh-Core

[R2-2307399](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307399.zip) Discussions on uplink End of Data Burst indication for XR Fujitsu discussion Rel-18 NR\_XR\_enh-Core

[R2-2307531](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307531.zip) Details of UAI for XR awareness in RAN ZTE Corporation, Sanechips discussion

[R2-2307728](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307728.zip) Discussion on XR awareness Samsung discussion Rel-18 NR\_XR\_enh-Core

[R2-2308586](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308586.zip) Discussion on XR awareness Ericsson discussion Rel-18 NR\_XR\_enh-Core

[R2-2307607](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307607.zip) Discussion on XR Awareness Facebook India discussion

[R2-2307295](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307295.zip) Discussion on XR awareness vivo discussion Rel-18 NR\_XR\_enh-Core

[R2-2307368](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307368.zip) Discussion on XR awareness Xiaomi Communications discussion

[R2-2307828](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307828.zip) Views on XR-Awareness Apple discussion NR\_XR\_enh-Core

[R2-2308023](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308023.zip) Discussion on PDU sets and data burst awareness in RAN Lenovo discussion Rel-18

[R2-2308074](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308074.zip) UE Assistance Information for XR Intel Corporation discussion Rel-18 NR\_XR\_enh-Core

[R2-2308127](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308127.zip) Discussion on XR awareness Spreadtrum Communications discussion Rel-18

[R2-2308155](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308155.zip) Considerations on awareness of XR PDU prioritization Sony discussion Rel-18 NR\_XR\_enh-Core

[R2-2308183](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308183.zip) Discussion on XR awareness OPPO discussion Rel-18 NR\_XR\_enh-Core

[R2-2308247](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308247.zip) On XR awareness Google Inc. discussion

[R2-2308401](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308401.zip) On UE assistance information for XR traffic MediaTek Inc. discussion Rel-18 NR\_XR\_enh [R2-2305897](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2305897.zip)

[R2-2308518](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308518.zip) Discussions on UE indicating EoDB to RAN for XR Futurewei discussion Rel-18 NR\_XR\_enh-Core

[R2-2308610](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308610.zip) Discussion on XR awareness LG Electronics Inc. discussion NR\_XR\_enh-Core

### 7.5.3 XR-specific power saving

Including signalling details of using rational number DRX cycles with XR

Including discussion on solutions for SFN wrap-around (e.g. how does the dedicated signalling of the SFN counter work)?

Online (Monday) (1) – Reference SFN

[R2-2307077](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307077.zip) Power saving enhancements for XR Qualcomm Incorporated discussion Rel-18 NR\_XR\_enh-Core

*Non-integer DRX cycles*

*Proposal 1. New DRX cycles in rational numbers are supported for both short and long DRX cycles.*

*Proposal 2. If short DRX cycle in rational number is configured, the length of the long DRX cycle shall be an integer multiple of the short DRX cycle, as in legacy.*

*Observation 1. There are different mathematical ways to implement modulo operations on rational numbers without rounding errors. And modern programming languages also can support such operations without rounding errors.*

*Proposal 3. In TS 38.321, capture the following changes for the case where the DRX cycle is in rational numbers:*

*- add floor operation to the legacy DRX formula;*

*- in a note, capture the requirement that the modulo operation should be implemented by a method that does not produce rounding errors. The exact method is up to UE implementation.*

*Proposal 4. In TS 38.331, specify a long DRX cycle in rational number as follows:*

*- Represent it by the corresponding frame rate in pair with its associated start offset, which has the range of 0~ [floor(1000 / frame rate) – 1];*

*- In its field description, specify the actual value of a long DRX cycle as the canonical representation of the reciprocal of its correspond frame rate, in unit of msec.*

*Proposal 5. Short DRX cycle in rational numbers can be captured in ASN.1 in the same way as specified in Proposal 4 for long DRX cycles.*

*Proposal 6. Ask SA4 to provide a set of frame rates that need to be supported in Rel-18.*

*SFN wrap-around*

*Observation 2. If maximum value of the counter is not specified, there can be inter-operability issue between different spec implementations.*

*Proposal 7. The maximum of the counter (NSFN) is RRC configured by network during DRX re-/configuration.*

*Proposal 8. Network sets DRX reference SFN (drx-ReferenceSFN) to either 0 or 512, in the same way as in Rel-16 IIoT.*

*Proposal 9. RAN2 discuss and select one of the following options:*

*- Option A: both the counter NSFN and the DRX reference SFN drx-ReferenceSFN are added to the DRX formula. NSFN is initialized to 0;*

*- Option B: only NSFN is added to the DRX formula. However, NSFN is initialized according to drx-ReferenceSFN as follows:*

*◦ If UE successfully receives RRC configuration in SFNUE, UE initializes NSFN to 1 if 0 ≤ SFNUE < 512 and drx-ReferenceSFN = 512;*

*◦ Otherwise, UE initializes NSFN to 0.*

- Huawei thinks the number of frame rates in Rel-18 is limited so is not sure we need to support non-integer values. Thinks using max value 25 is sufficient for Rel-18 and if configurability is necessary. Nokia wonders if we need a maximum value and even if we do, we could just have a fixed value and NW can reconfigure UE. vivo agrees. OPPO also agrees we can leave this to network. Can just use the Rel-16 mechanism. Samsung thinks the main intention is to allow network flexibility but is not sure that is needed. Can just specify a fixed value as well. Ericsson agrees with Nokia. MTK thinks it’s important to know how big the value can get so implementation can prepare for that.

- Huawei thinks we need to guarantee the range allows integer values.

* The maximum value of the counter (NSFN) is 2^16 = 65536.
* 8. Network sets DRX reference SFN (drx-ReferenceSFN) to either 0 or 512, in the same way as in Rel-16 IIoT.
* 9. Use the following option (option A): both the counter NSFN and the DRX reference SFN drx-ReferenceSFN are added to the DRX formula. NSFN is initialized to 0.

CB XR (Thursday) (1) – Correction to above agreements

Chair: Offline, it was noticed that since indexing starts from zero, the maximum counter value should be 2^16-1 = 65535 instead. Therefore, the agreement is modified accordingly

* The maximum value of the counter (NSFN) is 2^16 – 1 = 65535.

Online (Thursday) (1) – Other DRX aspects

*TBD*

[R2-2307119](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307119.zip) Discussion on C-DRX enhancements for XR Huawei, HiSilicon discussion Rel-18 NR\_XR\_enh-Core

[R2-2307296](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307296.zip) Analysis on SFN wrap around issue vivo discussion Rel-18 NR\_XR\_enh-Core

[R2-2307347](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307347.zip) Discussion on power saving CATT discussion Rel-18 NR\_XR\_enh-Core

[R2-2307369](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307369.zip) Discussing on XR-specific power saving Xiaomi Communications discussion

[R2-2307533](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307533.zip) XR-specific power saving ZTE Corporation, Sanechips discussion

[R2-2307704](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307704.zip) Discussion on various frame rates supported for XR-specific power III discussion

[R2-2307788](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307788.zip) DRX enhancements for XR Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_XR\_enh-Core

[R2-2307807](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307807.zip) Remaining issues on DRX enhancement for XR LG Electronics Inc. discussion Rel-18 NR\_XR\_enh-Core

[R2-2307829](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307829.zip) Views on Configurations of Rational Number-Based DRX Cycles Apple discussion NR\_XR\_enh-Core

[R2-2307891](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307891.zip) Discussion on DRX enhancement for XR ITRI discussion NR\_XR\_enh-Core

[R2-2307901](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307901.zip) Discussion on C-DRX enhancement for XR NEC Corporation discussion Rel-18 NR\_XR\_enh-Core

[R2-2308024](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308024.zip) Discussion of DRX enhancement Lenovo discussion Rel-18

[R2-2308184](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308184.zip) Discussion on XR-specific power saving OPPO discussion Rel-18 NR\_XR\_enh-Core

[R2-2308223](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308223.zip) Discussion on remaining issue of power saving scheme for XR Samsung discussion Rel-18 NR\_XR\_enh

[R2-2308278](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308278.zip) XR-specific power saving enhancement Google Inc. discussion

[R2-2308309](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308309.zip) Discussion on the DRX enhancement CMCC discussion Rel-18 NR\_XR\_enh-Core

[R2-2308402](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308402.zip) Remaining issues for C-DRX in XR MediaTek Inc. discussion Rel-18 NR\_XR\_enh

[R2-2308585](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308585.zip) Discussion on XR-specific power saving Ericsson discussion Rel-18 NR\_XR\_enh-Core

### 7.5.4 XR-specific capacity improvements

No documents should be submitted to 7.5.4. Please submit to 7.5.4.x

#### 7.5.4.1 BSR enhancements for XR

Including discussion on details for the delay status reporting (e.g. BSR format and values to be reported, how does the DSR work with the BSR, is there impact from intra-UE prioritization on the remaining time calculation, etc.)

Including discussion on how to define the static BSR table for XR (e.g. min/max of the table and steps between values etc.)

Online (Monday) (2) – DSR reporting details

[R2-2307942](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307942.zip) Delay information reporting for XR Lenovo discussion Rel-18 NR\_XR\_enh-Core

*Proposal 1: UE should include delay information, e.g. remaining delay budget, associated with data being available for transmission within a new XR-specific BSR.*

*Proposal 2: UE reports the shortest PDCP discard timer value of the PDUs belonging to a PDU set as the remaining time info for the PDU set.*

*Proposal 3: UE reports the shortest delay information, e.g. shortest remaining delay, per LCG.*

*Proposal 4: UE triggers a BSR including remaining timing information of the available PDU set:*

*• if the remaining time associated with a PDU set, e.g.PDCP discard timer value, is less than a threshold.*

*• UL data for an LCH configured to report the delay information becomes available to a MAC entity and none of the LCHs configured to report the delay information contains any available UL data.*

*Proposal 5: UE should notify gNB when the delay budget is exceeded for data which has been previously reported in a BSR.*

*Proposal 6: RAN2 to discuss whether UE should update the delay information reported in a MAC CE at the time of MAC CE transmission, e.g. for cases when previous transmission couldn’t be carried our due to intra-UE prioritization. Given that UE indicates unused resources, e.g. UTO-UCI, gNB should be generally aware of an intra-UE prioritization situation occurring.*

P1-2

- Ericsson thinks we should report more than one value. You should know all the values and report them as early as possible.

- QC wonders what P1 means: Does UE report all LCGs or only those LCGs for delay informaiton reporting? Lenovo clarifies we should report DSR with BSR.

- For P2, shouldn’t all PDUs have the same delay budget and what does that mean? Lenovo clarifies that not all PDUs might arrive at the same time. Remaining time comes from the first PDU in the PDU set that is not yet transmitted.

- Intel thinks P1 is agreeable to most and would be fine to only report those configured, but need to discuss the MAC CE structure first. P2 can wait fo rthe modelling discussion.

- Nokia thinks UE should report remaining time and buffer status, but not necessarily in the same MAC CE. BSR reporting does not always need to trigger DSR.

- Interdigital also thinks DSR and BSR need to be reported together.

- Huawei thinks we should use single MAC CE.

- LGE wonders if UE should report remaining time at all, or just that the reporting threshold has triggered. NW should configure when the DSR is triggered. It’s not sufficient to only report the shortest time.

- QC thinks we should specify the granularity of the reporting, e.g. per-LCG. Should only report BSR for those LCGs which have the DSR triggered.

- Futurewei also thinks it’s important to have data volume available for all LCGs that are relevant for DSR. Lenovo thinks this was the P1. Nokia also thinks we might not have 1ms granularity.

- CATT thinks we should capture than DSR and BSR are in the same MAC CE.

- Ericsson thinks shehduler needs all the information together for the scheduler, that’s why we should extend BSR.

*?? 1: UE should include delay information, e.g. remaining delay budget, associated with data being available for transmission within a new XR-specific BSR.*

*Proposal 2: UE reports the shortest PDCP discard timer value of the PDUs belonging to a PDU set as the remaining time info for the PDU set.*

*Proposal 3: UE reports the shortest delay information, e.g. shortest remaining delay, per LCG*

* Network can configure the UE whether to trigger delay status reporting. FFS if we have some thresholds per LCG.
* When UE triggers reporting delay information for a LCG, and UE also reports the buffer status associated with the remaining time.
* RAN2 aims to define a single MAC CE for the DSR reporting (including the buffer status). FFS if this extends BSR MAC CE or is a new MAC CE.
* Continue offline on MAC CE design options (modified BSR or new MAC CE)

Single vs. multiple remaining time values

- QC thinks for QoS flows for a PDU set, a single value could be enough. For other QoS flows it might be necessary to have more than one, e.g. FEC-based QoS flows.

- Vodafone wonders about the use case for multiple values. If we have a technical reason it’s fine but is not sure yet.

- Ericsson wonders how the single value works if we have e.g. 2 PDUs in the buffer with 50ms in between? What to report if we have both PDUs if they have different remaining time? MTK thinks we have BSR reporting already and that can be used for scheduling. The DSR only tells additional information related to that.

- CMCC thinks one value is enough and we anyway have different QoS flows. We just use the threshold per QoS flow.

* Many companies think single value per LCG is sufficient. Some companies think scheduler needs more information.
* Continue offline in the MAC CE discussion on how many values would be reported and when.
* Continue discussion on whether we have threshold value for the DSR or not.
* Offline 201 (Lenovo, F2F, coffee break): Discuss above points.

Offline discussion [201] – XR MAC CEs

* [AT123][201][XR] XR MAC CEs (Lenovo)

Scope: Discuss the topic and aim for consensus.

Intended outcome: Discussion summary in [R2-2309002](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309002.zip).

Deadline: Thursday CB session

CB XR (1) – XR MAC CEs

[R2-2309002](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309002.zip) Report of [AT123][201][XR] XR MAC CEs (Lenovo ) Lenovo report NR\_XR\_enh-Core

*Working assumption: Define a new separate MAC CE for DSR (remaining delay and associated data volume) reporting, e.g. DSR reporting is not coupled with BSR reporting. Detailed Definition of associated data volume is FFS.*

*Proposal: Support threshold based DSR reporting, e.g. DSR reporting is triggered when remaining delay of a PDU/PDU set is below a NW configured threshold. The threshold is configured per LCG. FFS whether configuring multiple thresholds for a LCG is supported. Definition of remaining time is FFS.*

* Working assumption: Define a new separate MAC CE for DSR (remaining delay and associated data volume) reporting, e.g. DSR reporting is not coupled with BSR reporting. Detailed Definition of associated data volume is FFS.
* Support threshold based DSR reporting, e.g. DSR reporting is triggered when remaining delay of a PDU/PDU set is below a NW configured threshold. The threshold is configured per LCG. FFS whether configuring multiple thresholds for a LCG is supported. Definition of remaining time is FFS.

[R2-2307197](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307197.zip) Discussion on MAC enhancements for XR-specific capacity improvement Huawei, HiSilicon discussion NR\_XR\_enh-Core

*For the remaining time status report:*

*Observation 1: A MAC CE which includes only the delay information without the association of data volume is not useful for facilitating network scheduling decisions.*

*Proposal 1: Define a new BSR MAC CE format indicating the data volume together with its associated remaining time. The remaining time can be implicitly signalled based on pre-configured thresholds.*

*Proposal 2: UE should be able to report multiple BS values and their associated remaining times in a single BSR MAC CE when there is data with different remaining times within the same LCG.*

*Proposal 3: The network should be able to configure which LCG should report the remaining time.*

*Proposal 4: When BSR including remaining time information is triggered, the PDCP entity indicates the remaining time of the discard timers to the MAC entity.*

*For the intra-UE prioritization:*

*Observation 2: RAN2 should determine the baseline of intra-UE prioritization for resource conflict handling in XR. If the Rel-15 intra-prioritization mechanism is used for XR, it does not affect the remaining time calculation.*

*Proposal 5: There is no need to consider the impacts of intra-UE prioritization for remaining time reporting, i.e. any potential grant collisions can be handled by the gNB implementation.*

*For the trigger of BSR:*

*Proposal 6: BSR trigger can be enhanced in the following aspects:*

*‐ trigger BSR when a new data burst arrives (alternatively: enhance the Periodic BSR by allowing the periodicBSR-Timer not to be restarted by other transmitted BSRs);*

*‐ trigger BSR when the data volume of discarded packets exceeds a threshold.*

*For the BSR table selection and reporting:*

*Observation 3: The UE uses the new defined BS table if the buffered data volume is within the range of the new table, otherwise the legacy table is used for BSR.*

*Proposal 7: The UE uses the new defined BS table if the buffered data volume is within the range of the new table, otherwise the legacy table is used for BSR.*

*Proposal 8: In case the quantization error needs to be reduced further, UE should use an additional index to indicate a more precise BS value based on the original index.*

Online (Monday) (2) – BSR table details

[R2-2308587](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308587.zip) Discussion on BSR enhancements for XR Ericsson discussion Rel-18 NR\_XR\_enh-Core

*Observation 1 Increasing the granularity of the BSR tables (down to a step size of 200 bytes) improves the capacity in a network with XR traffic.*

*Proposal 1 RAN2 to discuss the new BSR table considering that a small step size (down to 200 bytes) improves XR capacity.*

*Proposal 2 Create a new BSR MAC CE based on the legacy BSR MAC CE, with one extra byte, where the individual bits are indicating whether the correspondent LCG is using the legacy or the new BS table, as shown in example in Figure 2.*

*Proposal 3 When both the legacy and the new BS table contain an index which can represent the UE buffer size, the UE shall use the new BS table and format.*

*Proposal 4 When only one table (i.e. the legacy BS table) contains an index which represents the UE buffer size, the UE shall use the legacy BS table and format.*

*Proposal 5 Current BSR triggering conditions are the baseline conditions for the new BSR introduced in Section 2.1.*

*Proposal 6 Delay reporting should also provide buffer information utilizing the defined BS tables.*

*Proposal 7 Delay reporting is done by indicating bucket indexes similar as for the buffer status, per LCG.*

*Proposal 8 Two delay tables per LCG can be configured: one for short delay reporting, another table for long delay reporting.*

*Proposal 9 A delay table is defined by: - min value, - max value, and - stepSize.*

*Proposal 10 Up to 8 buckets can be configured for long delay reporting. 1 bucket is enough for short delay reporting (see 2.2.3).*

*Proposal 11 Delay table is built as: For index 0, BS value is defined by: [ ≥ min value & ≤ min value x (stepSize x (BS index + 1) Second and third index, BS value is defined by [≤ min value x (stepSize x (BS index + 1)] Last bucket index is defined by ≥ min value x (stepSize x (BS index + 1)] or ≥ max value (if provided)*

*Proposal 12 For short delay reporting, min and max value, or min and step size needs to be provided.*

*Proposal 13 Adopt the ASN.1 outlined above to configure the delay table.*

*Proposal 14 Delay reporting is triggered when data enters an empty delay bucket. The buckets which trigger the delay reporting are configured by the network.*

*Proposal 15 The UE reports the buffer status in each of the delay/latency buckets.*

*Proposal 16 A short delay reporting is introduced. Its format is the same as the legacy BSR.*

*Proposal 17 A short delay reporting indicates the highest priority LCG configured with delay reporting which has data in a bucket configured by the network.*

*Proposal 18 One bit is used to indicate the presence of data in a bucket.*

*Proposal 19 1 byte per LCG that reports delay is introduced to indicate 8 buckets. BS is reported as described in Figure 2.*

*Proposal 20 The eLCID (1 octet) is used to for this new long delay reporting MAC CE.*

[R2-2307789](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307789.zip) BSR enhancements for XR Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_XR\_enh-Core

*Proposal 1: one possible compromise could be to introduce multiple predefined tables and NW configures which table is used for an LCG, which does not deviate too much from the agreement from the last meeting on one predefined table.*

*Proposal 2: for regular BSR, it uses 8-bit table if new BS table is configured for the LCG with Long BSR even if there is only one LCG with data available for transmission.*

*Proposal 3: when the remaining data for the LCG configured with new table falls out of the range of the new table, it falls back to use legacy 8-bits BSR table, i.e., a LCG configured to use new table can be reported in legacy MAC CE as well.*

*Proposal 4: the MAC CE using new BSR table and the MAC CE using legacy BSR table for different LCGs are identified with different LCIDs, thus the NW knows those reported LCGs used legacy table or the new table without other explicit indication.*

*Proposal 5: priority of the BSR MAC CEs is according to the highest priority of the LCH with data available for transmission.*

*Proposal 6: legacy 5 bits BS table can be used for the LCG configured with new table for padding BSR in case there is only one byte left for BS payload.*

*Proposal 7: the shortest remaining time and the corresponding buffered data is reported for the LCG.*

*Proposal 8: both independent PDUs or PDUs conforming a PDU set are supported.*

*Proposal 9: The remaining time can be reported as an integer or an index pointing out the threshold fitting its remaining time from a predefined table.*

*Proposal 10: The remaining time report is triggered when the remaining time of data buffered for a LCG becomes below threshold.*

*Proposal 11: Define a delay report MAC CE separately from the BSR MAC CE to report remaining time information for LCG(s) with remaining time is below threshold.*

*Proposal 12: BSR can be reported together with delay report if delay report is triggered to provide total buffered data.*

*Proposal 13: similar to BSR, up to UE implementation to update the delay information content in case the TB with delay information multiplexed is deprioritized due to intra-UE prioritization.*

[R2-2307078](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307078.zip) BSR and delay status reporting for XR Qualcomm Incorporated discussion Rel-18 NR\_XR\_enh-Core

*Proposal 1. Use exponential distribution to generate code points in the new BSR table.*

*Proposal 2. Maximum buffer size can be determined based on the ratio between maximum bit rate and minimum frame rate of UL-centric XR applications.*

*Proposal 3. Minimum buffer size is the one which minimizes average quantization error over the size range of data bursts of UL-centric XR applications.*

*Proposal 4. Ask SA4 to provide a list of bit rate and frame rate (in pair) used by UL-centric XR applications. Finalize the entries in the new BSR table after receiving reply LS back from SA4.*

*Proposal 5. UE uses the new BSR table to report the buffer size of an LCG if it is within the range of the new BSR table. Otherwise, the legacy BSR table is used.*

*Proposal 6. The enhanced BSR MAC CE can be extended from the legacy one by introducing a new bitmap that indicates which BSR table each LCG has used to encode its BS field.*

*Delay status report*

*Proposal 7. Network can configure which LCG(s) should report its delay status.*

*Proposal 8. UE triggers a DSR when an LCG configured for reporting and its associated L2 buffer has data whose remaining time drops below a configured triggering threshold.*

*Proposal 9. Network can configure one or more reporting thresholds for an LCG. For each reporting threshold, UE reports the amount of data whose remaining time is below that threshold.*

*Proposal 10. DSR does not include buffer size of LCGs that are not configured for DSR or LCGs that do not have data whose remaining time is below their reporting threshold(s).*

*Proposal 11. The MAC CE for sending DSR should include at least the following elements:*

*- A bitmap that indicates which LCGs are reporting their delay status;*

*- A bitmap that indicates which BSR table is used in the reporting of an LCG;*

*- For each LCG included in the report, amount of data whose remaining time is below each of its configured reporting threshold(s).*

*Proposal 12. When autonomous retransmission is configured and a DSR is sent over a configured grant, this DSR includes the reference time which is the 5G system time of the first PUSCH transmission that includes this DSR.*

CB XR (1) – BSR table details

*Chair proposal: single BSR table with reduced range, using exponential distribution?*

[R2-2307682](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307682.zip) Discussion on Delay status reporting NTT DOCOMO, INC. discussion Rel-18

[R2-2307099](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307099.zip) Discussion on delay information and BSR enhancement for XR Google Inc. discussion NR\_XR\_enh-Core

[R2-2307133](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307133.zip) Discussion on XR-specific BSR enhancements TCL discussion

[R2-2307156](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307156.zip) Discussion on BSR enhancements for XR Honor discussion Rel-18 NR\_XR\_enh-Core

[R2-2307243](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307243.zip) Discussion on delay status reporting for XR DENSO CORPORATION discussion Rel-18 NR\_XR\_enh-Core

[R2-2307297](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307297.zip) Discussion on BSR enhancements for XR vivo discussion Rel-18 NR\_XR\_enh-Core

[R2-2307348](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307348.zip) Consideration on DSR and BSR CATT discussion Rel-18 NR\_XR\_enh-Core

[R2-2308883](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308883.zip) Discussion on BSR enhancements for XR Samsung discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1: UE may have more than one candidate BS table for a certain LCG when reporting BSR.*

*Proposal 1: RAN2 is kindly asked to consider including BS table indicator per LCG to indicate which BS table is used, when designing new BSR.*

*Proposal 2: RAN2 is kindly asked to discuss how UE determines which BS table to use for a certain LCG, if it has more than one candidate BS table.*

*Observation 2: In achieving the timely UL scheduling, two options can be considered in terms of which information UE should report*

*- Option 1) the urgent buffer size,*

*- Option 2) the remaining time with associated buffer size.*

*Proposal 3: If Option 1 is agreed, RAN2 is kindly asked to consider that UE reports the amount of the urgent data, whose remaining time satisfies certain condition configured by gNB, e.g., less than a certain threshold.*

*Proposal 4: If Option 1 is agreed, RAN2 is kindly asked to discuss about, at which level, e.g., per LCH/LCG/MAC Entity, the amount of the urgent data should be reported, considering signalling overhead and potential gain.*

*Observation 3: gNB may need a way to limit the signalling overhead caused by reporting remaining time, since there could be overwhelmingly many remaining time values associated with the data in the UE buffer.*

*Observation 4: If remaining time is sufficiently long, gNB may have no interest in such information.*

*Proposal 5: If Option 2 is agreed, RAN2 is kindly asked to consider that UE reports the (shortest) remaining time value(s) satisfying certain condition configured by gNB, e.g., less than a certain threshold.*

*Proposal 6: If Option 2 is agreed, RAN2 is kindly asked to discuss about, at which level, e.g., per LCH/LCG/MAC Entity, the remaining time should be reported, considering signalling overhead and potential gain.*

*Observation 5: New BSR design may become much simpler with option 1 than option 2.*

*Observation 6: Signalling overhead may be much less with Option 1 than Option 2, without sacrificing considerable performance loss.*

*Proposal 7: RAN2 is kindly asked to give higher priority to Option 1 than Option 2 in achieving the timely UL scheduling.*

[R2-2307370](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307370.zip) Discussing on BSR enhancements for XR capacity Xiaomi Communications discussion

[R2-2307400](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307400.zip) Discussions on delay information reporting Fujitsu discussion Rel-18 NR\_XR\_enh-Core

[R2-2307532](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307532.zip) BSR enhancements for XR ZTE Corporation, Sanechips discussion

[R2-2307609](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307609.zip) XR BSR and Delay Information Enhancements Facebook India discussion

[R2-2307761](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307761.zip) Discussions on delay status reporting in BSR for XR Futurewei discussion Rel-18 NR\_XR\_enh-Core

[R2-2307762](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307762.zip) Discussions on new Buffer Status table design for XR Futurewei discussion Rel-18 NR\_XR\_enh-Core

[R2-2307830](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307830.zip) Buffer Delay Reporting and BSR Enhancements for XR Apple discussion NR\_XR\_enh-Core

[R2-2307902](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307902.zip) Discussion on delay status reporting for XR NEC Corporation discussion Rel-18 NR\_XR\_enh-Core

[R2-2307913](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307913.zip) New buffer status report table design FGI discussion

[R2-2307914](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307914.zip) Discussion on BSR enhancements for XR III discussion NR\_XR\_enh-Core

[R2-2308025](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308025.zip) Discussion on BSR enhancements Lenovo discussion Rel-18

[R2-2308076](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308076.zip) BSR Enhancements for XR Intel Corporation discussion Rel-18 NR\_XR\_enh-Core

[R2-2308134](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308134.zip) Consideration on BSR enhancements for XR Spreadtrum Communications discussion Rel-18

[R2-2308156](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308156.zip) Considerations on XR UL PDU set information Sony discussion Rel-18 NR\_XR\_enh-Core

[R2-2308157](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308157.zip) Some considerations on BSR enhancements for XR Sony discussion Rel-18 NR\_XR\_enh-Core

[R2-2308185](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308185.zip) Discussion on BSR enhancement for XR OPPO discussion Rel-18 NR\_XR\_enh-Core

[R2-2308310](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308310.zip) Consideration on BSR enhancement for XR CMCC discussion Rel-18 NR\_XR\_enh-Core

[R2-2308372](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308372.zip) New static BS table and BSR trigger(s) NEC discussion NR\_XR\_enh

[R2-2308412](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308412.zip) Buffer status and remaining time reporting for XR Interdigital Inc. discussion Rel-18 NR\_XR\_enh-Core

[R2-2308677](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308677.zip) BSR enhancements for XR MediaTek Inc. discussion Rel-18

[R2-2308875](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308875.zip) Discussion on new BSR table and delay status report LG Electronics Inc. discussion Rel-18 NR\_XR\_enh-Core

[R2-2307268](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307268.zip) Discussions on remaining time reporting KDDI Corporation discussion NR\_XR\_enh-Core

*(moved from 7.5.4)*

Withdrawn:

[R2-2308567](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308567.zip) Buffer status and remaining time reporting for XR Interdigital Inc. discussion Rel-18 NR\_XR\_enh-Core Withdrawn

#### 7.5.4.2 Discard operation for XR

Including discussion the configuration and PDCP specification details of PDU set-based discard operation

Including discussion on how PSI-based discard is used by UE e.g. by RRC configuration, PDCP/RLC/MAC header or control PDU, MAC CE?

Including discussion on how PSI impacts discard operation (e.g. do we have one or two timers, etc.)

Online (Tuesday) (1) – PDU set discard details

[R2-2307349](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307349.zip) PDCP discard timer model for PDU Set discard CATT, China Unicom, DELL, Ericsson, Intel Corporation, OPPO discussion Rel-18 NR\_XR\_enh-Core

*Observation 1: UL PDUs of a PDU Set can arrive, in the UE buffer, at the same time, or at different points in time.*

*Observation 2: Legacy PDCP discard timer cannot be reused “as is” for PDU Set PSDB monitoring.*



**Figure 2: Using legacy PDCP timer for PDU Set PSDB monitoring**



**Figure 3: PDCP discard timer maintenance (Option 1)**



**Figure 4: PDCP discard timer maintenance (Option 2)**

*Proposal 1: The operation of PDCP discard timer is enhanced to address PSDB monitoring when PDUs of a PDU Set arrive at different instances of time.*

*Proposal 2: The RRC configuration indicating whether PDCP performs PDU Set based discard also indicates PDCP to use the enhanced timer model addressing PDU Set based discard.*

*Proposal 3: RAN2 selects amongst the below two options for the PDCP discard timer model addressing PSDB monitoring with different arrival times of the PDU Set PDUs:*

*• Option 1: One PDU Set PDCP discard timer is maintained per PDCP SDU. When a PDU in the PDU Set arrives at PDCP, its discard timer is set to run for a duration equal to the configured PDCP discard timer minus the time interval between this PDU and the first PDU of the same PDU Set. Once a PDCP discard timer expires, UE discards all the PDUs in the associated PDU Set.*

*• Option 2: One single PDCP discard timer is maintained per PDU Set, started upon the arrival of the first PDU of the PDU Set. When the PDCP discard timer expires, UE discards all the PDUs in the associated PDU Set.*

* 1: PDCP discard timer for PDU sets supports cases where PDUs of a PDU Set arrive at different instances of time.

- Lenovo thinks there are other options: e.g. as soon as one PDU is discarded, so are the rest without correcting any timer values. Nokia agrees but this only works if PSIHI is set.

- LGE thinks we agreed to use existing timer. Agrees with Lenovo. LGE explains that PDCP discard timer never stops. So it keeps running until the PSDB is reached at which time all PDUs of the PDU set that are not yet received will be discarded if PSIHI is set.

Online (Tuesday) (1) – PSI-based discard details

[R2-2307953](C:\\Users\\terhentt\\Documents\\Tdocs\\RAN2\\RAN2_123\\R2-2307953.zip) Remaining details on discarding operation for XR Lenovo discussion Rel-18 NR\_XR\_enh-Core

*Proposal 1: For a PDU Set of a radio bearer for which PDU set based discarding is configured, UE considers the PDCP discard timer of all the PDCP SDUs associated with the PDU set as expired for cases when the PDCP discard timer of one PDCP SDU expires or when one PDU of the PDU set is known to be lost.*

*Proposal 2: RAN2 to agree on the following PSI-based discarding mechanism:*

*• configuring UE with multiple PDCP discard timer configurations, e.g. one for normal mode of operation and one for congestion. NW indicates the mode of operation, e.g. whether to apply the PDCP discard timer configuration for congestion or for normal mode of operation; or*

*• configuring UE with one PDCP discard timer for each PSI. NW updates the timer values based on detected congestion level.*

- Huawei thinks it’s better to use one timer. Futurewei thinks one timer may have some problems for remaining time. QC agrees and thinks UE has to know the remaining time for the DSR.

- Fujitsu thinks the first option is not PSI-based but congestion – based. Thinks timer-based discarding is too dynamic. Ericsson thinks this is about what is coming to the buffer and continue using the timer-based discarding.

- LGE thinks there are three options: Multiple discard timers (one for normal and one for congestion), each SDU having different timer based on PSI, or UE discards PDU SDUs lower than threshold. Thinks congestion happens very rarely so should keep it very simple. Thinks second option is very complex and doesn’t help congestion. Thinks we should only discuss 1st and 3rd optin but thinks third option is the simplest one. Futurewei thinks 3rd option means packets are discarded on arrival.

- Google thinks the 3rd option is most efficient. Intel thinks there are two choices to make: 1) How does network control the discard (e.g. PSI level) and how does UE do the discard. 2) Whether to have 2 or more categories for discarding (e.g. normal and congestion). Thinks we should align to SA2.

* Offline 205 (Ericsson): Clarify the options on the table for PSI-based discard. CB Thursday.

1. One discard timers for normal operation and additional discard timer for when NW indicates congestion
2. Per-PSI timer(s) for each SDU
3. UE discards PDU SDUs lower than PSI threshold

*Proposal 3: UE applies the PDCP discard timer configuration associated with the indicated mode of operation (congestion/normal mode) until NW explicitly changes the mode of operation, e.g. indicating a different PDCP discard timer configuration.*

*Proposal 4: MAC CE indicates on a DRB level which discarding mode to apply, e.g. PDCP discarding timer configuration associated with the mode (congestion/normal mode).*

*Proposal 5: RAN2 to discuss enhancements to the discarding mechanism, e.g. informing receiving entity about discarded packets at the transmitter side, which may impact PDCP/RLC window operation.*

*Proposal 6: RAN2 should discuss UE reporting enhancements to inform gNB about discarded PDU/SDUs at the transmitter side, e.g. when the delay budget is exceeded for data which has been previously reported in a BSR.*

Offline discussion [205] – Options for PSI-based discard

* [AT123][205][XR] Options for PSI-based discard (Ericsson)

Scope: Discuss the topic and aim for consensus.

Intended outcome: Discussion summary in [R2-2309003](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309003.zip).

Deadline: Thursday CB session

CB XR (1) – PSI-based discard

[R2-2309003](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309003.zip) Report of [AT123][205][XR] Options for PSI-based discard (Ericsson) Ericsson report NR\_XR\_enh-Core

*Proposal 1: RAN2 to select between either a timer-based or threshold-based PSI based discarding. Both solution spaces can contain subset of solutions.*

*Proposal 2: RAN2 thinks that a PSI based discarding solution could potentially benefit of having the flexibility to also in congestion transmit low level PSI packets but not at the expense of too high complexity.*

*Proposal 3: RAN2 thinks that it is sufficient for PSI based discarding solution to handle PSI levels divided into two groups.*

*Proposal 4: RAN2 think that the selected PSI based discarding solution should be able to instantly discard packets that are already in the UE buffer up on activation*

*Proposal 5: RAN2 thinks that if a timer-based solution is selected as the PSI based discarding solution this needs to be taken into account when designing the delay reporting in the BSR.*

*Proposal 6: RAN2 to select the solution option which has the least amount of objection against.*

Against Timer vs. Threshold

Timer: 5

Threshold: 4

PSI levels: 2

Delay reporting issues

P1

- Ericsson thinks it will be hard to determine which solution based on only preferences. The views are quite equal but also somewhat difficult to interpret at times.

- LGE thinks threshold is simple but timer-based has some problems: It cannot support simultaneous discard since the running timer does not stop when discard starts, so only new SDUs are subject to the discard. In congestion the DSR may also be triggered more frequently, which doesn’t help in congestion.

- CATT thinks P2 is correct so how to set the new timer is not necessarily simple. Timer has to be both small and large enough at the same time. So it will be difficult for the network.

- Xiaomi has concern that UE has to detect the congestion. NW can give UE an indication so it requires more spec impact. Therefore thinks timer is better. Huawei thinks the threshold-based solution doesn’t work at all: How can NW indicate PSI threshold if it doesn’t know the traffic distribution for all PSI levels? Also, PDU set discarding for congestion should not be tied to the PSI-based discard. UE can only identify two categories so if NW indicates PSI level and UE doesn’t support PDU set-based discard. Finally, NW has to know which PDU sets are most important to UE and this is not possible always.

- Intel thinks the threshold-based solution description is not 100% accurate. There are sub-solutions. Should be called PSI-level based. Thinks we can roughly get the same effect in the timer solution but allow value zero. If it turns out to be overcomplicated, we can revert the decision.

- Nokia thinks we should explore the timer-based but keep it simple. The main complexity is the PDU set handling and could have complications to existing timer.

- vivo thinks the proposal from Intel is not a good solution. That means UE would have to wait for the timer expiration.

- Apple thinks congestion is a subjective matter: We have agreed it’s up to NW to determine it and indicate to UE. Threshold-based works well when congestion is bad but when it’s not that bad, it makes more sense to use timer-based solution since it allows UE to send something. This also helps since SA4 told us that any packet loss is not good. Is fine with the compromise. CATT thinks this is not a compromise since zero-value was anyway considered. Lenovo agrees with Apple. Currently we only rely on timers since it reuses the existing principles. Threshold-based would be new since we don’t yet know how it fully works.

- Meta thinks QoS is important so prefers the threshold.

- Vodafone thinks the threshold means there is a command to discard PDUs below a specific PSI.

- Futurewei thinks service response time is really important to avoid users from adopting the service.

* No decision now. Companies should bring detailed Stage-3 proposals, preferably co-signed by several supporters, to the next meeting, at which time RAN2 aims to decide on which solution to use.

[R2-2308339](C:\\Users\\terhentt\\Documents\\Tdocs\\RAN2\\RAN2_123\\R2-2308339.zip) Details of PSI-based Discard Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_XR\_enh-Core

[R2-2307079](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307079.zip) PDU discard operation for XR Qualcomm Incorporated discussion Rel-18 NR\_XR\_enh-Core

[R2-2307100](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307100.zip) Discussion on PDU discard for XR Google Inc. discussion Rel-18 NR\_XR\_enh-Core

[R2-2307134](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307134.zip) Discussion on XR-specific discard enhancements TCL discussion

[R2-2307165](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307165.zip) Discussion on packet discarding for XR CANON Research Centre France discussion Rel-18 NR\_XR\_enh-Core

[R2-2307196](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307196.zip) Discussion on PDU set discarding for XR traffic Huawei, HiSilicon discussion Rel-18 NR\_XR\_enh-Core

[R2-2307298](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307298.zip) Discussion on discard operation for XR vivo discussion Rel-18 NR\_XR\_enh-Core

[R2-2307299](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307299.zip) Discussion on RLC impacts on PDU set discard vivo discussion Rel-18 NR\_XR\_enh-Core

[R2-2307350](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307350.zip) Discard Operation for XR CATT discussion Rel-18 NR\_XR\_enh-Core

[R2-2307371](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307371.zip) Discussing on PDU discarding of XR traffic Xiaomi Communications discussion

[R2-2307401](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307401.zip) Discussions on PDU discard based on PDU Set Importance Fujitsu discussion Rel-18 NR\_XR\_enh-Core

[R2-2307534](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307534.zip) PDU discard for XR ZTE Corporation, Sanechips discussion

[R2-2307593](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307593.zip) Discard Operation for XR Samsung R&D Institute India discussion

[R2-2307608](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307608.zip) Discussion on PDU Discard Operation for XR Facebook India discussion

[R2-2307763](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307763.zip) Discussions on PSI-based discard operation for XR Futurewei discussion Rel-18 NR\_XR\_enh-Core

[R2-2307831](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307831.zip) Views on PDU Discard Operation for XR Apple discussion NR\_XR\_enh-Core

[R2-2307892](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307892.zip) Discussion on PSI-based discard operation ITRI discussion NR\_XR\_enh-Core

[R2-2308075](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308075.zip) Discard Enhancements for XR Intel Corporation discussion Rel-18 NR\_XR\_enh-Core

[R2-2308128](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308128.zip) Discussion on XR discard operation Spreadtrum Communications discussion Rel-18

[R2-2308173](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308173.zip) Some considerations on PSI and PSIHI Sony discussion Rel-18 NR\_XR\_enh-Core

[R2-2308186](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308186.zip) Discussion on discard operation for XR OPPO discussion Rel-18 NR\_XR\_enh-Core

[R2-2308331](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308331.zip) Further discussions on discard operation for XR CMCC discussion Rel-18 NR\_XR\_enh-Core

[R2-2308371](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308371.zip) PDU discard NEC discussion NR\_XR\_enh

[R2-2308546](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308546.zip) Discard operation for XR InterDigital discussion Rel-18 NR\_XR\_enh-Core

[R2-2308588](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308588.zip) Discussion on PSI-based discarding Ericsson discussion Rel-18 NR\_XR\_enh-Core

[R2-2308607](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308607.zip) Discussion on the discard for XR LG Electronics Inc. discussion NR\_XR\_enh-Core

[R2-2308668](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308668.zip) Further aspects of PDU discard MediaTek Inc. discussion Rel-18 [R2-2305899](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2305899.zip)

Withdrawn:

[R2-2307950](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307950.zip) Remaining details on discarding operation for XR Lenovo discussion Rel-18 NR\_XR\_enh-Core Late

* Withdrawn

#### 7.5.4.3 Configured Grant enhancements for XR

Including RAN2-specific aspects of unused and/or multiple configured grant (CG) PUSCH transmission occasions in a period of a single CG PUSCH configuration (UTO-UCI, HARQ process determination, etc.).

Including discussion on the topics raised in RAN1 LS R1-2306233.

Online (Tuesday) (2) – RAN2 impacts from RAN1 decisions for CG enhancements

[R2-2308672](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308672.zip) HARQ ID determination formula for CG MediaTek Inc. discussion Rel-18

*Proposal 1: Clarify and correct the HARQ Process ID formula for multiple CG PUSCH transmission occasions in RAN1 LS.*

*Proposal 2: Always increment HARQ PID within a set of configured CG PUSCHs in a period regardless of their validity.*

*Proposal 3: Send reply LS about correct HARQ Process ID formula back to RAN1.*

- QC agrees with MTK and RAN1 is already aware of the error.

- LGE agrees with P1. For P2 thinks this is RAN2 decision and RAN1 should not have decided on this.

- QC thinks P2 is in RAN1 scope and this is in their specifications. For TDD this could change the number of PUSCH occasions quite a lot.

- CATT thinks P2 is not correct and we should further discuss validity. Otherwise the probability of process ID collision increases, which can block some CG occasions. Thinks UTO-UCI should define the validity. MTK thinks NW will configure HARQ processes to the CG anyway. Skipping one of them doesn’t matter so much.

- Sony thinks NW knows which occasion UE is going to use. So why would it need to know something different? Apple is not clear on whether first determines UTO-UCI or HARQ for those resources. Thinks this could depend on UE implementation. Nokia thinks we shouldn’t re-open RAN1 discussion in RAN2 and this depends on the configuration. Lenovo also thinks both options can work and RAN1 discussed it. vivo agrees with Nokia and thinks RAN1 already considered these. QC also agrees.

- Nokia thinks the validity will be in RAN1 specification. LGE thinks we may cause more “invalid” CG occasions in the future.

- Ericsson thinks whatever RAN1 specifies for validity, RAN2 needs to know for MAC CE generation. This could cause issues for overlapping gaps.

- Google wonders if we should capture the index in the formula?

* Send LS to RAN1 (MTK) informing them of the error in the formula and tell RAN2 will capture the HARQ process formula in RAN2 specifications. Ask RAN1 whether the validity is going to be defined in RAN1 specifications. Can ask clarifications how the validity works if there are ambiguities for RAN2 specifications.
* Offline 202 (MTK): LS to RAN1 on CG formula for XR

Offline discussion [202] – LS on CG formula

* [AT123][202][XR] LS on CG formula (MediaTek)

Scope: Provide LS reply to RAN1 based on meeting agreements.

Intended outcome: Reply LS in [R2-2309005](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309005.zip).

Deadline: Thursday CB session

CB XR (XR) (1) – LS to RAN1 on CG formula

[R2-2309005](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309005.zip) [Draft] LS on CG formula MediaTek LS out Rel-18 NR\_XR\_enh-Core To: RAN1

- Nokia thinks the “if yes/no”, RAN2 could indicate RAN1 to capture it. MTK thinks we haven’t yet agreed to that.

- Intel wonders about the last sentence: Is the intention that there would be a new indication from L1 to MAC? Ericsson explains that this could be solved by reference to RAN1 specification.

- Samsung wonders what “K” means in the equation? MTK explains this could be added.

- LGE thinks we could ask from RAN1 what the definition of “invalid” is.

- Sony wonders how often the invalid condition changes? Is it dynamic or semi-static? If dynamic, NW needs to know. MTK thinks implementers need to know and this is something RAN1 would handle anyway.

- Huawei thinks the last sentence is not needed: “*Regardless of where invalid/valid CG opportunities are captured, MAC layer needs to be aware of unusable CG opportunities to not obtain MAC PDUs for them, as that data will be lost.*”

- MTK thinks we could ask them to capture the definition but also let us know. Apple thinks that if CQI occasion is invalid, we don’t need to assign HARQ.

- Ericsson thinks if we ask RAN1 to capture, we don’t need the last sentence.

* Add definition of “K” of the equation to the text
* Ask RAN1 to capture the definition and clarify the text accordingly (i.e. no “yes” or “no” parts) so that RAN2 can refer to it in our specifications
* Remove the last sentence “*Regardless of where invalid/valid CG opportunities are captured, MAC layer needs to be aware of unusable CG opportunities to not obtain MAC PDUs for them, as that data will be lost.*”
* Revised in R2-2309006 (CBF)

[R2-2307790](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307790.zip) CG enhancements for XR Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_XR\_enh-Core

*Proposal 1: confirm the RAN1 agreement on HARQ process ID determination is fine also from RAN2 point of view and capture it in MAC specification.*

*Proposal 2: MAC indicates to PHY the number of required CG PUSCH occasions based on the buffer status and TBS of the CG configuration.*

*Proposal 3: the UE should not set a CG occasion as unused too early, and the restriction details can be left to RAN1 to decide taking the NW processing time into account.*

*Proposal 4: When other criteria for UL skipping is fulfilled, UE skips UL CG PUSCH transmission in case the UTO-UCI, which would be multiplexed on the CG PUSCH, does not contain any new information, i.e., UL skipping still applies for this case and the UE does not generate empty TB.*

*Proposal 5: confirm the agreement “For any other CG PUSCH occasion that is NOT indicated as “unused”, the UE is allowed to transmit or not to transmit CG PUSCH on that CG PUSCH occasion as per legacy specification” is applicable to the CG occasions that have been indicated as not unused as well as the occasions that have not been indicated with any state yet.´*

[R2-2307080](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307080.zip) Configured grant enhancements for XR Qualcomm Incorporated discussion Rel-18 NR\_XR\_enh-Core

[R2-2307120](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307120.zip) Discussin on Multi-PUSCH CG Huawei, HiSilicon discussion Rel-18 NR\_XR\_enh-Core

[R2-2307244](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307244.zip) Discussion on HARQ process ID determination for multi-PUSCHs CG DENSO CORPORATION discussion Rel-18 NR\_XR\_enh-Core

[R2-2307245](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307245.zip) Configured Grant enhancements for XR Xiaomi discussion Rel-18 NR\_XR\_enh-Core

[R2-2307351](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307351.zip) Discussion on configured grant CATT discussion Rel-18 NR\_XR\_enh-Core

[R2-2307535](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307535.zip) Configured Grant enhancements for XR ZTE Corporation, Sanechips discussion

[R2-2307729](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307729.zip) Discussion on CG enhancements Samsung discussion Rel-18 NR\_XR\_enh-Core

[R2-2307832](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307832.zip) Views on UTO for Multi-PUSCH Configured Grant Apple discussion NR\_XR\_enh-Core

[R2-2307915](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307915.zip) Discussion on Configured Grant enhancements for XR III discussion NR\_XR\_enh-Core

[R2-2307954](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307954.zip) CG enhancements for XR communications Lenovo discussion Rel-18 NR\_XR\_enh-Core

[R2-2308158](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308158.zip) Configured Grant enhancements for XR Sony discussion Rel-18 NR\_XR\_enh-Core

[R2-2308187](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308187.zip) Discussion on configured grant enhancement for XR OPPO discussion Rel-18 NR\_XR\_enh-Core

[R2-2308246](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308246.zip) On Configured Grant enhancements for XR Google Inc. discussion

[R2-2308311](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308311.zip) Consideration on CG enhancement for XR CMCC discussion Rel-18 NR\_XR\_enh-Core

[R2-2308370](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308370.zip) CG enhancement for XR NEC discussion NR\_XR\_enh

[R2-2308543](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308543.zip) Configured Grant enhancements for XR Ericsson discussion Rel-18 NR\_XR\_enh-Core

[R2-2308547](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308547.zip) Configured Grant enhancements for XR InterDigital discussion Rel-18 NR\_XR\_enh-Core

[R2-2308679](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308679.zip) Discussion on multiple-PUSCHs CG for XR TCL discussion Rel-18

[R2-2308876](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308876.zip) Discussion on CG enhancement for XR LG Electronics Inc. discussion Rel-18 NR\_XR\_enh-Core

### 7.5.5 UE capabilities for XR

Including UE capability specification rapporteur (Intel) proposal for starting point of UE capability discussions (e.g. as provided in [R2-2305492](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2305492.zip), does not count against Tdoc limit)

Including discussion on UE capabilities for XR from RAN2 perspective, e.g. what are the baseline capabilities for XR and what are optional additions and are there some dependencies to existing capabilities?

Online (Thursday) (1-2) – UE capability starting point

[R2-2308073](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308073.zip) UE Capabilities for Rel-18 XR WI Intel Corporation discussion Rel-18 NR\_XR\_enh-Core

*Observation 1. During Rel-18 XR SI phase, RAN2 informed SA2 and SA4 multiple times the assumption that PDU set concept is applicable to UL side and UE is able to identify the corresponding PDU set related information. By not responding to this, RAN2 understands that there is no concern/issue identified by SA2 and SA4 on this regard.*

*Observation 2. UE AS layer has visibility to XR awareness (including PDU set concept/information and data burst) for UL as it is currently defined by SA2 for DL traffic.*

*Observation 3. RAN2 agreed for UE to provide UL jitter and bust arrival information to RAN and it is FFS whether UE might also be defined other ones such as periodicity.*

*Proposal 1. A new optional radio capability (e.g., supportOfXR-Awareness) is defined to identify UE supporting XR awareness for UL traffic as it is defined in TS 38.300 §16.x.2 (which includes the PDU set concept/QoS parameters/information and data burst one).*

*Proposal 2. A new optional UE capability signaling is defined for the new UE assistance information related to XR traffic requires (e.g., supportOfXR-AssistanceInfo).*

*Proposal 2.1. To discuss whether different capabilities are required to indicate UE’s support for each of the new XR related assistance information, e.g., one for the support of providing UL jitter and another for burst arrival time.*

*Proposal 2.2. To discuss whether option (a) supportXR-AssistanceInfo is defined as a standalone feature (i.e., it does not require that UE also supports supportOfXR-Awareness) or option (b) this supportXR-AssistanceInfo should be defined as an optional capability only if UE also supports supportOfXR-Awareness.*

*Proposal 3. A new optional UE capability signaling (e.g., supportOfDiscardPDU-Set) is defined to identify Rel-18 UEs supporting discard operation associated with the PDU Set concept.*

*Proposal 3.1. UE supporting supportOfDiscardPDU-Set shall also support supportOfXR-Awareness (i.e., supportOfDiscardPDU-Set is optional capability only if UE also supports supportOfXR-Awarenessi).*

*Proposal 4. A new optional UE capability signaling (e.g., supportOfNewBS-Table) is defined to identify Rel-18 UEs supporting BSR enhancements associated with the new BS tables.*

*Proposal 4.1. This supportOfNewBS-Table is defined as a standalone feature (i.e., it does not require that UE also supports supportOfXR-Awareness).*

*Proposal 5. A new optional UE capability signaling (e.g., supportOfDelayReporting) is defined to identify Rel-18 UEs supporting the delay reporting of the buffered data.*

*Proposal 5.1. UE supporting supportOfDelayReporting shall also support supportOfXR-Awareness (i.e., supportOfDiscardPDU-Set is optional capability only if UE also supports supportOfXR-Awarenessi).*

*Proposal 6. A new optional UE capability signaling (e.g., supportOfDisableHARQ-RTT-CG) is defined to identify UE supporting retransmission-less CG enhancement (which allows disabling the HARQ RTT timer per CG configuration).*

*Proposal 6.1. This supportOfDisableHARQ-RTT-CG is defined as a standalone feature (i.e., it does not require that UE also supports supportOfXR-Awareness).*

*Proposal 7. Wait for RAN1 input on new UE capabilities for RAN1 lead objectives (i.e., Multiple CG PUSCH transmission occasions in a period of a single CG PUSCH configuration and Dynamic indication of unused CG PUSCH occasion(s) based on UCI). NOTE: The corresponding TP would be included in the mega capability CR.*

*Proposal 8. A new optional UE capability signaling (e.g., supportOfRationalDRX) is defined to identify Rel-18 UEs supporting C-DRX enhancements targeting any traffic with non-integer periodicity.*

*Proposal 8.1. This supportOfRationalDRX is defined as a standalone feature (i.e., it does not require that UE also supports supportOfXR-Awareness).*

[R2-2308351](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308351.zip) Discussion on UE capabilities for XR Huawei, HiSilicon discussion Rel-18 NR\_XR\_enh-Core

*Proposal 1: Proposal 1: A new UE capability (ul-TrafficInfoReporting) is defined to identify UEs supporting UAI-based XR traffic assistance information.*

*Proposal 2: A new UE capability (rationalDRX-Cycle) is defined to identify UEs supporting rational number DRX cycles.*

*Proposal 3: A new UE capability (additionalBSR-Table) is defined to identify UEs supporting the new BSR table.*

*Proposal 4: A new UE capability (dataDelayReporting) is defined to identify UEs supporting the remaining time report.*

*Proposal 5: A new UE capability (timerBasedPDU-SetDiscard) is defined to identify UEs supporting timer based PDU set discard.*

*Proposal 6: A new UE capability (psi-BasedDiscarding) is defined to identify UEs supporting PSI-based discard.*

*Proposal 7: As per the previous agreement, a new UE capability (retransmissionLessCG) should be defined to identify UEs supporting retransmission-less CG.*

[R2-2307081](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307081.zip) UE capabilities for XR services Qualcomm Incorporated discussion Rel-18 NR\_XR\_enh-Core

*Observation. All top-level XR enhancements are independent from each other and work well by themselves without support from others. They therefore should have their own UE capabilities.*

*Proposal 1. Introduce a UE capability related to XR awareness, which is the support for identification of UL data bursts and reporting of UL traffic information via UE Assistance Information.*

*Proposal 2. Introduce the following UE capabilities related to UE power savings:*

*- a UE capability for the support of non-integer DRX cycles defined by ratios of two rational numbers and SFN wrap-around;*

*- a UE capability for the support of retransmission-less CG.*

*Proposal 3. Introduced the following UE capabilities related to UL status reporting:*

*- a UE capability for supporting the new BSR table;*

*- a UE capability for supporting delay status reporting.*

*Proposal 4. Introduce the following UE capabilities related to PDU discard:*

*- a UE capability for supporting PSIHI based PDU set discard;*

*- a UE capability for supporting PSI based PDU set discard.*

*Proposal 5. All UE capabilities in Proposal 1~4 are optional, per UE, “no” for FDD-TDD DIFF, and “no” for FR1-FR2 DIFF.*

*Proposal 6. UE capabilities related to CG enhancements can be discussed based on RAN1’s input or after they finalize the designs.*

[R2-2307536](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307536.zip) UE capabilities for XR ZTE Corporation, Sanechips discussion

*Observation 1: For DL XR awareness, UE capability is not necessary.*

*Proposal 1: For UL XR awareness, introduce two UE capabilities: UL PDU set Integrity handling(supportOfPSIHIBasedPSDiscarding) and/or PSI based PDU set discarding in cell congestion state(supportOfPSIBasedPSDiscarding).*

*Proposal 2: Introduce a UE capability for UE assistance information to report burst arrival time, UL jitter etc(supportOfUAIforXR).*

*Proposal 3: Introduce a UE capability for C\_DRX enhancement(supportOfCdrxEnhancement) to indicate whether the UE supports DRX cycle with rational numbers and DRX formula with a counter to deal with the C-DRX SFN wrap around issue.*

*Proposal 4: Introduce two UE capabilities to report whether the UE supports new BS Table supported(supportOfNewBS-Table) and supports the delay information reporting(supportOfDelayReporting) respectively.*

*Proposal 5: For the UE capability definition for Multiple CG transmission occasions in a single CG period, wait for RAN1 conclusion.*

[R2-2307246](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307246.zip) UE capabilities for XR Xiaomi discussion Rel-18 NR\_XR\_enh-Core

[R2-2307300](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307300.zip) Discussion on UE capability for XR vivo discussion Rel-18 NR\_XR\_enh-Core

[R2-2307730](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307730.zip) UE capability for XR Samsung discussion Rel-18 NR\_XR\_enh-Core

[R2-2307833](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307833.zip) Views on UE capabilities for XR Apple discussion NR\_XR\_enh-Core

[R2-2308188](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308188.zip) Discussion on UE capabilities for XR OPPO discussion Rel-18 NR\_XR\_enh-Core

[R2-2308340](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308340.zip) UE capabilities for Rel-18 XR Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_XR\_enh-Core

[R2-2308545](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308545.zip) UE capabilities for XR InterDigital discussion Rel-18 NR\_XR\_enh-Core

[R2-2308589](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308589.zip) Discussion on UE capabilities for XR Ericsson discussion Rel-18 NR\_XR\_enh-Core

## 7.14 Enhancement on NR QoE management and optimizations for diverse services

(NR\_QoE\_enh-Core; leading WG: RAN3; REL-18; WID: RP-223488)

Time budget: 1 TU

Tdoc Limitation: 4 tdocs

### 7.14.1 Organizational

Including LSs and any rapporteur inputs (e.g. work plan)

Running CR rapporteurs of 37.340 (Nokia), 38.300 (China Unicom) and NR RRC (Ericsson) specifications are requested to provide first/updated versions running CRs as rapporteur input (which are not counted against the Tdoc limits)

Including UE capability rapporteur proposal for starting point of UE capability discussions

Online (Tuesday) (1) – Work plan

[R2-2308869](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308869.zip) Revised Work Plan for Rel-18 NR QoE Enhancement China Unicom Work Plan NR\_QoE\_enh-Core

- Lenovo wonders about Stage-2 CR handling since also RAN3 has them. How do we avoid duplication? China Unicom thinks we can send our endorsed version and has already submitted it to RAN3.

* Rapporteur will ensure RAN3 has the latest version of RAN2-endorsed Stage-2 CRs.
* Endorsed

Online (Tuesday) (1) – LS from SA4 on threshold-based RVQoE reporting

[R2-2307074](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307074.zip) Reply LS on buffer level threshold-based RVQoE reporting (S4-231119; contact: Apple) SA4 LS in Rel-18 NR\_QoE\_enh-Core To:RAN2, RAN3

- Chair wonders whether this LS means we cannot do the buffer-level based approach in Rel-18? Apple is not sure and thinks this depends on SA4.

- Lenovo thinks this will be discussed by SA4 this week. Thinks RAN3 will treat QoE on Thursday so could leave the decision to them as well.

* RAN2 to discuss what the SA4 decision means under AI 7.14.3
* Noted

Online (Tuesday) (3) – Running CRs

[R2-2307966](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307966.zip) Running CR for QoE measurements Ericsson draftCR Rel-18 38.331 17.5.0 NR\_QoE\_enh-Core

* Companies are encouraged to provide comments on the CR to rapporteur(s) already during the meeting (i.e. before any post-meeting email discussion)
* Two-week post-meeting email discussion to handle updates to the running CR

[R2-2308231](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308231.zip) 37.340 Running CR to support QoE in NR-DC Nokia, Nokia Shanghai Bell draftCR Rel-18 37.340 17.5.0 B NR\_QoE\_enh-Core

* Companies are encouraged to provide comments on the CR to rapporteur(s) already during the meeting (i.e. before any post-meeting email discussion)
* Two-week post-meeting email discussion to handle updates to the running CR

[R2-2308872](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308872.zip) 38.300 running CR for R18 QoE enhancement in NR China Unicom, Huawei, HiSilicon draftCR Rel-18 38.300 17.5.0 NR\_QoE\_enh-Core [R2-2302307](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2302307.zip)

* Companies are encouraged to provide comments on the CR to rapporteur(s) already during the meeting (i.e. before any post-meeting email discussion)
* Two-week post-meeting email discussion to handle updates to the running CR

Post-meeting email discussions (QoE) (3) – Running CR(s)

* [Post123][221][QoE] 37.340 running CR for QoE (Nokia)

Scope: Update 37.340 running CR based on this meeting’s agreements.

Intended outcome: Endorsed running CR

Deadline: Short (2 weeks)

* [Post123][222][QoE] 38.300 running CR for QoE (China Unicom)

Scope: Update 38.300 running CR based on this meeting’s agreements.

Intended outcome: Endorsed running CR

Deadline: Short (2 weeks)

* [Post123][223][QoE] RRC running CR for QoE (Ericsson)

Scope: Update 38.331 running CR based on this meeting’s agreements.

Intended outcome: Endorsed running CR

Deadline: Short (2 weeks)

### 7.14.2 QoE measurements in RRC\_IDLE INACTIVE

Including any further discussion on area scope handling for MBS QoE

Including discussion on AS layer signalling details and UE indication to network on report availability

Online (Tuesday) (2) – UE selection, buffering and reporting

[R2-2308354](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308354.zip) Discussion on QoE measurements in RRC IDLE/INACTIVE Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core

*Observation 1: There are multiple issues still under discussion in RAN3 and SA4/SA5 which will likely impact RAN2 specifications and will have to be discussed by RAN2 in future, e.g. area scope handling, whether MBS is treated as a QoE service type or not, whether to distinguish when the service is provided over MBS and when over unicast, whether the QoE configuration details are stored at the UE or at the network etc.*

*Selection of UEs for MBS QoE configuration*

*Observation 2: Forcing the gNB to utilize blind configuration of MBS broadcast QoE to all MBS capable UEs is sub-optimal for both the UE and the network in terms of signaling overhead, memory/storage requirements, predictability of receiving QoE measurements etc.*

*Proposal 1: RAN2 should investigate the means for the gNB to identify which UEs should be provided with MBS broadcast QoE configuration for a specific MBS session via, e.g.:*

*1. Allowing the network to indicate to the UE the IDs of MBS broadcast sessions for which it is interested in receiving QoE measurements.*

*2. The UE indicating to the network when the UE is configured with or receiving/starting to receive the indicated MBS sessions.*

- Lenovo wonders what the issue is. Why can’t we use MII? Do we need to change something in signalling? Huawei clarifies there will be some specification impact since MII triggering is only before the session starts.

- QC thinks RAN3 has asked on option 1 from SA4 but there is no reply yet. Agrees with Lenovo that the option 2 could reuse existing MII. Ericsson agrees that MII could be used. ZTE agrees with QC on option 1. Thinks that for option 2 existing MII is sufficient. CATT also agrees with using MII. Nokia agrees with Huawei on option 2.

- Huawei thinks MII is not used by the UE to ask about MBS configuration. That comes from broadcast signalling. MII is also only sent once the session is ongoing, not before the session.

- Ericsson thinks it could be checked whether something is needed. Lenovo agrees that ideally UE could collect from start of the session. But for non-MBS we already collect for ongoing sessions so same could be applied. QC thinks MII is not only sent during ongoing session, but also when UE is interested in receiving MBS session. Network just sends the configuration to UE when receiving it.

- Samsung thinks we don’t necessarily need to do anything. Thinks UE can just indicate which MBS session it is interested, but this still doens’t guarantee UE receives it. Huawei thinks RAN3 is still discussing whether to collect something from specific sessions.

- Nokia wonders what happens if there are many UEs and network wants to select only some UEs. Could randomize the selection. Samsung thinks this is just network implementation and anyway network can do it.

* From RAN2 viewpoint, network implementation can choose which UEs to use for MBS QoE. No new specification impacts have been identified. If RAN3 decides something on this aspect, RAN2 will take it into account.

*QoE reporting procedure*

*Observation 3: Resuming/setting up an RRC connection just for the sake of reporting QoE brings no benefits while it causes MBS broadcast service performance deterioration, increases signaling overhead, impacts UE battery life and brings additional complexity.*

*Proposal 2: Only 1-bit indication is used by the UE to inform the network about stored QoE reports when the UE setups or resumes the RRC connection, i.e. no additional information is included in the indication (e.g. QoE data size).*

- Huawei clarifies this is how it’s been done in the running CRs already. ZTE thinks RAN3 agreed for m-QoE that UE can provide assistance information. Ericsson agrees with Huawei.

- Lenovo has some sympathy for additional information in case there are a lot of QoE reports. Network should know whether to enable UL segmentation to avoid loss of reports. Nokia thinks for IDLE 1-bit is enough and BSR can be used for determining the buffer size. QC thinks that network should always enable segmentation to avoid data loss. Thinks RAN3 is also still discussing UE- or NW-based mechanisms.

- Huawei thinks that for UL segmentation there is a UE capability without signalling. Network can just enable segmentation and if UE supports it, UE shall use it. Thinks it may not be in Msg5 but this might lead to s-QoE overwriting m-QoE.

- Samsung thinks UE can indicate whether segmentation is supported or not so that has no issue. for overwriting, agrees with ZTE that we could address it further. Can just follow RAN3 on UE- vs. NW-based solution.

- Vodafone wonders about segmentation: When does NW tell about that to UE? Samsung clarifies that UE can tell this in Msg5 and NW can enable it in RRCReconfiguration.

- China Unicom thinks that we already agreed that UE indicates it starts QoE measurements. gNB will not establish SRB4/5 without that.

* 1-bit indication is used by the UE to inform the network about stored QoE reports in Msg5 (SetupComplete or ResumeComplete). RAN2 does not intend to specify additional mechanisms unless it can be identified that existing mechanisms (e.g. BSR) do not work. If RAN3 decides something on this aspect, RAN2 will take it into account.
* 3: The UE does not setup/resume RRC connection just for QoE reporting, i.e. the QoE reports are sent to the network when the UE moves to RRC\_CONNECTED state due to other reasons. RAN2 will not specify any mechanisms to cope with UEs not doing that. Can capture this in Stage-2.

*Proposal 3: The UE does not setup/resume RRC connection just for QoE reporting, i.e. the QoE reports are sent to the network when the UE moves to RRC\_CONNECTED state due to other reasons.*

*Buffering of QoE reports*

*Proposal 4: RAN2 agrees that assistance information for the UE to decide which reports to discard in case the UE’s QoE buffer becomes full is useful. RAN2 should wait for RAN3 conclusion on the contents of assistance information provided from OAM to RAN before working on the details.*

- Lenovo thinks that RAN3 already agreed not to send any information to UE. QC thinks we still need to wait for RAN3. Nokia agrees with Lenovo on the usefulness but we can wait for RAN3 on the assistance information. Huawei clarifies that from RAN3 viewpoint there was no need to forward the information but they didn’t analyze it from UE viewpoint. CATT also thinks some assistance information is useful but should wait for RAN3. QC thinks SA5 sent LS already that latest information is more valuable so not sure. Ericsson thinks we shouldn’t send this to the UE. What would be the use case? Thinks this is not the normal case. Samsung thinks this would be something like priority and service type so UE can decide which reports to discard.

- Huawei thinks that if the buffer is small this is not a corner case. Thinks SA5 had a default behaviour on policies so this is useful.

- Apple wonders what the “assistance information” means? Is it for overload case or something else? Lenovo thinks this is different case. China Unicom thinks RAN3 should decide on the information content to send to UE. Samsung thinks RAN3 assumption is for CONNECTED while RAN2 considers also IDLE/INACTIVE. Huawei clarifies RAN3 discussed overload and that’s why they didn’t think it’s useful for UE. This is about buffer management so not the overload case.

* 4: RAN2 thinks that assistance information for the UE to decide which reports to discard in case the UE’s QoE buffer becomes full could be useful at least for UEs in IDLE/INACTIVE to allow network to prioritize some reports over others. Send LS to RAN3 to ask whether and what information can be provided to the UE for this.
* Offline 204 (Huawei): Send LS to RAN3 based on the above.

Offline discussion [204] – LS to RAN3 on QoE

* [AT123][204][QoE] LS on MBS QoE (Huawei)

Scope: Provide LS reply to RAN3 based on meeting agreements.

Intended outcome: Reply LS in [R2-2309031](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309031.zip).

Deadline: Thursday CB session

CB QoE Thursday (1) – LS to RAN3 on QoE

[R2-2309031](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309031.zip) [Draft] LS on QoE in RRC IDLE/INACTIVE and NR-DC scenarios Huawei LS out Rel-18 NR\_QoE\_enh-Core To: RAN3

* With the usual clean-ups, the LS is approved in [R2-2309004](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309004.zip)

[R2-2309004](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309004.zip) LS on QoE in RRC IDLE/INACTIVE and NR-DC scenarios RAN2 LS out Rel-18 NR\_QoE\_enh-Core To: RAN3

* Approved

[R2-2308871](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308871.zip) Discussion on QoE measurements in RRC\_IDLE and INACTIVE states China Unicom discussion NR\_QoE\_enh-Core

*Proposal 1: RAN-based area scope information shall be sent from gNB to the UE when transferring to RRC\_IDLE state.*

*Proposal 2: 1-bit QoE measurement availability indicator per QoE configuration list can be used for the gNB to retrieve QoE reports stored in RRC\_IDLE/INACTIVE state.*

*Proposal 3: QoE configurations cannot be released via broadcast.*

*Proposal 4: Whether to adopt priority or service type information for UE to decide which reports to discard in case the UE’s QoE buffer becomes full can be aligned with RAN3’s decision.*

[R2-2307618](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307618.zip) Discussion on support of QoE measurements in RRC\_IDLE and RRC\_INACTIVE Lenovo discussion Rel-18 NR\_QoE\_enh-Core

[R2-2307746](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307746.zip) Open issues on QoE collection for IDLE and Inactive state Qualcomm Incorporated discussion NR\_QoE\_enh-Core

[R2-2307793](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307793.zip) Discussion on QoE measurement in IDLE and INACTIVE ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core

[R2-2307834](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307834.zip) QoE Measurements Discarding in IDLE/INACTIVE States Apple discussion NR\_QoE\_enh-Core

[R2-2307926](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307926.zip) Discussion on QoE measurement in RRC\_IDLE and RRC\_INACTIVE Samsung discussion Rel-18 NR\_QoE\_enh-Core

[R2-2307967](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307967.zip) QoE measurements in RRC\_INACTIVE and RRC\_IDLE Ericsson discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308232](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308232.zip) QoE for RRC IDLE and RRC INACTIVE Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308312](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308312.zip) Discusson on QoE in RRC\_IDLE and RRC\_INACTIVE CMCC discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308361](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308361.zip) Discussion on QoE measurements in RRC IDLE and INACTIVE state CATT discussion Rel-18 NR\_QoE\_enh-Core

### 7.14.3 Rel-17 leftover topics for QoE

Including discussion on Rel-17 leftover topics as agreed in previous meetings.

Including discussion on buffer level threshold based triggering (e.g. how do the RAN3 decisions impact RAN2 specifications)

Online (Tuesday) (2-3) – Buffer-level based RVQoE reporting

[R2-2307835](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307835.zip) Views on Buffer Level Threshold Based RVQoE Reporting Apple discussion NR\_QoE\_enh-Core

*Proposal: RAN2 does not proceed with the work relating to buffer level threshold based RVQoE reporting until the potential misalignment between RAN3 and SA4 is sorted out.*

- Ericsson thinks we can wait for now. QC agrees. Nokia thinks RAN3 can first decide and then we discuss if we need an LS.

* Wait for RAN3 and SA4 decisions. Can discuss need for LS to SA4 at Thu/Fri CB session.

Online (Thursday) (1) – Buffer-level based RVQoE reporting

* CB Friday: Discuss whether to have an LS to SA4 after RAN3 decisions.

CB Friday (1) – LS to SA4 on buffer-level based RVQoE reporting

*CB main session??*

[R2-2308233](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308233.zip) Discussion on Rel-17 leftovers Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core

*Observation 1: RAN2 can wait for RAN3’s final decision on one of the above options with respect to UE’s behaviour for RVQoE reporting after the threshold is met before working further on the topic.*

*Observation 2: Given the new SA4 LS, RAN2 cannot continue the work on the specification of buffer-level based RvQoE reporting without further updates from SA4.*

*Proposal 1: RAN2 to not specify buffer-level based RVQoE reporting before a new update is received from SA4.*

*Proposal 2: RAN2 to send LS response to SA4 to clarify whether the buffer-level RVQoE reporting is still valid for Rel-18 and identify the next steps from SA4.*

*Proposal 3: gNB may provide assistance information to the UE including at least priority information, FFS on additional content needed.*

[R2-2308313](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308313.zip) Discusson on Rel-17 leftover topics for QoE CMCC discussion Rel-18 NR\_QoE\_enh-Core

*Proposal 1: RAN is kindly asked to confirm buffer level threshold-based triggering of RVQoE reporting is triggered by AS layer.*

*Proposal 2:Low threshold and high threshold of buffer level can be configured for event triggered RVQoE.*

*Proposal 3: RAN2 is kindly asked to discuss the following option of event-triggered RVQoE mechanism:*

*- Option 1: A reporting mechanism based on RAN configured counter (can be 1, a positive integer, or infinity).*

*- Option 2: A periodically reporting mechanism based RAN configuration.*

*Proposal 4: RAN is kindly asked to introduce report filter or buffer management for RAN overload.*

Online (Tuesday) (1) – Buffer-level based RVQoE reporting

[R2-2307747](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307747.zip) Discussion on QoS flow ID(s) reporting and threshold-based Buffer Level reporting Qualcomm Incorporated discussion NR\_QoE\_enh-Core

*Proposal 1: Send LS to ask SA4 whether application layer can always provide QoS flow ID(s) for the both metrics of Bufferlevel and Playout delay.*

*Proposal 2: RAN2 should wait for SA4 progress on threshold-based Buffer Level reporting.*

- Ericsson thinks the IE is already optional in the running CR. Huawei agrees and thinks we just include them in the RRC.

* Follow the same approach as in Rel-17. No need send an LS due to this

[R2-2307473](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307473.zip) Discussion on buffer level threshold based triggering NEC discussion Rel-18 NR\_QoE\_enh-Core

[R2-2307794](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307794.zip) Discussion on Rel-17 leftover issues for QoE ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core

[R2-2307927](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307927.zip) Discussion on buffer level threshold based triggering Samsung discussion Rel-18 NR\_QoE\_enh-Core

[R2-2307969](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307969.zip) Event based RVQoE reporting Ericsson discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308356](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308356.zip) Discussion on Rel-17 left-over issues Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308362](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308362.zip) Discussion on Rel-17 leftover topics for QoE CATT discussion Rel-18 NR\_QoE\_enh-Core

### 7.14.4 Support of QoE measurements for NR-DC

Including discussion on how the QoE report transmission is handled (e.g. if the QoE report is not configured to use the currently configured SRB, whether this works if SCG is deactivated/released, what do the RAN3 agreements state on this, etc.)

Including discussion on how MN knows to corrrectly forward SN-associated QoE reports received via SRB4

Including discussion on RRC configuration of QoE reporting and measurements for NR-DC

Online (Tuesday) (2) – Reporting leg for NR-DC

[R2-2307474](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307474.zip) Discussion on QoE measurements for MR-DC NEC discussion Rel-18 NR\_QoE\_enh-Core

*Proposal 1 When there is only one SRB is configured, MN- and SN-associated QoE reports use the configured SRB without explicitly configuration for the configured SRB.*

- Ericsson thinks this is not in line with RAN3 agreement that MN has to ask for SN whether to allow the reporting via SCG. QC thinks this proposal doesn’t work in some cases since MN doesn’t have the forwarding information towards MCE. Thinks explicit configuration is easier.

- Huawei agrees with explicit configuration.

- Samsung wonders if UE needs to be indicated which QoE report to use when SCG is added?

- Samsung wonders if it’s valid scenario if there is only one SRB but network has configured the other leg? Does UE store the reports but not send them if the SRB to use is not available? Nokia thinks we need to define some rules on this but thinks UE should store the reports. QC thinks existing mechanisms can be used and UE can request.

- China Unicom wonders how this works with Rel-17? Nokia thinks this is different from Rel-17 and that still works.

- QC wonders if we need to do something special? Nokia thinks that for RVQoE UE should not store the report.

* In Rel-18, network always configures SRB usage for each QoE reporting explicitly.
* If UL traffic arrives and the UE cannot send a QoE report because the configured SRB is not available, UE continues to store the report until the SRB is available or the QoE configuration is released.

*Proposal 2 RAN2 confirm that MN-associated and SN-associated QoE report handling in Proposal 1 can work when SCG is deactivated or released.*

*Proposal 3 RAN2 confirm that when MCE IP address is indicated by the QoE report forwarding request node, then the QoE forwarding node forwards received encapsulated QoE reports to MCE, otherwise, the QoE forwarding node forwards received encapsulated QoE reports to MCE QoE report forwarding request node.*

[R2-2307748](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307748.zip) Open issues to support QoE collection in NR-DC Qualcomm Incorporated discussion NR\_QoE\_enh-Core

*RRC message to report QoE report associated with non-receiving RAN node*

*Proposal 1: For container based on QoE report associated with the non-receiving RAN node, use option 1 (i.e.MeasurementReportAppLayer message) to send to the receiving RAN node.*

- Ericsson prefers to use *ULInformationTransferMRDC* since that is similar to legacy evem if the RAN3 decision does allow MN to forward reports directly to MCE. Thinks we cannot use this if we support EN-DC. ZTE agrees with QC. Thinks RAN3 has already agreed that receiving node can directly forward the measurements to MCE. Huawei also supports P1 because of RVQoE works better with that.

* 1: As working assumption, for encapsulated QoE report associated with the non-receiving RAN node, use option 1 (i.e.MeasurementReportAppLayer message) to send to the receiving RAN node. This can be revisited if RAN3 decisions warrant something different for RVQoE.
* 2: Send LS to ask RAN3 to ask if the above RAN2 working assumption has some problem from RAN3 perspective (e.g. since the RVQoE measurement associated with the non-receiving RAN node can be visible to the receiving RAN node). The question is included in the LS for offline 204 (Huawei).

Online (Thursday) (1) – QoE in NR-DC

*QoE handling during NR-DC mobility,*

*Proposal 3: When SCG is deactivated, UE keeps the QoE configurations which were configured by SN or configured to be reported over SRB5.*

*Proposal 4: When SCG is deactivated, UE can be configured which QoE configurations can be reported over SRB4.*

*Proposal 5: When SCG is deactivated, UE indicates data availability for SCG bearer as existing if there is data available for those QoE configurations which are not reconfigured to SRB4.*

- Ericsson thinks we should agree to P5. Nokia wonders when UE should send these reports? Will UE store the report and only then indicate to network when it has other data available. Samsung thinks network can anyway change the reporting leg at SCG deactivation. Nokia thinks network doesn’t know whether to activate SCG or not since it doesn’t know the report size. Samsung thinks it’s premature to decide on this yet. We need to know how UL is triggered for QoE.

*?? 5: When SCG is deactivated, UE indicates data availability for SCG bearer if there is data available for those QoE configurations which are not reconfigured to SRB4 (no changes to Rel-17 mechanism).*

- Chair comments that we need to decide whether NW configures everything or not.

- Ericsson thinks that for activation, this may not work. UE could indicate assistance on data for SRB5. Huawei thinks we can leave the configuration up to network implementation.

- Nokia agrees that for deactivation, it’s up to NW. But for activation, NW does not know UE needs SCG activation. We already agreed there is no RRC setup for only QoE. Huawei thinks it’s not a problem since NW just detects the overload and can decide whether to release or pause reporting. Nokia thinks this is different from pause since UE buffers the data. So how does UE send indication whether there is QoE data to be sent?

- Samsung thinks there are many reasons to deactivate SCG. It’s not useful to indicate SCG activation only for QoE. Ericsson thinks in legacy UE can tell the reason. Samsung agrees for Rel-17 but thinks for QoE, there is a periodicity for QoE reporting even though NW doesn’t know it. So NW can activate SCG for that periodically.

- QC thinks we take the existing SCG activation as baseline and leave it up to NW what to do.

* Follow Rel-17 principles: UE indicates data availability for DRBs when requesting SCG activation. It is up to NW implementation to map SRB5 to MN or pause QoE reporting when SCG is deactivated. FFS whether this requires any specification impacts.
* UE should not request to activate SCG only for the purpose of QoE reporting via SRB5. FFS for RVQoE reporting.

*Proposal 6: When SN is released, UE is indicated which QoE configurations should be released or kept.*

- Ericsson thinks there is procedure text to upper layers at normal release. Should have something similar here. QC agrees but the intention was that UE should be explicitly indicated which QoE configurations are released. Huawei agrees.

* 6: When SN is released, UE is indicated which QoE configurations should be released or kept. For released configurations, UE indicates the release to upper layers (as in Rel-17)

*Proposal 7: Existing SCG failure and recovery procedure are reused, i.e. SRB5 bearer and related QoE reporting are suspended During SCG failure and recovery.*

*Proposal 8: Existing MCG failure and recovery procedure are reused, SRB4 bearer and related QoE reporting are suspended During MCG failure and recovery.*

- Huawei agrees with P7 and P8.

* 7: Existing SCG failure and recovery procedure are reused, i.e. SRB5 bearer and related QoE reporting are suspended During SCG failure and recovery.
* 8: Existing MCG failure and recovery procedure are reused, SRB4 bearer and related QoE reporting are suspended During MCG failure and recovery.

*QoE reporting pause and resume in NR-DC,*

*Proposal 9: Per-leg based QoE reporting pause or resume is not introduced. That means if MN is overloaded and SN is not, QoE reporting can be changed to SRB5 (if configured), or vice versa.*

- Huawei wonders what “per-leg based” means? QC clarifies that we wouldn’t support pausing for MN leg or SN leg. Would rather support Rel-17 mechanism of per-index puasing.

* Do not change QoE pause/resume in Rel-18, i.e. pause/resume works based on QoE reporting IDs.

*Proposal 10: If both MN and SN are overloaded, network can indicate QoE reporting pause per QoE configuration to UE. It is left to RAN3 which RAN node sends the pause indication to the UE.*

*Proposal 11: When network indicates QoE reporting resume to UE, network can indicate which bearer is used when QoE reporting is resumed. It is left to RAN3 which RAN node sends the resume indication to the UE.*

*RVQoE reporting,*

*Proposal 12: RAN node should indicate which bearer should be used for RVQoE reporting per QoE configuration.*

- Nokia thinks this is still discussed in RAN3.

* Wait for RAN3

[R2-2307968](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307968.zip) QoE measurements in NR-DC Ericsson discussion Rel-18 NR\_QoE\_enh-Core

*Observation 1 Reusing existing DC procedures for QoE guarantees support in multi-vendor and multi-RAT scenarios and decreases the complexity of the feature.*

*Proposal 1 A MeasurementReportAppLayer message to the SN can be sent embedded in ULInformationTransferMRDC to the MN.*

*Proposal 2 ULInformationTransferMRDC can be sent using SRB4.*

*Proposal 3 A reporting instruction is provided for each RRC QoE configuration, i.e. per measConfigAppLayerId, in rel-18.*

*Proposal 4 The RRC reporting instruction for QoE reporting can include the options: - report to MN via SRB4, - report to SN transparently via SRB4, and - report to SN directly via SRB5.*

*Proposal 5 QoE configurations configured by the SN are released in the UE when the SCG is released.*

*Proposal 6 A UE can be configured to, upon SN release, send the unsent SN QoE reports to the MN.*

*Proposal 7 The UE sends a UEAssistanceInformation message indicating that it has UL data to send (according to existing procedures), if the SCG is deactivated when the UE has a QoE report to send.*

*Proposal 8 The UE can indicate in UEAssistanceInformation that it has a QoE report to transmit.*

[R2-2308314](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308314.zip) Discussion on QoE in NR-DC CMCC discussion Rel-18 NR\_QoE\_enh-Core

[R2-2307795](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307795.zip) Discussion on QoE measurement for NR-DC ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core

[R2-2307836](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307836.zip) Discussions on QoE Reporting for NR-DC Apple discussion NR\_QoE\_enh-Core

[R2-2307928](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307928.zip) Discussion on QoE measurement in NR-DC Samsung discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308234](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308234.zip) On QoE configuration and reporting in NR-DC Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308355](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308355.zip) Discussion on QoE measurements in NR-DC Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308363](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308363.zip) Discussion on support of QoE measurement for NR-DC CATT discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308870](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308870.zip) Discussion on QoE configuration and reporting for NR-DC China Unicom discussion NR\_QoE\_enh-Core

### 7.14.5 UE capabilities and other topics

Including discussion on the continuity of legacy QoE measurement job for streaming and MTSI service during intra-5GC inter-RAT handover process (deprioritized if input from RAN3 is not received during the meeting).

Including any other QoE enhancement discussion (e.g. service type aspects).

Including discussion on UE capability aspects of the QoE WI (e.g. support of MBS QoE and corresponding UE memory size requirements, support of SRB5, support of buffer level threshold based triggering in AS, alignment between AS and AL capabilities, etc.)

Online (Tuesday) (3) – UE capabilities for QoE

[R2-2308315](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308315.zip) Discussion on QoE UE capabilities CMCC discussion Rel-18 NR\_QoE\_enh-Core

*MBS QoE aspect:*

*Proposal 1: Introduce an independent UE capability indicating whether UE can perform QMC in RRC\_IDLE and RRC\_INACTIVE.*

*Proposal 2: Wait for SA4's reply LS for RAN3 on other MBS QoE relating UE capability.*

*Proposal 3: Reuse 64KB AS buffer size for paused QoE for MBS QoE in RRC\_IDLE/RRC\_INACTIVE.*

*Proposal 4: Introduce an optional UE capability for QoE in RRC\_IDLE/RRC\_INACTIVE indicates whether UE support extra AS buffer size for QoE in RRC\_IDLE/RRC\_INACTIVE. 256KB can be a baseline.*

*Event-triggered RVQoE aspect:*

*Proposal 5: Introduce an optional UE capability for event triggered RVQoE indicates whether UE AS layer supports to buffer level threshold triggering mechanism.*

[R2-2307749](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307749.zip) Discussion on UE QoE capabilities Qualcomm Incorporated discussion NR\_QoE\_enh-Core

*UE capabilities on IDLE/Inactive state QoE*

*Proposal 1 Introduce UE capability of supporting QoE collection in IDLE/Inactive with radio access capability parameters.*

*Proposal 2 UE can report capability of supporting IDLE and Inactive state QoE collection only when UE supports MBS broadcast.*

*Proposal 3 Waiting for SA4/SA5 feedback on whether to introduce UE capability of supporting CONNECTED state QoE for MBS service type.*

*Proposal 4 UE is required to buffer 64KB size for QoE data if the UE supports QoE collection for IDLE and Inactive state .*

*Proposal 5 RAN2 assume to introduce independent UE capabilities of supporting 128KB i.e. 256KB, 512KB buffer size. Send LS to SA4 to confirm the UE capabilites .*

*UE capabilities on NR-DC QoE*

*Proposal 6 Introduce UE capability of supporting NR-DC configuration via SRB3 with radio access capability parameter .*

*Proposal 7 Introduce UE capability of supporting SRB5 for QoE reporting with radio access capability parameters .*

*Proposal 8 It is FFS on other NR-DC QoE capabilities e.g. whether to support new message or IEs.*

*Other UE capabilities*

*Proposal 9 RAN2 assumes it is optional to report QoS Flow ID when reporting RVQoE measurements .*

*Proposal 10 Wait for SA4 progress on UE capability of supporting threshold-based*

*Proposal 11 Send LS to SA4 to check the following UE capabilities*

*- Independent UE capabilities of supporting 128KB i.e. 256KB, 512KB buffer size*

*- UE capability of supporting QoS Flow ID reporting*

[R2-2307970](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307970.zip) Outstanding issue and UE capabilities for QoE Ericsson discussion Rel-18 NR\_QoE\_enh-Core

*Observation 1 In existing procedures, a target node may end up having incorrect QoE measurement status information at conditional handover.*

*Proposal 1 Discuss how to resolve the issue that a target node may not have correct measurement status information when a conditional handover is executed.*

*Proposal 2 Define a new per UE bit for support of QoE measurements in RRC\_IDLE/RRC\_INACTIVE. A UE supporting this feature shall also support a minimum memory size of 512 kBytes for storing of QoE reports.*

*Proposal 3 Define a new per UE bit for support of storing of QoE reports up to 1024 kBytes.*

*Proposal 4 Define a new UE capability bit for support of QoE measurements in NR-DC.*

MBS QoE in IDLE/INACTIVE

*Proposal 1: Introduce an independent UE capability indicating whether UE can perform QMC in RRC\_IDLE and RRC\_INACTIVE.*

- Samsung wonders whether there would be different capabilities for IDLE/INACTIVE and CONNECTED or just one? CMCC clarifies there would be a separate capability for CONNECTED.

- QC thinks a capability is needed for UE selection. Is not sure about CONNECTED since this depends on the service type usage and is up to SA5. Huawei agrees.

* 1: Introduce an UE capability indicating whether UE can perform MBS QoE in RRC\_IDLE and RRC\_INACTIVE. FFS whether the same capability can be used for MBS QoE in RRC\_CONNECTED.

*Proposal 4: Introduce an optional UE capability for QoE in RRC\_IDLE/RRC\_INACTIVE indicates whether UE support extra AS buffer size for QoE in RRC\_IDLE/RRC\_INACTIVE. 256KB can be a baseline.*

- Lenovo thinks there are different values but can accept >64 kB if it’s justified. How are the values calculated, i.e. what are the assumptions on what UE has to support? QC thinks it’s not easy to evaluate the minimum size so would like the 64 kB as minimum size. Also thinks for RedCap or IOT the buffer size is important. Lenovo agrees it’s not easy but at least we had some numbers from SA4. Whether these are realistic or can be discussed but at least we need to agree on the assumptions and can verify those from SA4.

**Table 1: Exemplary QMC scenarios for MBS broadcast services in RRC\_IDLE**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **#** | **#QoE configs** | **Size of QoE report per QoE config** | **Reporting interval** | **QMC duration** | **Total size of generated QoE reports** |
| 1 | 1 | 2 kBytes | 10min | 1 hour | 12 kB |
| 2 | 1 | 18 kBytes | 10min | 1 hour | 108 kB |
| 3 | 4 | 2 kBytes | 10min | 1 hour | 48 kB |
| 4 | 4 | 18 kBytes | 10min | 1 hour | 432 kB |
| 5 | 8 | 2 kBytes | 10min | 1 hour | 96 kB |
| 6 | 8 | 18 kBytes | 10min | 1 hour | 864 kB |
| 7 | 16 | 2 kBytes | 10min | 1 hour | 192 kB |
| 8 | 16 | 18 kBytes | 10min | 1 hour | 1728 kB |

- Huawei thinks we could converge to 64 kB as the basic capability. Ericsson thinks 64 kB is not sufficient since that might not even allow 1 QoE configuration in some cases. At least 128 kB would be better. Samsung thinks most UEs can anyway support more than 64 kB but that’s the safest minimum value. CMCC thinks QoE configuration could last up to 48h so prefers large enough buffer. Lenovo thinks 64 kB doesn’t still tell what exactly UE supports. Lenovo thinks allowing a value range would make most sense. QC thinks buffer size is very sensitive for RedCap UEs. That’s why 64 kB should be the minimum value. Apple agrees.

- Nokia wonders if this buffer is additional for the Rel-17 QoE or shared with it? Huawei thinks we need to agree to this. QC thinks it should be shared. Rel-17 is only for the paused reports.

* Introduce a UE capability for the supported buffer size. It is conditionally mandatory if UE supports MBS QoE. The range is from 64 kB to 1024 kB (exact values can be discussed in RRC running CR discussion). FFS whether this is shared or additional to the Rel-17 buffer size requirement.

*Proposal 4 Define a new UE capability bit for support of QoE measurements in NR-DC.*

[R2-2307796](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307796.zip) Discussion on Rel-18 other QoE enhancement ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core

[R2-2307837](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307837.zip) Views on UE Capabilities for Rel-18 QoE Apple discussion NR\_QoE\_enh-Core

[R2-2307929](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307929.zip) Discussion on QoE measurement continuity during inter-RAT handover Samsung discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308235](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308235.zip) Inter-RAT QoE continuity and UE capabilities Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core

[R2-2308357](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308357.zip) Discussion on UE capabilities for QoE enhancements Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core

## 7.17 Dual Transmission/Reception (Tx/Rx) Multi-SIM for NR

(NR\_DualTxRx\_MUSIM-Core; leading WG: RAN2; REL-18; WID: [RP-230751](https://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_99/Docs/RP-230751.zip))

Time budget: 1 TU

Tdoc Limitation: 4 tdocs

### 7.17.1 Organizational

Including LSs and any rapporteur inputs (e.g. work plan)

Running CR rapporteurs of 37.340 (ZTE), 38.300 (China Telecom) and 38.331 (vivo) specifications are requested to provide first/latest versions running CRs as rapporteur input (which are not counted against the Tdoc limits)

Online (Monday) (3) – Running CRs

[R2-2307538](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307538.zip) 37.340 Running CR for Introduction of MUSIM ZTE Corporation, Sanechips draftCR Rel-18 37.340 17.5.0 B NR\_DualTxRx\_MUSIM-Core

* Companies are encouraged to provide comments on the CR to rapporteur(s) already during the meeting (i.e. before any post-meeting email discussion)
* Two-week post-meeting email discussion to handle updates to the running CR

[R2-2307689](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307689.zip) Running RRC CR for NR MUSIM enhancements vivo draftCR Rel-18 38.331 17.5.0 NR\_DualTxRx\_MUSIM-Core

* Companies are encouraged to provide comments on the CR to rapporteur(s) already during the meeting (i.e. before any post-meeting email discussion)
* Two-week post-meeting email discussion to handle updates to the running CR

[R2-2308726](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308726.zip) 38.300 Running Stage-2 CR for NR MUSIM enhancements China Telecom draftCR Rel-18 38.300 17.5.0 NR\_DualTxRx\_MUSIM-Core

* Companies are encouraged to provide comments on the CR to rapporteur(s) already during the meeting (i.e. before any post-meeting email discussion)
* Two-week post-meeting email discussion to handle updates to the running CR

Post-meeting email discussions (MUSIM) (3) – Running CR(s)

* [Post123][231][MUSIM] 38.300 running CR for MUSIM (China Telecom)

Scope: Update 38.300 running CR based on this meeting’s agreements.

Intended outcome: Endorsed running CR

Deadline: Short (2 weeks)

* [Post123][232][MUSIM] 37.340 running CR for MUSIM (ZTE)

Scope: Update 37.340 running CR based on this meeting’s agreements.

Intended outcome: Endorsed running CR

Deadline: Short (2 weeks)

* [Post123][214][MUSIM] RRC running CR for MUSIM (vivo)

Scope: Update 38.331 running CR based on this meeting’s agreements.

Intended outcome: Endorsed running CR

Deadline: Short (2 weeks)

### 7.17.2 Procedures for MUSIM temporary capability restriction

Including discussion on “proactive” and “reactive” approaches and whether/how it’s possible to use the same procedural framework for both cases

Including discussion on how the early MUSIM indication from UE to NW indication during RRC connection setup/resume works

Including discussion on whether/how UE can request specific serving cells to be released for for the “proactive” approach

Including discussion on how the UE signalling on capability restrictions works (e.g. which RRC message and other signalling details)

Online (Monday) (2) – Early indication on capability restrictions

[R2-2308243](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308243.zip) Discussion on early capability restriction indication NEC discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Observation: sending the early indication in RRCResumeRequest message would use the precious 1 spare bit, and sending the early indication in RRCResumeComplete message is too late.*

*Proposal 1: During RRC setup and RRC resume procedure, UE indicates its capability is temporary restricted by sending CCCH message using dedicated LCID.*

*Proposal 2: During RRC re-establishment procedure, UE indicates its capability is temporary restricted by sending CCCH message using dedicated LCID.*

- QC thinks we should discuss whether we need Msg3 or not. Could only do Msg5.

- Huawei thinks for Setup we could use Msg5. For Resume could consider LCID or Msg5.

- vivo thinks Msg5 doesn’t work for resume.

- LGE also supports LCID-based solution for resume. For RRCSetup Msg5 doesn’t bring much gains. Could use LCID for all cases.

- OPPO thinks unified solution may be OK but we have limited amount of LCIDs. Not needed for RRCSetup. For Resume could also use UE going to RRC\_IDLE.

- Apple thinks LCID would terminate in DU, while Msg5 is in CU.

- ZTE thinks for setup, Msg5 is enough. Resume could use going to RRC\_IDLE.

- Intel thinks for setup Msg5 may be fine but for resume we do not know what happens. QC thinks if you have configuration failure, UE goes to IDLE.

- China Telecom agrees with ZTE and thinks Msg5 is enough for both cases. Nokia agrees with ZTE and thinks LCID is unsecure so could be dangerous. Samsung thinks Msg5 is enough.

- MTK agrees with ZTE. Ericsson also agrees.

- Huawei thinks for resume, Msg5 is sufficient.

- Samsung wonders what happens if UE can cope with the MUSIM restrictions, do we then force UE to go to IDLE? vivo wonders MUSIM is the only case? QC thinks UE can already declare RLF if UE cannot comply with RRCResume. Samsung thinks this is still related to actual UE capabilities and this is about temporary capability restriction. vivo thinks we have a problem with UE behaviour with Msg5. With LCID we have no such problem.

- MTK thinks we are lacking LCIDs already.

- Ericsson thinks we could use some reduced configuration until you get UAI. Intel thinks we could have also used UE capability, but it would be better to know UE has a MUSIM connection.

* Use Msg5 for early indication of MUSIM capability restriction for UEs in IDLE.
* Using LCIDs would avoid any problems for RRC resume procedure. However, there are not many LCIDs left for UL and some other Rel-18 WIs also intend to use them.
* CB Thursday How to handle possible conflicts with LCID if RAN2 decides to use those for MUSIM.

*?? For RRC resume, if UE cannot comply with the RRCResume due to restricted MUSIM capabilities, UE shall fall back to RRC\_IDLE and use RRCSetupRequest when restarting the connection.*

*?? For RRC resume, there could be some network-provided configuration that MUSIM UE always applies for RRC resume.*

- OPPO wonders why NW would use the indication? vivo clarifies not all gNBs support the MUSIM so UE cannot know whether to send the MUSIM indication. Samsung wonders what UE will do if the network is not sending the indication? OPPO thinks UE can use Msg5. Nokia thinks the flag will just mean network control of the flag from UE, not about cell barring. OPPO thinks there is no signalling saving with this indication.

- Huawei thinks the NW indication can let UE know whether temporary capability is allowed, or whether UE needs to update capabilities via NAS. Samsung thinks if NW doesn’t indicate, UE needs to find another way to do the capability restriction so it’s useful also for the UE side. vivo wonders if we need the FFS? QC thinks UE can use this in cell selection as well.

* 3: UE sends early indication of MUSIM temporary capability restriction only if the network indicates that it is allowed in SIB1.

[R2-2307450](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307450.zip) Discussion on early MUSIM indication Huawei, HiSilicon discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1: Using a 1-bit as the “early MUSIM indication” from the UE to NW during RRC connection setup/resume procedure to indicate that the UE capabilities are temporarily restricted.*

*Proposal 2: gNB indicates whether sending the early MUSIM indication during the RRC connection setup/resume procedure is allowed via the System information. It is FFS which SIB is used to carry such indication.*

*Proposal 3: It is up to UE implementation whether to send early MUSIM indication during the RRC connection setup/resume procedure if the gNB enable it. After UE sends early MUSIM indication, the gNB can enable the UE to provide MUSIM UAI for temporary capabilities reporting.*

*Proposal 4: The 1-bit Early MUSIM indication is introduced in RRCSetupComplete message for RRC connection setup procedure.*

*Proposal 5: To avoid security issue, the early MUSIM indication is also introduced in RRCReconfigurationComplete message in RRC connection setup procedure for confirmation.*

*Proposal 6: Early MUSIM indication is carried when the UE sends the RRCResumeRequest message for RRC connection resume procedure.*

*Proposal 7: If Proposal 6 is agreed, RAN2 to discuss how the RRCResumeRequest message carries early MUSIM indication.*

- Intel thinks the restriction is anyway temporary so UAI will anyway be sent afterwards. QC wonders if this would be in the RRCComplete with the restricted configuration. ZTE thinks UE capability is anyway sent only after security activation.

- Huawei wonders if this means UE would always need to send UAI after security activation?

- Apple thinks that if UE is in restricted operation and is in cell that doesn’t have the SIB indication. UE continues to use the cell and starts connection. If UE has no problems, it will not send UAI.

* No support to use RRCReconfigurationComplete for the early indication of MUSIM capability restriction. Can come back if sufficient support.

*Proposal 5: To avoid security issue, the early MUSIM indication is also introduced in RRCReconfigurationComplete message in RRC connection setup procedure for confirmation.*

[R2-2307690](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307690.zip) Early indication for MUSIM temporary capability restriction vivo discussion Rel-18

*Proposal 1 The UE can indicate capability restriction during RRC resume procedure via the following options:*

*- Option 1: Use the spare bit in RRC resume request/RRC resume request1.*

*- Option 2: Introduce two LCIDs for CCCH and CCCH1 for temporary capability restriction indication.*

*Proposal 2 The network can configure the UE to report capability restriction information via UAI in RRC Resume message.*

*Proposal 3 If the option2 of proposal 1 is not agreed, the UE can indicate capability restriction in RRC setup complete.*

*Proposal 4 The UE can be configured by the network via system information whether the UE is allowed to report capability restriction during RRC resume /RRC setup procedure.*

[R2-2307162](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307162.zip) Discussion on early MUSIM Indication OPPO discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal1: Early MUSIM indication only has one single bit.*

*Proposal2: During connection setup procedure, early MUSIM indication is included into MSG5, i.e. RRCSetupComplete message.*

*Proposal3: For inactive state UE, RAN2 is kindly asked to do down selection from the following options for early MUSIM indication:*

*Option1: For inactive state UE, early MUSIM indication is included into MSG3, i.e. RRCResumeRequest message, which is carried via CCCH1;*

*Option2: For inactive state UE, UE will trigger state transition to idle if UE is aware of the potential resource collision due to MUSIM operation and the follow-up UE behavior is the same as idle UE.*

*Proposal4: No toggle indicator is needed in the system information to control UE on whether to enable early MUSIM indication function during RRC connection setup/resume procedure.*

[R2-2307780](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307780.zip) Indication of UE Capability Restriction for eMUSIM SHARP Corporation discussion

[R2-2308091](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308091.zip) MUSIM Capability restriction signalling during RRC Resume and Setup Intel Corporation discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2308497](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308497.zip) Early indication of temporary capability restriction Samsung discussion

[R2-2308255](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308255.zip) Early indication of restricted capabilities for MUSIM UE Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2307872](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307872.zip) Signalling aspects for MUSIM temporary capability restriction Apple discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

Online (Monday) (2) – Procedures for reactive/proactive approaches

[R2-2307774](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307774.zip) Basic signalling procedure for reactive and proactive approach for Dual TX/TX MUSIIM operation Nokia, Nokia Shanghai Bell discussion

*Reactive Approach*

*Proposal 1: MUSIM UE Assistance information for the reactive approach indicate the preference for the reduction of secondary cells or cell-group from the current configuration.*

*Proposal 2: UAI for the reactive approach includes a preference for the release of specific secondary cells and a preference to swap secondary cells to the new frequency.*

*Proposal 3: UAI for the reactive approach for NW-A in dual connectivity includes UE preference to release specific cell-group.*

*Proposal 4: For the reactive approach, the wait-timer is defined with the Wait timer value configured by Network.*

*Proposal 5: For UAI with reduction of secondary cells, the release of RRC connection at NW-A is considered as default behavior. NW may configure UE automatically switching to a reduced configuration as alternative UE behavior for wait-timer expiry.*

*Proposal 6: For wait-timer expiry for UAI with cell-group release UE may either send SCG-Failure indication via MN-RRC connection or release of RRC connection depending on the cell-group needs to be released.*

- Nokia explains that UAI would indicate the release of cells or SCG instead of the capabilities.

- Huawei thinks we do not need multiple indications. UE could also indicate affected cells and leave it up to network what to do.

- China Telecom thinks we already agreed that in reactive scenario, UE will directly request SCG or SCell release.

- LGE is generally fine but wonders if the swap is needed in UAI? Network could also change based on measurement results. Nokia thinks UE may not be capable of all frequencies, so it needs to indicate that.

- Apple supports P1-3 and is wondering how measurements apply here. This is about UE restricting certain frequencies.

- Samsung thinks there is no need to indicate release of SCells.

- Huawei wonders what swapping of frequencies means since that is more proactive. Nokia clarifies this would indicate the alternative frequency that UE can use. Huawei thinks we sholdn’t mix both approaches.

- MTK thinks we already agreed except for the swap.

* Continue discussion in Thursday session with proactive approach on whether UE can indicating frequency that it would prefer to use.

Online (Thursday) (1) – Procedures for reactive/proactive approaches

*?? 2: UAI can include a preference for the release of specific secondary cells and a preference to swap secondary cells to the new frequency.*

*?? 3: UAI to request release of SCG can indicate preference for which frequency to use.*

*Proactive Approach*

*Proposal 7: For the proactive approach, UE indicates its state of reduced capability in UAI to inform the NW about the reduced capability at UE due to MUSIM operation.*

*Proposal 8: Number of proactive UAI, Triggering condition for UAI can be configured by NW.*

*Proposal 9: Pro-active temporary capability restriction triggering on the reception of RRC-Reconfiguration is supported.*

*Removal of Restrictions*

*Proposal 10: Indication to the restoration of full capability is included as an additional parameter in RRC Reconfiguration completion and measurement report instead of a separate UAI for this scenario.*

*Proposal 11: Simple Indication of the change in capability is triggered on partial removal of capability restriction and NW to obtain the complete restricted capability information via separate signaling.*

Online (Thursday) (1-2) – Using timer(s)?

[R2-2308789](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308789.zip) Timer based approach in MUSIM LG Electronics discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1. A timer is introduced to allow the UE to perform the temporary capability restriction w/o the network response when the timer, which should start upon request of the restriction, expires.*

*Proposal 2. The UE can utilize the timer to support temporary capability restrictions in the proactive cases if the network allows.*

[R2-2307691](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307691.zip) Procedures for MUSIM temporary capability restriction vivo discussion Rel-18

*Proposal 1 A network configured band filtering is only applied for proactive approach. For proactively reporting DC/CA capability change and band conflict issue, if a band filtering is configured, the UE is only allowed to report constrained BCs or constrained bands in a BC or constrained FeatureSetDownlinkPerCC-Id(s) in a BC which has a band included in the band filtering.*

*Proposal 2 For reactively reporting DC/CA capability change and band conflict issue, the UE includes the serving cell index to be released / SCG release indication in the UAI.*

*Proposal 3 For Rel-18 MUSIM dual active operation, extend the similar measurement gap requirement change reporting in RRC reconfiguration complete to UAI.*

*Proposal 4 If RAN2 agrees maximum MIMO layer change can be reported for specific serving cell, the UE includes the maximum MIMO layer for the specific serving cell by using the serving cell index in the UAI.*

*Proposal 5 If RAN2 agrees maximum MIMO layer change can be reported per FSPC, the UE only includes the maximum MIMO layer per CC per feature set entry for the BC which contains a band included in the band filtering list in the UAI.*

*Proposal 6 The UE can remove the MUSIM capability restriction information by not including the detailed fields in Rel-18 MUSIM field in the UAI.*

*Proposal 7 If the UE requests a change of UE capabilities reactively, the UE starts a wait timer. The UE shall maintain the capabilities until the expiry of wait timer.*

*Proposal 8 Introduce separate network enable configurations for the “proactive” and “reactive” approaches.*

*Proposal 9 Not introduce individual control for each temporarily changed capability.*

*Proposal 10 Prohibit timer for the signaling of UE capability changes is not supported in Rel-18 MUSIM.*

[R2-2308758](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308758.zip) Procedure for MUSIM temporary capability restriction China Telecom discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Observation 1: No matter proactive approach or reactive approach, common signalling framework can be used.*

*Observation 2: it will be more controllable to define the UE behaviour when no NW response was received after the expiry of wait timer when reduced and released capability restrictions are included in UAI.*

*Proposal 1: It is not necessary to explicitly distinguish reactive and proactive approach in specifications, but may include different IEs in UAI. Both reactive and proactive UE capabilities restrictions can be included in one UAI.*

*Proposal 2: Introduce a wait timer for reactive capabilities restrictions reporting to address the UE behaviour when no response was received from NW. When the timer expiries, UE can e.g. either reduce capability locally or request to release connection in NW A (using Rel-17 MUSIM leave indication), or not respond the paging from NW B.*

*Proposal 3: Introduce a prohibit timer for proactive capability restriction reporting to prevent the frequently UAI reporting. UAI cannot report again until the timer expiry. And it’s FFs whether the wait timer and prohibit timer can be merged into one single timer.*

*Proposal 4: It is more appropriate to send early indication in RRC Setup/Resume Complete message.*

*Proposal 5: Introduce an indication in SIB1/on-demand SI to indicate whether the UE is allowed to send temporary capability restriction indication in Msg5.*

*Proposal 6: Compared to explicit request in reactive way, proactive way favours implicit request. In proactive case, UE can indicate a list of constrained/affected band combinations/bands(e.g., band combinations/bands affected by camping frequency in NW B, band combinations/bands may affected in the future) to NW A via UAI.*

[R2-2307280](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307280.zip) Procedures for MUSIM temporary capability restriction DENSO CORPORATION discussion NR\_DualTxRx\_MUSIM-Core

*Observation 1: When RRCSetupRequest or RRCResumeRequest or RRCReestablishmentRequest is received, network would start configuration/resume for the UE even though capability restriction information is not yet available*

*Proposal 1: The “early indication” should be included in RRCSetupRequest or RRCResumeRequest or RRCReestablishmentRequest*

*Proposal 2: 1 bit flag is enough for “early indication” to indicate whether the UE has restricted capability or not*

*Proposal 3: Even in case “early indication” is used, the capability restriction information itself should be sent by using UAI, from perspective for the data size of RRCSetupRequest / RRCResumeRequest / RRCReestablishmentRequest and consistency with normal scenario*

*Proposal 4: The network should postpone configuration/resume for the UE until capability restriction information is available if “early indication” is received at RRCSetupRequest / RRCResumeRequest / RRCReestablishmentRequest*

*Proposal 5: UE should inform full (non-restricted) capability for UECapabilityEnquiry procedure even though the UE has restricted capability*

*Observation 2: To configure CG specific MUSIM gap, UE may need to indicate its preference on which CG to configure the MUSIM gap to the network A, since the network A is not able to know which RF chain will be used for the communication with the network B.*

*Proposal 6: RAN2 to introduce UE indication for its preference on which CG to configure the MUSIM gap.*

[R2-2308791](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308791.zip) Procedures for Dual-Active MUSIM Qualcomm Incorporated discussion

*Observation 1: There are not sufficient spare bits to signal “early indication” in msg3.*

*Observation 2: An earlier indication than msg5 is not needed for the existing NR deployments.*

*Observation 3: RAN2 specifications define the UE behavior only from one NW perspective.*

*Proposal 1: The NW can allow “early indication” via dedicated (e.g. RRC Release for Inactive mode) or broadcast signalling (e.g. in SIB1).*

*Proposal 2: The UE signals the “early indication” for temporary UE capability restriction in msg5.*

*Proposal 3: The “early indication” includes a Boolean flag (e.g. TRUE means that the capability is restricted). Other types of additional information (e.g. MIMO layers) are FFS.*

*Propsoal 4: In principle, the same set of UE capabilities for temporary restrictions are applicable to both proactive and reactive approaches. ASN.1 may differ between the two in some cases and can be FFS.*

*Proposal 5: RAN2 should discuss whether “proactive” approach is an additional/optional behavior for UE capability restriction or is always allowed as part of dual-active MUSIM feature.*

*Proposal 6: “Proactive” approach is allowed based on NW configuration, similar to other UAI reporting.*

*Proposal 7: RAN2 to acknowledge the scenario where the UE capability restrictions have to happen before a certain time and discuss solutions when NW A response does not happen before that time.*

*Proposal 8: As in Rel-17 MUSIM, RAN2 will introduce new Rel-18 UE behavior from only NW A perspective.*

[R2-2307161](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307161.zip) Discussion on proactive and reactive approaches OPPO discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2307454](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307454.zip) Discussion on proactive and reactive approaches Huawei, HiSilicon discussion

[R2-2308089](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308089.zip) Common framework for proactive and reactive approach for MUSIM Intel Corporation discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2308244](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308244.zip) Procedures for MUSIM temporary capability restriction NEC discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2308498](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308498.zip) Discussion on temporary capability restriction Samsung discussion

[R2-2308787](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308787.zip) General procedure for Both Proactive and Reactive cases LG Electronics discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2307539](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307539.zip) Consideration on the Temporary capability Reporting procedure ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

Postponed to next meeting (2) – MUSIM with C-DRX, CHO, gaps, etc.

[R2-2308788](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308788.zip) Supporting Proactive cases in other scenarios LG Electronics discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1. For one of proactive cases, if the UE has been configured CHO configuration, the UE can send a UAI message to indicate a potential conflict on SCG/SCell in the CHO configuration before execution.*

*Proposal 2. For one of proactive cases, if the UE has early measurement results for fast CA/DC activation, the UE can indicate which frequencies are problematic due to MUSIM operation when reporting EMR (Early Measurement Report).*

* Postponed

[R2-2307775](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307775.zip) Additional aspects for Dual TX/RX MUSIM Operation Nokia, Nokia Shanghai Bell discussion

*MUSIM Gap Configuration for Dual TX/RX UE*

*Proposal 1: Cell-Group specific Gap preference and configuration are allowed for Dual TX/RX UE in Rel-18.*

*C-DRX gaps for Capability Sharing*

*Proposal 2: For NW-A Dual connectivity operation with C-DRX, the establishment of RRC connection at NW-B without the release of SCG is considered instead of SCG Release. FFS additional information is included in the RRC message at NW-B to enable resource sharing using C-DRX gaps.*

*Proposal 3: Small Data Transmission at NW-B should be allowed in NW-B without triggering UAI to release the cell group at NW-A depending on the gaps available to complete the SDT.*

*Gaps for Capability Sharing*

*Observation 1: For short RRC connection or SDT at NW-B, the Rel-17 MUSIM switching mechanism is not optimized for signaling overhead and data interruption performance at NW-A.*

*Observation 2: Release of secondary cells /cell groups at NW-A and adding them back via RRC procedure for short RRC connection at NW-B will result in signaling overhead and longer interruption time than the actual duration of NW-B activity.*

*Proposal 4: RAN2 to consider defining an aperiodic gap for ‘suspension of secondary-cell /secondary cell group’ for short activity (e.g short signaling, SDT) at NW-B whose maximum duration is known to UE.*

*Proposal 5: RAN2 to consider periodic gaps for capability sharing for Rel-18 MUSIM operation which does not require capability restriction and removal of restrictions across NW.*

*Restoring of Dual Connectivity after restriction removal*

*Proposal 6: UAI for Cell-Group Release includes additional information on the purpose/cause that can be used by NW-A on whether to conditionally configure SCG for return after NW-B activity.*

*Observation 3: As per the current specification, It is possible to include conditional configuration for CPA in the RRC Reconfiguration that indicates the release of SCG for MUSIM operation.*

*Proposal 7: For CPA configuration included in the RRC Reconfiguration that releases SCG for MUSIM operation the evaluation is postponed until UE returns.*

*Mobility Enhancements Interworking*

*Observation 4: Starting of RRC connection at NW-B when UE has stored conditional configuration may result in mobility failure if these configurations are not considered in the capability restriction check.*

*Proposal 8: RAN2 to discuss the impact to conditional configurations when UAI for temporary capability restriction is triggered.*

*Proposal 9: RAN2 to study the impact to DAPS configuration from Rel-18 MUSIM capability restriction.*

* Postponed

### 7.17.3 Allowed MUSIM temporary capability restrictions

Including discussion on which UE capabilities in NW A or NW B can be impacted by temporary UE capability restrictions (e.g. MIMO layers, measurement gaps, SRS tx switching, bandwidth support, etc.) and in which granularity?

Including discussion band combination restrictions due to band conflict and what does UE report to the network for those cases?

Online (Thursday) (2) – allowed UE capability restrictions

[R2-2307540](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307540.zip) Consideration on the Temporory Capability Reporting ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1: The UE can report the BCs that are affected by the collision, and these affected BCs includes 2 types:*

* Type 1: The BCs that are forbidden because of the collision;*

* Type 2: The BCs that are supported but with lower capabilities (e.g. with lower MIMO layer and/or lower bandwidth) because of the collision.*

*Proposal 2: The UE can indicate the affected BCs by Index, the Index indicates the position of the BC that reported in the supportedBandCombinationList of the UE capability message.*

*Proposal 3: For the Type 2 affected BCs, besides the BC index, the UE also needs to report the additional affected capabilities (e.g. MIMO layer and/or bandwidth, FFS on the Granularity).*

*Proposal 4: The affected band-combinations can be CA, DC and/or single CC.*

*Proposal 5: The MIMO layer and/or the supported bandwidth restriction shall only work for the Type 2 BCs.*

*Proposal 6: The MIMO layer and the supported bandwidth shall be reported with the same granularity.*

*Proposal 7: The same granularity shall be adopted for the DL and UL on the MIMO layer and the supported bandwidth reporting.*

*Proposal 8: Adopt per FSPC (or per BC) granularity for the MIMO layer and Bandwidth reporting.*

*Proposal 9: Apply one configuration to control all temporary capabilities update.*

[R2-2307692](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307692.zip) Discussion on temporary capability restriction for Rel-18 Multi-SIM vivo discussion Rel-18

*Proposal 1 For dual active MUSIM, the UE can indicate the temporary maximum MIMO layers for specific serving cells.*

*Proposal 2 For dual active MUSIM, the UE can indicate the temporary supported bandwidth for specific serving cells.*

*Proposal 3 RAN2 to discuss whether maximum MIMO layers/bandwidth can be also reported per FSPC.*

*Proposal 4 For dual active MUSIM, the UE can indicate the temporary SRS switching capability for specific serving bands or per band per BC.*

[R2-2307451](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307451.zip) Details of allowed MUSIM temporary capability restrictions Huawei, HiSilicon discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*General procedure*

*Proposal 1: For the NR + NR case, the UE can indicate the temporary UE capabilities to either NR NW A or NR NW B or both if the corresponding NW enables the temporary UE capabilities reporting.*

*Which UE capabilities can be impacted*

*Proposal 2: No need to introduce additional signalling to indicate the temporary restrictions on SRS capability for MUSIM purpose.*

*Proposal 3: Do not introduce the signalling to indicate the temporary restrictions on bandwidth for MUSIM purpose.*

*Proposal 4: No additional signalling procedure is needed specifically for band conflict since it can be addressed by release/recovery of SCells/SCG.*

*The granularity of impacted capabilities*

*Proposal 5: Both UL and DL maximum MIMO layers can be changed and are supported to be indicated to the NW separately.*

*Proposal 6: The temporary maximum UL/DL MIMO layers can be indicated per serving cells/CCs.*

[R2-2307163](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307163.zip) Allowed MUSIM temporary capability restrictions OPPO discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal1: Both MIMO layers capability and bandwidth capability are reported per direction (i.e. DL/UL) per FR for R18 MUSIM.*

*Proposal2: No enhancement for UAI message is needed to support the measurement gap requirement update due to MUSIM operation, i.e. the legacy need for gap signaling is reused to update the measurement gap requirement due to MUSIM operation.*

*Proposal3: RAN2 is kindly asked to consider whether to introduce a response timer for the case when network A cannot response UE dynamic UE capability reporting request in time.*

[R2-2307678](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307678.zip) Capability sharing issue for SRS Tx switching capability Xiaomi discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Observation 1: The srs-TxSwitch capability from SIM-A can be changed temporarily due to the capability sharing of SIM-B.*

*Observation 2: Due to the wrong channel estimation for srs-TxSwitch capability between 1t4r and 1t2r, the DL throughput could be reduced by 24.5%.*

*Proposal: The UE should be able to indicate its temporary srs-TxSwitch capability per BC.*

[R2-2307598](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307598.zip) Allowed MUSIM temporary capability restrictions Samsung R&D Institute India discussion

*Observation 1: High granular solution of IDC (Center frequency and bandwidth of affected frequencies based on the network configuration for the region close/adjacent to channels used by non-3GPP technologies) is not applicable for MUSIM. A simpler solution of reporting conflicted bands or band combinations is more pertinent for MUSIM band conflict.*

*Proposal 1: For Rel-18 MUSIM dual active operation, the capability restrictions (or restrictions removal) are reported to NW A only. It is upto UE implementation to select one of the two NR networks as NW A for dual-active MUSIM.*

*Proposal 2: For Rel-18 MUSIM dual active operation, the granularity for the UE to report its maximum MIMO layers to the NW A is adopted as “per direction (DL/UL) per FR, with the same maximum MIMO layer for each serving cell”.*

*Proposal 3: For Rel-18 MUSIM dual active operation, UAI signalling is used to report measurement gap requirements to NW A with reusing needForGapsInforNR mechanism for updating measurement gap requirements.*

*Proposal 4: For Rel-18 MUSIM dual active operation, SRS switching capability is not explicitly signalled to the NW A.*

*Proposal 5: For Rel-18 MUSIM dual active operation, to address MUSIM band conflict, UE indicates its constrained/affected UL/DL bands or band combinations based on the existing UE configuration, to the NW A in the UAI signalling.*

[R2-2308258](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308258.zip) Measurement gap capability for MUSIM UE Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1 The UE indicates in UAI message that support of independentGapConfig is restricted (flag independentGapConfigRestricted).*

*Proposal 2 Rel-18 MUSIM UE uses existing NeedForGap feature to indicate changes in need for gap caused by MUSIM operation.*

*Proposal 3 An indication in UAI message (e.g. same as proposed in Proposal 2 above) indicates a change in UE’s needForGaps, and Nw can trigger a reconfiguration procedure to allow the UE to indicate its new needForGaps.*

*Proposal 4 The mechanisms developed in this WI shall allow that UE indicates the capability restriction to both NW A and NW B.*

[R2-2307776](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307776.zip) Analysis on capability restriction for Dual TX/RX MUSIM Operation Nokia, Nokia Shanghai Bell discussion

[R2-2307873](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307873.zip) Allowed MUSIM temporary capability restriction for band conflict mitigation Apple discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2308257](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308257.zip) Discussion on frequencies restriction for MUSIM UE Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

* Revised in [R2-2308941](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308941.zip)

[R2-2308941](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308941.zip) Discussion on frequencies restriction for MUSIM UE Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core [R2-2308257](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308257.zip)

### 7.17.4 Other

Including discussion on gap priority: How does the network set the gap priorities for MUSIM gaps?

Online (Wednesday or Thursday) (1) – Rel-17 MUSIM gap priority handling

[R2-2308790](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308790.zip) MUSIM Gap Priority LG Electronics discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1. When requesting periodic MUSIM gap(s), UE indicates an absolute priority values for all or a subset periodic MUSIM gaps by taking into account of the Type-2 MG gap priority.*

*Proposal 2. When receiving priorities for periodic MUSIM gap(s), the UE may receive changed priority values while keeping the relative priorities among MUSIM gaps.*

- QC is fine with these but wonders what the “taking into account” means? Will we specify that? LGE clarifies this has no specification impact.

- Nokia agrees with P1 but thinks it’s absolute priority across all configured gaps.

- Samsung thinks RAN2 should discuss if UE can indicate priority for MUSIM gaps by taking into account the values of other MGs. Thinks UE may consider only periodic gaps or then consider also other gaps. UE might not care about Type-2 gap priorities. Thinks UE could also use relative priorities. MTK is fine with P2 but thinks P1 is not needed.

- Huawei thinks we already agreed that UE can request gap pattern.

* 1. When requesting periodic MUSIM gap(s), UE indicates priority values (using R17 IE definition) for all or a subset periodic MUSIM gaps.
* 2. When receiving priorities for periodic MUSIM gap(s), the UE may receive changed priority values. If network doesn’t retain the relative priorities among MUSIM gaps, UE behaviour is not specified.
* Send LS to RAN4 informing them of this agreement. Offline 203 (LGE).

Offline discussion [203] – LS to RAN4 on gap priorities

* [AT123][203][MUSIM] LS to RAN4 on gap priorities (LGE)

Scope: Provide LS reply to RAN4 based on meeting agreements.

Intended outcome: Reply LS in [R2-2309001](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309001.zip).

Deadline: Thursday CB session

CB MUSIM (1) – LS to RAN4 on gap priorities

[R2-2309001](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309001.zip) [DRAFT] LS on MUSIM gap priorities LGE LS out Rel-18 NR\_DualTxRx\_MUSIM-Core To: RAN4

[R2-2307452](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307452.zip) Discussion on MUSIM gap priority Huawei, HiSilicon discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1: UE can optionally indicate the preferred relative priority of each periodic MUSIM gap in the MUSIM-GapInfo.*

*Proposal 2: Once the gNB decides to configure MUSIM gap(s) for the UE, the configured priority among the periodic MUSIM gap(s) should be aligned with the relative priority provided by the UE in UAI message.*

*Proposal 3: The IE gapPriority-r17 is used to configure the priority for periodic MUSIM gap by NW.*

[R2-2307777](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307777.zip) On MUSIM Gap Priority handling for Single RX MUSIM operation Nokia, Nokia Shanghai Bell discussion

*Proposal 1: Indication of the same priority for all periodic MUSIM gaps should be supported.*

*Proposal 2: The Gap-Priority parameter included in UAI is absolute priority over all the configured NW-A measurement gaps.*

*Proposal 3: The Gap-Priority assigned for the MUSIM gap can be different from the requested priority from UE.*

*Proposal 4: The Gap-Priority for aperiodic gap should be uniquely different for Gap preference and Gap configuration of periodic gaps.*

*Proposal 5: RAN2 to await for conclusion on UE behavior on partial overlapping gap situations for further signaling changes related to handling this gap collision.*

*Proposal 6: UAI triggering to modify the absolute priority of the MUSIM gap after receiving RRC configuration that modifies the MUSIM gap priority is supported.*

[R2-2308256](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308256.zip) MUSIM gap priority configuration Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2307693](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307693.zip) Discussion on MUSIM gap priorities vivo discussion Rel-18

[R2-2308708](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308708.zip) Further discussion on MUSIM gap priorities Samsung Electronics Nordic AB discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2307541](C:\\Users\\terhentt\\Documents\\Tdocs\\RAN2\\RAN2_123\\R2-2307541.zip) Consideration on the MUSIM Gap Priority ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

IF time allows Online Thursday (2) – MUSIM feature dependency and interactions

[R2-2308090](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2308090.zip) UAI repetition for MUSIM and dependency on Rel-17 MUSIM capability Intel Corporation discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Observation#1: Prohibit timer should not prevent UE from requesting capability restrictions using the assistance information as the configuration in NW B is asynchronous to procedures in NW A and is unpredictable (i.e., UE has no prior knowledge of what configuration will be used in network B and when).*

*Proposal#1: RAN2 should discuss overhead reduction of sending the UAI in view of the asynchronous nature in the configuration of NW B. A couple of options:*

*Option 1: a prohibit timer for UAI is used with the following behaviour: 1.1) bypass the prohibit timer for capability restriction but 1.2) apply the prohibit timer for removing the capability restriction*

*Option 2: Limit the number of UAI for MUSIM over a period of time*

*Observation#2: A UE may support/use Rel-17 or Rel-18 MUSIM feature based on its implementation. Supporting and configuring Rel-17 and Rel-18 MUSIM features simultaneously for a UE can lead to more optimal performance by using the most appropriate solution depending on the scenario and the UE state.*

*Proposal#2: it is not necessary for a UE supporting Rel-18 MUSIM to also support Rel-17 MUSIM feature.*

*Proposal#3: It should be possible to configure both Rel-17 and Rel-18 MUSIM features (if both are supported) simultaneously for a UE. Which solution is used is left to UE implementation.*

[R2-2307542](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2307542.zip) Consideration on the R17/18 MUSIM Feature interaction ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1: For the UE that support R18 Temporary capability restriction feature, the UE shall also support musimLeaveConnected-r17.*

*Proposal 2: The network can configure the R17 (musim-GapAssistanceConfig and/or musim-LeaveAssistanceConfig) and R18 temporary capability restriction feature simultaneously.*

*Proposal 3: The UE is allowed to request the R17 scheduling Gap and the R18 temporary capability restriction simultaneously.*

# Summary

**Comebacks:**

None

**Agreed documents ()**

*4.1: LTE legacy ()*

**Endorsed ()**

*7.5: Rel-18 XR enhancements ()*

*7.14: Rel-18 QoE enhancements ()*

*7.17: Rel-18 MUSIM ()*

**Approved LS out (3)**

*7.5: Rel-18 XR enhancements ()*

*7.14: Rel-18 QoE enhancements ()*

[R2-2309004](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_123\R2-2309004.zip) LS on QoE in RRC IDLE/INACTIVE and NR-DC scenarios RAN2 LS out Rel-18 NR\_QoE\_enh-Core To: RAN3

*7.17: Rel-18 MUSIM ()*

**Post-meeting email discussions (short, CR/LS finalization) ()**

**Post-meeting email discussions (long) ()**