3GPP TSG-RAN WG2 Meeting #119bis electronic [R2-2210802](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210802.zip)

Online, August, 2022

**Agenda item: 10.2**

**Source: Vice Chairman (Nokia)**

**Title: Report on LTE legacy, DCCA, MUSIM, Slicing, 71 GHz, XR and QoE**

**Document for: Approval**

# Organizational

Not Treated Agenda Items

- The current agenda has a number of items marked tdoc limitation: 0 and Not treated. Such Agenda items may have LS ins, and they are also not expected to be treated, but exceptions could be considered if needed.

Tdoc limitations (reminder)

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

- Assigned Editor of Running CRs input to update the running CR and input of one tdoc to facilitate addressing of CR open issues.

- 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).

Tdoc limitations applies to all other submitted tdocs.

Rel-17 CR

General, all correction CRs / draft CRs:

1. Rapporteurs of Rel-17 WI CRs are asked to continue their volunteer responsibility.

2. Unless otherwise explicitly agreed/indicated, max one Cat F CR per TS per WI shall be produced as outcome of the meeting. Exception: NBC aspects, if any, may need to be in a separate CR per WI (decided case by case). Note that Impact analysis is required per CR.

3. No editorial corrections for this meeting

Rel-17 UE capabilities

For NR UE capabilities the following applies:

1: As previously, work on mega CRs (one mega CR for TS 38.306 and one for TS 38.331). This work is done under Agenda Item AI 6.0.2

2: Coordinate centrally incorporation in CRs of RAN1 / RAN4 features for all Rel17 WIs. This work is done under Agenda Item AI 6.0.2 and changes are done directly to the mega CRs. There could be exceptions, case by case, where RAN1 / RAN4 features are treated under a WI-specific Agenda Item instead.

3 At the end of R2 119bis-e, endorsed WI specific UE capability CRs will be merged into the mega CRs, and the mega CRs will be provided to TSG RAN. Any exception to this need to be decided case by case.

**List of offline email discussions:**

**NOTE: the email discussion deadlines are meant to allow at least all regions to have one day to comment (other than weekend) and also give rapporteurs time to update their proposals before the meeting)**

**Email discussion deadlines**

**NOTE: No AT-meeting email discussion reports will be handled in sessions happening during 1st week Mon-Wed.**

**Deadline 1 (discussions for 1st week Fri online session)**

* **Comment deadline:** Thursday W1, 0700 UTC (for collecting views)
* **Rapporteur proposals:** Thursday W1, 1200 UTC (proposed outcome)
* **Document deadline:** 1h before session (discussion report)

**Deadline 2 (discussions for 2nd week online sessions)**

* **Comment deadline:** Friday W1, 0700 UTC (for collecting views)
* **Rapporteur proposals:** Monday W1, 1000 UTC (proposed outcome)
* **Document deadline:** 1h before session (discussion report)

**Deadline 2.5 (discussions for 2nd week Tuesday online)**

* **Comment deadline:** Monday W2, 1000 UTC (for collecting views)
* **Rapporteur proposals:** Tuesday W1, 1000 UTC (proposed outcome)
* **Document deadline:** 1h before session (discussion report)

**Deadline 3 (CR/LS approval via email):**

* **Comment deadline:** TuesdayW2, 1200 UTC (for collecting views)
* **Rapporteur proposals:** EOM (LS and/or agreed CRs)

**Organizational**

* [AT119bis-e][200] Organizational – LTE legacy, 71 GHz, DCCA, Multi-SIM, RAN slicing, QoE and XR (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 (for LS discussion):

* + - General information sharing about the sessions

      Deadline for providing comments to LSs:

* + - Deadline: Deadline 1

**Post-meeting email discussions**

**N/A**

**NR Rel-17 DCCA (started only after online session)**

* [AT119bis-e][201][DCCA] Stage-2 Corrections to DCCA (ZTE)

      Scope: Discuss the documents marked for this discussion under AI 6.2.x and provide agreeable versions of CRs (if any) for endorsement.

 Intended outcome: Report in in [R2-2210810](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210810.zip).

 Deadline: Deadline 2 (report) / Deadline 3 (CRs)

* [AT119bis-e][202][DCCA] Stage-3 Corrections to DCCA (Huawei)

      Scope: Discuss the documents marked for this discussion under AI 6.2.x and provide agreeable versions of CRs (if any) for endorsement.

 Intended outcome: Report in in [R2-2210811](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210811.zip).

 Deadline: Deadline 2 (report) / Deadline 3 (CRs)

* [AT119bis-e][205][DCCA] BWP handling for deactivated SCG (Ericsson)

      Scope: Discuss the CRs to BWP handling and other CRs under AI 6.2.2 and provide agreeable CR for endorsement.

      Intended outcome: Report in in [R2-2210818](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210818.zip) and CR for BWP handling in [R2-2210819](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210819.zip).

 Deadline: Deadline 2 (report) / Deadline 3 (CRs)

* [AT119bis-e][209][DCCA] Corrections to measurements with CPAC (Huawei)

      Scope: Discuss the Tdocs [R2-2201071](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2201071.zip)9, [R2-2201072](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2201072.zip)0 and [R2-2201071](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2201071.zip)8 to determine agreeable proposals.

 Intended outcome: Report in in [R2-2210820](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210820.zip).

 Deadline: Deadline 2 (report)

**NR Extension to 71 GHz (can be started at meeting start or after online session)**

* [AT119bis-e][203][71 GHz] Corrections to 71 GHz (ZTE)

      Scope: Discuss the documents marked for this discussion under AI 6.20.x and provide agreeable versions of CRs (if any) for endorsement.

 Intended outcome: Report in in [R2-2210812](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210812.zip).

 Deadline: Deadline 2 (report) / Deadline 3 (CRs)

**NR Rel-18 XR (TBD - started only after online session)**

* [AT119bis-e][206][XR] TP to 38.835 (Nokia)

      Scope: Provide TP to 38.835 on based on online agreements.

 Intended outcome: TP in [R2-2210815](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210815.zip).

 Deadline: EOM (TP)

**NR Rel-18 QoE enhancements (started immediately at meeting start)**

* [AT119bis-e][204][QoE] Summary of Rel-17 leftovers for QoE (China Telecom)

      Scope: Summarize content of Tdocs under AI 8.14.3. Request company input on the leftover issus and identify proposals which can be most easily progressed in Rel-18.

 Intended outcome: Report in in [R2-2210813](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210813.zip).

 Deadline: Deadline 1 (report)

**NR Rel-18 Slicing (SA2 WI FS\_eNS\_Ph3)**

* [AT119bis-e][210][R18 Slicing] RAN dependency of FS\_eNS\_Ph3 (ZTE)

      Scope: Discuss RAN2 reply LS to [R2-2209355](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209355.zip) and provide agreeable LS.

 Intended outcome: Report in in [R2-2210821](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210821.zip) and LS out in [R2-2210822](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210822.zip).

 Deadline: Deadline 2 (report)

**NR Rel-18 Multi-SIM (started only after online session)**

* [AT119bis-e][211][MUSIM] MUSIM solutions for Rel-18 (QC)

      Scope: Discuss the technical details of solutions on the table for Rel-18 MUSIM and whether they may have RAN3/4 impacts. Can consider all documents from this meeting.

 Intended outcome: Report in in [R2-2210823](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210823.zip).

 Deadline: Deadline 2.5 (report)

**Dates and deadlines (see also RP-221818) – Technical Meeting**

Sept 30th 1000 UTC **Tdoc Submission Deadline**.

Oct 10th 0700 UTC **e-Meeting Start** (by email), Week 1
Rapporteurs in non-favourable time zones may kick off AT meeting offline / email discussions before meeting start (at most 12h before). It is assumed that participants starts paying attention to offline / email discussions after e-meeting start.

Oct 14th 1000 UTC **Weekend break**, Suspend decision making in email discussions (= no deadlines etc). It should be possible for a delegate to take the weekend off, rejoin and not miss decisions.

Oct 17th 1000 UTC Resume after weekend. Resume decision making in email discussions, Week 2.

Oct 19th 1000 UTC **e-Meeting Stop**, no more technical comments for AT-meeting email discussions. Decision confirmations announced within 24h. Session notes for email checking.

No Post Email Deadline No email discussions are expected after RAN2 119bis-e (except two ongoing long email discussions after RAN2 119-e targeting RAN2 120).

**Web Conference Schedule**

Note that this schedule is indicative and can change. After Week 1 the schedule for Week 2 will be updated.

**Web Conference Schedule, WEEK 1**

|  |  |  |  |
| --- | --- | --- | --- |
| **Time ZoneUTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Monday** |  |  |  |
| 12:30-13:30 | Incoming LS [3]- [R2-2210786](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210786.zip)NR17 General, inc LS for early disc (if any) (Johan)- [6.0.2] Intra-band EN-DC initial discussion (task by TSG RAN)- [6.0.2] [R2-2210638](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210638.zip), decide if to have the LS or notNR17 feMIMO [6.17] (Johan)- [6.17.2] Summary RRC- [6.17.3] Summary MAC- including incoming LSes. NR17 ePowSav [6.9] (Johan)- [Post119-e][043][ePowSav]- Incoming LSes (short, if significant discussion then postpone), NR17 TEI [6.21] (Johan)- [Post119-e][037][NRTEI17] Emergency Service Enhancement- Per-FR gaps, Initial Discussion to understand if some alternative or variant is unacceptable. NR17 Other [6.24.1]- FR2 UL Gap | (12:30-14:00)EUTRA 17 IoT NTN (Sergio)- 7.2.1- 7.2.3- 7.2.4.1- 7.2.4.2- 7.2.5NR 17 NR NTN (Sergio)- 6.2.1- 6.2.2- 6.2.3- 6.2.4.1- 6.2.4.2- 6.2.5 | NR17 Pos (Nathan)- 6.11.2.2 RRC ([R2-2209429](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209429.zip), [R2-2210480](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210480.zip))- 6.11.2.3 LPP (AI summary [R2-2210784](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210784.zip))- 6.11.2.4 MAC ([R2-2209427](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209427.zip), [R2-2210311](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210311.zip), [R2-2210607](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210607.zip))- 6.11.2.5 UE capabilities ([R2-2209428](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209428.zip), [R2-2210310](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210310.zip))- 6.11.2.1 Stage 2 if time |
| 13:30-14:30 | NR17 SL Relay (Nathan)- 6.7.2.2 Control plane (AI summary [R2-2210890](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210890.zip))- 6.7.2.3 User plane (AI summary [R2-2210770](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210770.zip))- 6.7.2.4 Discovery/(re)selection (AI summary [R2-2210777](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210777.zip))- 6.7.2.1 Stage 2 if time |
| (14:00 – 15:30)NR17 DCCA (Tero)- 6.2.1: Outcome of [Post119-e][224] [R2-2210177](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210177.zip)- 6.2.2: BWP handling for deactivated SCG ([R2-2210674](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210674.zip))- 6.2.3: skipped measIDs ([R2-2210457](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210457.zip), [R2-2210719](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210719.zip), [R2-2210720](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210720.zip)), UE requirements for CPC ([R2-2210718](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210718.zip))NR17 upto 71GHz (Tero)- 6.20.1/2: Channel access LS from RAN1 ([R2-2209318](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209318.zip)/[R1-2208231](http://3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_110/Docs/R1-2208231.zip)) + RAN2 input documents ([R2-2209862](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209862.zip))- 6.20.2: Inter-RAT TCI state ([R2-2209863](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209863.zip)) NR17 NR18 Slicing Inc LSes (Tero)- 6.8: SA2 LS [R2-2209358](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209358.zip), LS reply ([R2-2210750](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210750.zip))- 8.18: SA2 LS [R2-2209355](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209355.zip) |
| 14:30-15:30 | NR17 MBS (Dawid)- 6.1.1: LSin, Stage-2 CR ([R2-2209866](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209866.zip))- 6.1.3: FG 33-1-1 ([R2-2209909](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209909.zip), [R2-2210029](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210029.zip), [R2-2210714](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210714.zip))- 6.1.4: HARQ buffers ([R2-2209416](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209416.zip), [R2-2210594](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210594.zip)), MRB type changes ([R2-2210052](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210052.zip), [R2-2210519](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210519.zip)), PDCP state variables ([R2-2209551](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209551.zip), [R2-2209746](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209746.zip)) | NR17 SL enh (6.15) (Kyeongin)NR18 SL enh (8.15) (if time allows) |
| **Tuesday** |  |  |  |
| 12:30-13:30 | NR18 Mobile IAB (or NR18 Other TBD) (Johan) | NR18 Dual TxRx MUSIM (Tero)- 8.17.1: Work plan ([R2-2210388](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210388.zip))- 8.17.2.1: Scenarios ([R2-2209734](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209734.zip), [R2-2210389](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210389.zip), [R2-2210392](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210392.zip))IF time allows:- 8.17.2.1: MUSIM gap coordination in NR-DC ([R2-2210738](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210738.zip)) | NR18 Enh Pos (Nathan)- 8.2.1 Organizational ([R2-2209351](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209351.zip))- 8.2.2 Sidelink positioning ([R2-2209607](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209607.zip), [R2-2210363](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210363.zip), [R2-2210167](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210167.zip)) |
| 13:30-14:30 | NR18 UAV (Diana) | NR18 Dual TxRx MUSIM (Tero)- 8.17.2.2: Solutions ([R2-2209575](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209575.zip), [R2-2210514](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210514.zip))IF time allows:- 8.17.3: Other ([R2-2210485](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210485.zip), [R2-2210391](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210391.zip)) | NR18 Enh Pos (Nathan)- 8.2.2 Sidelink positioning continued- 8.2.3 RAT-dependent integrity (AI summary [R2-2210892](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210892.zip)) |
| 14:30-15:30 | NR18 Network Energy Saving (Diana) | NR18 SONMDT (HuNan) | NR18 MBS (Dawid)- 8.11.1: LSin- 8.11.3: [R2-2210385](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210385.zip)- 8.11.2: Report of [Post119-e][610] ([R2-2210068](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210068.zip)) |
| **Wednesday** |  |  |  |
| 12:30-13:30 | NR18 Mobility (Johan) | NR18 XR (Tero)- 8.5.1: SA2/SA4 progress ([R2-2209553](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209553.zip), [R2-2209554](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209554.zip))- 8.5.2.1: PDU sets and data bursts ([R2-2210201](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210201.zip), [R2-2209777](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209777.zip), [R2-2209450](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209450.zip))IF time allows:- 8.5.2.2: PDU prioritization ([R2-2210649](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210649.zip)) | NR18 Enh SL relay (Nathan)- 8.9.4 Multi-path ([R2-2210027](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210027.zip), [R2-2209375](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209375.zip) section 3 only) |
| 13:30-14:30 | NR18 Mobility (Johan) | NR18 XR (Tero) - 8.5.2.2: PDU prioritization ([R2-2210649](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210649.zip), [R2-2209778](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209778.zip), [R2-2209646](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209646.zip))- 8.5.2.3: PDU discard ([R2-2210559](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210559.zip), [R2-2210687](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210687.zip), [R2-2209557](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209557.zip), P2 from [R2-2210375](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210375.zip)) | NR18 Enh SL relay (Nathan)- 8.9.4 Multi-path continued- 8.9.2 UE-to-UE (AI summary [R2-2210893](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210893.zip)) |
| 14:30-15:30 | NR18 Mobility (Johan) | NR18 XR (Tero) - 8.5.3.1: DRX enhancements ([R2-2210186](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210186.zip), [R2-2210651](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210651.zip), P5 from [R2-2209453](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209453.zip))- 8.5.4.1: Feedback enhancements ([R2-2209558](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209558.zip))- 8.5.4.2: Scheduling enhancements ([R2-2210483](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210483.zip), [R2-2210541](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210541.zip)) | NR18 Enh SL relay (Nathan)- 8.9.2 UE-to-UE continued- 8.9.3 Service continuity (AI summary [R2-2210782](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210782.zip)) |
| **Thursday** |  |  |  |
| 13:00-14:00 | NR18 AIML air interface (Johan) | NR18 NTN (Sergio)- 8.7.3: outcome of [AT119bis-e][102]- 8.7.4 | NR18 SL Enh (8.15) (Kyeongin) |
| 14:00-15:00 | NR18 AIML air interface (Johan) | EUTRA18 IoT NTN (Sergio)- 8.6.3- 8.6.2.1 (if time allows) | NR18 Enh Pos (Nathan)- 8.2.4 LPHAP ([R2-2209405](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209405.zip)) |
| **Friday** |  |  |  |
| 03:30-04:30 | NR18 Other (or NR18 Mobile IAB TBD) (Johan) | NR18 NR NTN (Sergio)- 8.7.4 - 8.7.2: outcome of [AT119bis-e][103] | NR18 Enh Pos (Nathan)- 8.2.4 LPHAP continued (if needed)- 8.2.5 RedCap ([R2-2209963](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209963.zip), [R2-2209563](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209563.zip))- 8.2.3 RAT-dependent integrity continued |
| 04:30-05:30 | NR18 NC repeater (Sasha) | EUTRA IoT NTN (Sergio)- 8.6.2.1- 8.6.2.2: outcome of [AT119bis-e][101] | NR18 QoE (Tero)- 8.14.4: QoE with NR-DC ([R2-2209844](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209844.zip),[R2-2210752](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210752.zip))- 8.14.3: R17 leftovers: Report of [204] ([R2-2210813](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210813.zip)) |

**Web Conference Schedule, WEEK 2**

|  |  |  |  |
| --- | --- | --- | --- |
| **Time ZoneUTC** | **Web Conference R2 - Main** | **Web Conference R2 - BO1** | **Web Conference R2 - BO2** |
| **Monday** |  |  |  |
| 12:30-13:30 | NR17 feMIMO, NR17 TEINR17 Other NR17 General, ePowsav, Inc LS, (if needed) (Johan)  | NR17 CB SergioNR17 CB Tero- Report of [203]: [R2-2210812](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210812.zip) (if needed)- Report of [201]: [R2-2210810](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210810.zip) (if needed)- Report of [202]: [R2-2210811](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210811.zip) (if needed)- Report of [205]: [R2-2210818](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210818.zip) (if needed)- Report of [209]: [R2-2210820](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210820.zip) (if needed) | NR17 CB KyeonginNR17 CB Nathan |
| 13:30-14:30 |
| 14:30-15:30 | NR18 Mobility (Johan) | NR18 XR (Tero)- 8.5.4.1: Feedback enhancements ([R2-2209558](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209558.zip))- 8.5.3.2: Other enhancements ([R2-2209455](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209455.zip))- Additional topics and comebacks from 1st week (TBA) | NR18 SONMDT (HuNan) |
| **Tuesday** |  |  |  |
| 12:30-13:30 | NR17 MBS CB (Dawid)NR18 MBS CB (Dawid)NR18 NCR CB if needed (Sasha)NR18 CB (Johan) if time | NR18 Network Energy Saving (Diana) | NR18 CB if needed (Kyeongin)NR18 CB (Nathan) |
| 13:30-14:30 | NR18 CB (Diana)NR18 EUTRA18 CB (Sergio)NR18 CB (Tero) – 30 min- Report of [210]: [R2-2210821](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210821.zip) NR18 XR (Tero)- 8.5.4.2: Scheduling enhancements ([R2-2210483](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210483.zip), [R2-2210541](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210541.zip)) |
| 14:30-15:30 |
| **Wednesday** |  |  |  |
| 03:30-04:30 | TBD CB Johan | TBD CB Tero – 30 minTBD CB Sergio | TBD CB NathanTBD CB HuNan |
| 04:30-05:30 | TBD |

# 4 EUTRA Rel-16 and earlier

Tdoc Limitation: 0 tdocs

Not treated

# 6 NR Rel-17

## 6.2 MR DC CA further enhancements

(LTE\_NR\_DC\_enh2-Core; leading WG: RAN2; REL-17; WID: RP-201040)

Tdoc Limitation: 3 tdocs

No documents should be submitted to 6.2. Please submit to.6.2.x

Rapporteurs may provide baseline correction CRs containing smaller corrections, text clarifications etc - please contact the Rapporteur before providing contributions on those aspects.

### 6.2.1 Organizational and Stage-2 corrections

Including LSs and any rapporteur inputs.

Including Stage-2 corrections related to DCCA WI.

Including report of email discussion [Post119-e][224][DCCA] Stage-2 description of CHO with MR-DC (ZTE)

By Web Conf (1st Week Monday) (1+1)

[R2-2210177](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210177.zip) Report of [Post119-e][224][DCCA] Stage-2 description of CHO with MR-DC (ZTE) ZTE Corporation, Sanechips discussion Rel-17 LTE\_NR\_DC\_enh2-Core

* Option 1: Add some notes on SN release handling and data forwarding handling for CHO with MR-DC in section 10.7 Inter-Master Node handover with/without Secondary Node change, as that for section 10.8 Master Node to eNB/gNB Change [1] [4].*

* Option 2: Introduce a new signalling procedure for CHO with MR-DC:*

* Option 2a: Add the corresponding signaling procedure of CHO with MR-DC for MR-DC case in section 10.7.2. And similar changes are needed also in section 10.7.1, 10.8.1,10.8.2, 10.9.1,10.9.2 for other cases [2].*

* Option 2b: Introduce a new section with signaling flows for the co-existence of conditional handover and MR-DC [3].*

*Note: Regarding the issue on when to perform early data forwarding, it should be in RAN3 scope. So this issue would not be handled in this email discussion. As indicated by Chair, companies can raise RAN3-specific issues on this directly in RAN3 (no need for an LS).*

*Proposal 1: RAN2 introduces a new section with signaling flows to capture procedures for CHO with MR-DC in TS 37.340.*

- vivo is fine with separate section but thinks the current procedure in the draft CR may not be enough. We should capture the case with SCG addition, too. Chair thinks we could consider that for the next meeting. ZTE also things we could have a baseline now and improve the wording in next meeting.

- ZTE thinks we also need to handle the RAN3 input. But it seems this is not required anymore. Do we need LS to RAN3?

* 1: RAN2 introduces a new section with signaling flows to capture procedures for CHO with MR-DC in TS 37.340.
* FFS how to handle SCG addition with CHO. Can be discussed in [201].
* FFS if we need to send LS to RAN3 (can be checked once the CR has converged)

By Email [201] (1)

[R2-2210524](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210524.zip) Corrections for CHO with MR-DC ZTE Corporation (Rapporteur), Sanechips; Ericsson; CATT CR Rel-17 37.340 17.2.0 0350 - F TEI17, LTE\_NR\_DC\_enh2-Core

* CR to be finalized under [201]

By Email [202] (1)

[R2-2210721](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210721.zip) Corrections for further MR-DC enhancements Huawei, HiSilicon CR Rel-17 38.331 17.2.0 3563 - F LTE\_NR\_DC\_enh2-Core

Email discussions ([202])

* [AT119bis-e][202][DCCA] Stage-3 Corrections to DCCA (Huawei)

      Scope: Discuss the documents marked for this discussion under AI 6.2.x and provide agreeable versions of CRs (if any) for endorsement.

 Intended outcome: Report in in [R2-2210811](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210811.zip).

 Deadline: Deadline 2 (report) / Deadline 3 (CRs)

[R2-2210811](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210811.zip) Report of [AT119bis-e][202][DCCA] Stage-3 Corrections to DCCA (Huawei) Huawei report

### 6.2.2 SCG deactivation and Temporary RS for SCell activation Corrections

Including essential corrections to deactivated SCG and temporary RS for SCell activation..

By Web Conf (1st Week Monday) (2+2)

[R2-2210674](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210674.zip) Handling of BWP during SCG deactivation Ericsson discussion

*Proposal 1 The BWP handling for PSCell of deactivated SCG is corrected in 5.15.1.*

*Proposal 2 RAN2 to agree the CR in* [*R2-2210672*](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210672.zip)*.*

[R2-2210469](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210469.zip) Remaining issues for BWP operation in deactivated SCG Sharp discussion Rel-17 LTE\_NR\_DC\_enh2-Core

*Observation 1 There is no issue on the current MAC procedure for the PSCell in deactivated SCG.*

*Observation 2 According to MAC and RRC specs, the role of BWP for deactivated PSCell is to perform RLM, BFD and other measurements.*

*Observation 3 According to the PHY spec, UE is not required to perform RLM on DL BWPs other than the active DL BWP on the PSCell.*

*Proposal 1 BWP indicated in firstActiveDownlinkBWP-Id for deactivated PSCell is considered as an active DL BWP.*

*Proposal 2 RAN2 should confirm that there is no need to change additionally in MAC and RRC specs to support UE behaviour for deactivated PSCell configured with BWP if Proposal 1 is agreeable.*

Above discussed jointly

- Nokia thinks the Sharp contribution is correct but this requires very careful reading and it’s easier to misinterpret the specifications. Could be fine to clarify as Ericsson proposes and this doesn’t conflict with the Sharp proposal.

- Lenovo thinks the intention is indeed that UE does not perform meas (RLM, BFD, CSI) on a BWP of a deactivated SCG - can we confirm that? Thinks Sharp conclusions are OK. Ericsson points out that if configured, RLM and BFD is still performed on BWP of PSCell of deactivated SCG.

- Apple thinks UE does RRM but this is up to network configuration. Apple agrees with Sharp that specs is incomplete even if it’s not crystal clear.

- Vodafone, Huawei, Qualcomm, LGE, ZTE and Samsung think the Ericsson proposals look OK.

- CATT thinks BWP should not be active in deactivated SCG. Otherwise we introduce potential impacts to other specifications. It’s not clear in the state of PSCell how UE uses the SCG state.

- Huawei is not sure about CATT concern since SCells are deactivated when SCG is deactivated. thinks Ericsson correction could help. We never had PSCell as deactivated.

- CATT agrees with Ericsson intent but wording should be enhanced.

* 1 The BWP handling for PSCell of deactivated SCG is corrected in MAC specification 5.15.1. Exact wording discussed in offline [205] (Ericsson) (DL 2).

By Email [205] (4)

[R2-2210127](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210127.zip) BWP handling for deactivated SCG Nokia, Nokia Shanghai Bell CR Rel-17 38.321 17.2.0 1425 - F LTE\_NR\_DC\_enh2-Core

[R2-2210672](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210672.zip) Correction on BWP handling for deactivated SCG Ericsson CR Rel-17 38.321 17.2.0 1439 - F LTE\_NR\_DC\_enh2-Core

* Revised in [R2-2210819](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210819.zip)

[R2-2210455](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210455.zip) Correction on the BWP for PSCell in deactivation SCG and the timing requirement for SCG activation CATT CR Rel-17 38.321 17.2.0 1432 - F LTE\_NR\_DC\_enh2-Core

[R2-2210456](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210456.zip) Correction on ASN.1 for sCellState and scg-State CATT CR Rel-17 38.331 17.2.0 3546 - F LTE\_NR\_DC\_enh2-Core

Email discussions ([205])

* [AT119bis-e][205][DCCA] BWP handling for deactivated SCG (Ericsson)

      Scope: Discuss the CRs to BWP handling and other CRs under AI 6.2.2 and provide agreeable CR for endorsement.

      Intended outcome: Report in in [R2-2210818](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210818.zip) and CR for BWP handling in [R2-2210819](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210819.zip).

 Deadline: Deadline 2 (report) / Deadline 3 (CRs)

By Web Conf (2nd Week Monday) (2)

[R2-2210818](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210818.zip) Report of [AT119bis-e][205][DCCA] BWP handling for deactivated SCG (Ericsson) Ericsson report

[R2-2210819](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210819.zip) Correction on BWP handling for deactivated SCG Ericsson CR Rel-17 38.321 17.2.0 1439 1 F LTE\_NR\_DC\_enh2-Core [R2-2210672](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210672.zip)

### 6.2.3 Conditional PSCell change addition Corrections

Including essential corrections to of CPAC on network aspects (e.g. network communication via inter-node messages) handled by RAN2 and any aspects that require RAN3 interaction.

Including essential corrections to CPAC that relate to RRC signalling between network and UE and related UE capabilities.

Including essential corrections to CHO + MR-DC (done as part of TEI17).

By Web Conf (1st Week Monday or 2nd week Monday) (3)

Skipping measIDs not connected to any (conditional) RRC configurations:

[R2-2210457](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210457.zip) Discussion on measurement for conditional reconfiguration CATT discussion Rel-17 LTE\_NR\_DC\_enh2-Core

* Revised in [R2-2210775](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210775.zip)

[R2-2210775](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210775.zip) Discussion on measurement for conditional reconfiguration CATT discussion Rel-17 LTE\_NR\_DC\_enh2-Core

*Proposal 1: RAN2 to discuss and confirm which understanding is right on the restriction that UE is not required to perform the measurement on measIds that are configured for conditional reconfiguration, but are not linked with any candidate cell:*

*- Understanding 1: the restriction applies to SN initiated inter-SN CPC only;*

*- Understanding 2: the restriction applies to all kind of conditional reconfiguration, i.e., CHO, CPA, intra-SN CPC, MN initiated inter-SN CPC, and SN initiated inter-SN CPC;*

- Huawei thinks the distinction is not aligned with specification: This is about when UE is required to do measurements. It’s not possible to apply specification to understanding 1.

- Nokia thinks that the background for this was for SN-initiated CPC due to mismatch between prepared cells by source and some not agreed by target SN, which could cause UE to have conditions not linked to configurations. So intent was understanding 1 but how to capture that is not so clear. Ericsson agrees with both Huawei and Nokia. There is no good way to restrict it to SN-initiated cases. ZTE agrees with Nokia and thinks we can consider how to capture it.

- Nokia wonders if understanding 2 is backwards compatible (i.e. does it impact Rel-16 CHO)? Huawei thinks there are no such issues but conditional event is not defined by its purpose. It’s only conditional reconfiguration and if UE cannot find the measurement configuration, it cannot measure.

- QC agrees with background but thinks there was signalling in RAN3 about the accepted cells, and updated measConfig. So that could prevent the issue.

- Apple thinks we should not allow understanding 1. Could just have a NOTE.

* Postponed. Consider until next meeting whether this is a transitory issue or not.

*Proposal 2: RAN2 to agree the TP in annex 1, if the understanding 1 is confirmed.*

*Proposal 3: RAN2 to agree the TP in annex 2, if the understanding 2 is confirmed.*

* Email discussion [209] (Huawei, DL2) to handle the 10719, 10720 and 10718

By Email [209] (3)

UE performing measurements for NR CPC:

[R2-2210719](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210719.zip) UE measurement requirements for conditional events in TS 38.331 Huawei, HiSilicon discussion Rel-17 LTE\_NR\_DC\_enh2-Core

*Observation 1: As 5.5.3.1 does not specify in which VarMeasConfig (MCG or SCG) a condExecutionCond indicates (depending whether it is in the MCG or the SCG VarConditionalReconfig), it is unclear for which conditional event the UE is required or not required to perform measurements.*

*Observation 2: According to current RRC specifications, the UE is not required to perform any conditional measurement for SN-initiated CPC in EN-DC.*

*Proposal 1: To unambiguously determine whether the UE is required to actually perform measurements. clarify which field(s), condExecutionCond and/or condExecutionCondSCG in which VarConditionalReconfig can indicate a measId of the MCG and or the SCG VarMeasConfig.*

*Proposal 2: Capture in TS 38.331 clause 5.5.3.1 that the UE shall perform measurements for SCG measIds for conditional events whose ID is indicated in a an entry in VarConditionalReconfiguration as specified TS 36.331.*

UE performing measurements for LTE CPC:

[R2-2210720](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210720.zip) UE measurement requirements for conditional events in TS 36.331 Huawei, HiSilicon discussion Rel-17 LTE\_NR\_DC\_enh2-Core

*Observation 1: The motivation for the restriction to performing measurements for conditional events applies to TS 38.331 but does not apply to TS 36.331 (because it only affects SN-configured measurements).*

*Observation 2: A restriction to performing measurements for conditional event in TS 36.331 is not only unnecessary, but it may also affect Rel-16 UEs supporting CHO.*

*Observation 3: Rel-17 is frozen and there is no need for any change to measurements in TS 36.331.*

*Proposal: Keep TS 36.331 as it is, i.e. no restriction on UE measurements for conditional events configured in TS 36.331 is introduced.*

By Email [209] (1)

Network should not exceed UE capabilities for measurements:

[R2-2210718](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210718.zip) UE measurement capability handling for conditional measurements without a corresponding conditional reconfiguration Huawei, HiSilicon discussion Rel-17 LTE\_NR\_DC\_enh2-Core

*Observation 1: According to Rel-16 TS 38.331, the UE shall perform measurements for any conditional event that is configured, regardless whether a corresponding conditional reconfiguration is configured or not.*

*Observation 2: According to Rel-17 TS 38.331, the UE is not required to perform measurements for a conditional event for which there is no corresponding conditional reconfiguration is configured or not.*

*Observation 3: It is unclear whether a conditional measurement for which no conditional reconfiguration is configured is to be counted in the UE capability for measurements or not.*

*Proposal 1: The total number of configured L3 measurement events and frequencies, including all configured conditional measurements regardless whether there is an associated conditional reconfiguration or not, shall not exceed the applicable UE capabilities specified in TS 38.133.*

*Proposal 2: Discuss whether to capture this as note in TS 38.331 or to ask RAN4 to capture it.*

Email discussions ([209])

* [AT119bis-e][209][DCCA] Corrections to measurements with CPAC (Huawei)

      Scope: Discuss the Tdocs [R2-2201071](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2201071.zip)9, [R2-2201072](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2201072.zip)0 and [R2-2201071](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2201071.zip)8 to determine agreeable proposals.

 Intended outcome: Report in in [R2-2210820](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210820.zip).

 Deadline: Deadline 2 (report)

By Web Conf (2nd Week Monday) (2)

[R2-2210820](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210820.zip) Report of [AT119bis-e][209][DCCA] Corrections to measurements with CPAC (Huawei) Huawei report

By Email [202] (2)

Release of conditional configurations:

[R2-2210343](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210343.zip) On releasing conditional configurations when SCG is changed Nokia, Nokia Shanghai Bell discussion Rel-17 LTE\_NR\_DC\_enh2-Core

[R2-2210344](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210344.zip) Draft NR RRC CR on releasing conditional configurations when SCG is changed Nokia, Nokia Shanghai Bell CR Rel-17 38.331 17.2.0 3537 - F LTE\_NR\_DC\_enh2-Core

By Email [202] (1)

[R2-2210178](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210178.zip) Clarification on conditionalReconfiguration ZTE Corporation, Sanechips CR Rel-17 38.331 17.2.0 3528 - F LTE\_NR\_DC\_enh2-Core

By Email [201] (2)

[R2-2209478](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209478.zip) Correction on CHO with MR-DC in TS 37.340 vivo draftCR Rel-17 37.340 17.2.0 F LTE\_NR\_DC\_enh2-Core

[R2-2210305](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210305.zip) Correction on evaluations during CPAC execution Ericsson CR Rel-17 37.340 17.2.0 0349 - F LTE\_NR\_DC\_enh2-Core

Email discussions ([201])

* [AT119bis-e][201][DCCA] Stage-2 Corrections to DCCA (ZTE)

      Scope: Discuss the documents marked for this discussion under AI 6.2.x and provide agreeable versions of CRs (if any) for endorsement.

 Intended outcome: Report in in [R2-2210810](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210810.zip).

 Deadline: Deadline 2 (report) / Deadline 3 (CRs)

[R2-2210810](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210810.zip) Report of [AT119bis-e][201][DCCA] Stage-2 Corrections to DCCA (ZTE) ZTE report

## 6.3 Multi SIM

(LTE\_NR\_MUSIM-Core; leading WG: RAN2; REL-17; WID: RP-212610)

Tdoc Limitation: 0 tdocs

Not treated

Postponed (3)

[R2-2209348](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209348.zip) Reply LS on NAS busy indication in RRC\_INACTIVE (S2-2207029; contact: Samsung) SA2 LS in Rel-17 MUSIM To:RAN2 Cc:CT1

* Postponed (to be handled during RAN2#120)

[R2-2209927](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209927.zip) Conflict of UE Preferred RRC State Report                  FGI      discussion

*Moved from 6.24, not treated*

* Postponed (over quota, may be deprioritized in the next meeting)

[R2-2209928](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209928.zip) Corrections for the Conflict of UE Preferred RRC state Report           FGI   CR       Rel-17 38.331 17.2.0  3519    -           F          MUSIM

*Moved from 6.24, not treated*

* Postponed (over quota, may be deprioritized in the next meeting)

## 6.8 RAN slicing

(NR\_Slice -Core; leading WG: RAN2; REL-17; WID: RP-212534)

Tdoc Limitation: 0 tdocs

Only LS input from other WGs will be treated in this meeting.

By Web Conf (1st Week Monday) (1+1)

[R2-2209358](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209358.zip) LS Out on LS on slice list and priority information for cell reselection and Random Access (S2-2207698; contact: ZTE) SA2 LS in Rel-17 NR\_slice-Core, NRslice To:SA, CT, RAN, RAN2, RAN3, CT1

* Noted

[R2-2210749](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210749.zip) Discussion on SA2 LS on slice list and priority information for cell reselection and Random Access ZTE Corporation, Sanechips discussion Rel-17

* Revised in [R2-2210783](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210783.zip)

[R2-2210783](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210783.zip) Discussion on SA2 LS on slice list and priority information for cell reselection and Random Access ZTE Corporation, Sanechips discussion Rel-17 [R2-2210749](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210749.zip)

*Proposal 1: Based on the latest progress in SA2 and CT1, RAN2 understand AS layer is expected to filter the NSAG information based on the allowed/requested S-NSSAIs and only the NSAG information associated with the allowed/requested S-NSSAIs will be considered in slice based cell reselection.*

*Proposal 2: Agree the 38.304 text proposal in Annex to align with SA2 and CT1 understanding on the NAS-AS interaction in slice based cell reselection.*

*Proposal 3: Approve the draft reply LS in Annex to confirm RAN2 understanding with SA2 and CT1 and inform the update of 38.304.*

- ZTE clarifies that SA2/CT1 assumes AS layer does the S-NSSAI filtering. QC is fine to follow the SA2/CT1 decision.

- QC wonders if RAN2 knows about requested NSSAI? We only support allowed NSSAI so this would need some changes to RAN2.

- CMCC is fine with ZTE proposals. Thinks CT1 is discussing Stage-3 details in this meeting so we need to be aligned with them. Thinks NAS layer will indicate NSSAI information to AS.

- Nokia thinks we did not accept similar proposal earlier because AS layer should not do the filtering that is normally done in NAS. Thinks there is a problem with requested NSSAI and we shouldn’t go with CT1 approach. Samsung agrees with Nokia and thinks NAS should do the filtering. AS doesn’t need to care about anything else than the used information. Nokia thinks CT1 wanted to avoid additional work for NAS. Ericsson thinks we need to describe the UE behaviour and it doesn’t matter so much whether it’s in AS or NAS. Huawei agrees with Ericsson and thinks we need to check if RAN2 specifications need to be fixed further.

- CMCC thinks NAS layer don't know which NSAG is used for reselection and which NSAG is for RACH. So CT1 want AS do the filtering.

- Ericsson wonders if we capture this feature is applicable from IDLE to CONNECTED only?

* Discuss the CRs (including whether they are needed) according to SA2/CT1 requests in RAN2#120 based on contributions. No LS sent to SA2/CT1 before then (i.e. RAN2 does not intend to change CT1/SA2 decision)
* Can discuss how/if to capture applicability of slice-based RACH in RRC states in RAN2#120.

[R2-2210526](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210526.zip) Clarification on the slice information for cell reselection OPPO draftCR Rel-17 38.304 17.2.0 F NR\_slice-Core

* Withdrawn

[R2-2210527](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210527.zip) Clarification on the slice information for random access OPPO draftCR Rel-17 38.331 17.2.0 F NR\_slice-Core

* Withdrawn

[R2-2210750](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210750.zip) Correction on handling of the NSAG information in cell reselection ZTE Corporation, Sanechips CR Rel-17 38.304 17.2.0 0295 - F NR\_slice-Core

* Withdrawn

[R2-2210751](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210751.zip) [Draft] Reply LS on slice list and priority information for cell reselection and Random Access ZTE corporation, Sanechips LS out Rel-17 To:SA2 Cc:CT1

* Withdrawn

## 6.14 NR QoE

(NR\_QoE-Core; leading WG: RAN3; REL-17; WID: RP-211406)

Tdoc Limitation: 0 tdocs

Not treated

By Email [200] (1)

[R2-2209361](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209361.zip) Reply LS to SA5 on TS 28.404/TS 28.405 Clarification (S4-221121; contact: Qualcomm) SA4 LS in Rel-17 eQoE To:SA4 Cc:RAN2, RAN3

* [200] Noted [RAN2 in CC with no actions)

Postponed (1)

[R2-2209362](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209362.zip) Reply LS on questions on RAN visible QoE (S4-221129; contact: Huawei) SA4 LS in Rel-17 NR\_QoE-Core To:RAN2, RAN3

* Postponed (to RAN2#120, wherein company contributions can be provided for answering the questions)

## 6.20 Extending NR operation to 71GHz

(NR\_ext\_to\_71GHz-Core; leading WG: RAN1; REL-17; WID: RP-212637)

Tdoc Limitation: 2 tdocs

Rapporteurs may provide baseline correction CRs containing smaller corrections, text clarifications etc - please contact the Rapporteur before providing contributions on those aspects.

### 6.20.1 Organizational

By Web Conf (1st Week Monday) (1)

Including LSs and any rapporteur inputs.

[R2-2209318](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209318.zip) LS on condition to apply channel access procedure (R1-2208231; contact: OPPO) RAN1 LS in Rel-17 NR\_ext\_to\_71GHz To:RAN2

* Noted (actions discussed together with contributions)

By Email [200] (1)

[R2-2209339](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209339.zip) LS reply on TCI assumption for RSSI measurement for FR2-2 (R4-2214477; contact: Apple) RAN4 LS in Rel-17 NR\_ext\_to\_71GHz-Core To:RAN1 Cc:RAN2

* [200] Noted (RAN2 in CC, no action)

### 6.20.2 Corrections to 71 GHz operation

Including essential control plane corrections to NR operation up to 71GHz.

By Web Conf (1st Week Monday) (1+2)

RAN2 actions due to the RAN1 LS on channel access procedures in [R2-2209318](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209318.zip):

[R2-2209862](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209862.zip) Discussion on RAN1 LS R1-2208231 Ericsson discussion Rel-17 NR\_ext\_to\_71GHz-Core

*Observation 1 RAN1 agreed that when LBT is mandated in a region, the parameter channelAccessMode2-r17 is expected to be configured by the network.*

*Observation 2 RAN1 leaves RAN2 to decide how to capture the RAN1 agreement in RAN2 specification.*

*Observation 3 The gNB has full knowledge of whether LBT is mandated in a certain region, therefore, it is sufficient to fully leave to gNB implementation to determine when and whether the parameter channelAccessMode2-r17 needs to be signaled to UE.*

*Proposal 1 it is sufficient to fully leave to gNB implementation to determine when and whether the parameter channelAccessMode2-r17 needs to be signaled to UE, therefore no spec change is needed for the RAN1 agreement.*

*Proposal 2 RAN2 to send a LS reply to RAN1 to capture the following*

*a. it is sufficient to fully leave to gNB implementation to determine when and whether the parameter channelAccessMode2-r17 needs to be signaled to UE.*

*b. No spec change is needed for the RAN1 agreement indicated in the LS R1-2208231.*

- Ericsson has a strong concern to capture this. It is not necessary.

- ZTE wonders if Ericsson agrees that network shall use LBT in needed bands. If network doesn’t configure this, then UE will not perform LBT. Q C agrees.

* Use text saying “The network configures this field if channel access procedures are required for the serving cell band within this region.” to description of channelAccessMode-2. Can clarify whether this is only used in common signalling (e.g. ServingCellConfigCommon(SIB))
* Offline discussion [203] to handle the CR details

[R2-2209599](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209599.zip) Clarification on channelAccessMode2 vivo CR Rel-17 38.331 17.2.0 3496 - F NR\_ext\_to\_71GHz-Core

[R2-2209593](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209593.zip) Correction for condition to apply channel access procedure OPPO CR Rel-17 38.331 17.2.0 3495 - F NR\_ext\_to\_71GHz-Core

By Web Conf (1st Week Monday) (2)

Do we need to indicate TCI state for LTE UE RSSI measurements?

[R2-2209863](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209863.zip) Discussion on inter-RAT RSSI measurement Ericsson discussion Rel-17 NR\_ext\_to\_71GHz-Core

*Observation 1 the issue is regarding whether a LTE UE can measure NR neighbour cells according to a specific TCI state in the reference NR BWP of the rerence NR cell.*

*Observation 2 TCI state based RSSI measurement is an NR feature. i.e., the feature is only feasible to be supported by an NR UE in RRC CONNECTED. If we support the changes for the inter-RAT RSSI measurement, it is meaning that we extend the feature to LTE UE, which was not in the scope of the R17 WI of 71 GHz.*

*Proposal 1 Don’t support TCI state based RSSI measurement for inter-RAT mobility from LTE to NR.*

[R2-2209534](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209534.zip) Discussion on TCI-state indication for inter-RAT HO from E-UTRA to FR2-2 Huawei, HiSilicon discussion Rel-17 NR\_ext\_to\_71GHz-Core Late

*Proposal 1: TCI state indication is not needed for inter-RAT HO from E-UTRA to NR FR2-2.*

*Proposal 2: It is up to UE implementation to select the suitable beam to measure the RSSI for FR2-2 cell.*

- ZTE thinks this was not discussed in RAN1. Should leave it to RAN1. QC agrees and thinks we can wait for RAN1.

* CB 2nd week to check RAN1 status.

By Email [203] (3)

[R2-2209651](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209651.zip) CP corrections for NR operation to 71GHz ZTE Wistron Telecom AB CR Rel-17 38.331 17.2.0 3499 - F NR\_ext\_to\_71GHz-Core

[R2-2209652](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209652.zip) UP corrections for NR operation to 71GHz ZTE Wistron Telecom AB CR Rel-17 38.321 17.2.0 1414 - F NR\_ext\_to\_71GHz-Core

[R2-2210727](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210727.zip) Release FR2-2 related preference indication configurations in RRC resume Google Inc. CR Rel-17 38.331 17.2.0 3564 - F NR\_ext\_to\_71GHz-Core

Email discussions ([203])

* [AT119bis-e][203][71 GHz] Corrections to 71 GHz (ZTE)

      Scope: Discuss the documents marked for this discussion under AI 6.20.x and provide agreeable versions of CRs (if any) for endorsement.

 Intended outcome: Report in in [R2-2210812](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210812.zip).

 Deadline: Deadline 2 (report) / Deadline 3 (CRs)

[R2-2210812](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210812.zip) Report of [AT119bis-e][203][71 GHz] Corrections to 71 GHz (ZTE) ZTE report

# 7 Rel-17 EUTRA Work Items

## 7.1 Common

(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)

Tdoc limitation: 0

This agenda item will not be treated in this meeting.

Postponed (1)

[R2-2209308](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209308.zip) LS on updated Rel-17 RAN1 UE features lists for LTE after RAN1#110 Thursday (R1-2207926; contact: NTT DOCOMO, AT&T) RAN1 LS in Rel-17 NB\_IOTenh4\_LTE\_eMTC6, LTE\_NBIOT\_eMTC\_NTN, LTE\_terr\_bcast\_bands\_part1, NR\_SL\_enh To:RAN2 Cc:RAN4

* Postponed (to be handled during RAN2#120)

# 8 Rel-18

## 8.5 XR Enhancements for NR

(FS\_NR\_XR\_enh; leading WG: RAN2; REL-18; WID: RP-220285)

Time budget: 2 TU

Tdoc Limitation: 7 Tdocs

### 8.5.1 Organizational

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

By Email [200] (1)

[R2-2209552](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209552.zip) Work Plan for Rel-18 SI on XR Enhancements for NR Nokia, Qualcomm (Rapporteurs) Work Plan Rel-18 FS\_NR\_XR\_enh

* [200] Endorsed

By Web Conf (1st Week Wednesday) (2)

[R2-2209553](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209553.zip) SA2 Status for XR Nokia (Rapporteur) discussion Rel-18 FS\_NR\_XR\_enh

- Intel supports capturing TP. Thinks we could send LS to SA2/SA4 on how the PDU sets and data bursts work. Nokia thinks SA2 is discussing this currently.

- Ericsson points out there is a new SA4 LS to SA2 (S4aV220921).

* The TP is endorsed

[R2-2209554](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209554.zip) SA4 Status for XR Nokia (Rapporteur) discussion Rel-18 FS\_NR\_XR\_enh

- Nokia explains there was a new version 26.926 produced recently, but it doesn’t impact this TP (yet).

- LGE wonders about the PDU set: How is the PDU set created? The I/P/B-frames are different, so are they all in the same PDU set, or can they be different? Nokia agrees we need to discuss this later on. One approach is that we have sets for audio and video, and the video can have different resolutions in different sets.

- vivo thinks the current wording for video comes from SA4 but this is not yet final structure. The section 4.3.1 may still be updated. Nokia thinks the generic observation likely remain valid but we can change based on SA4 progress.

- Ericsson indicates the new SA4 LS reply had some updates to this te4xt.

* The TP is endorsed (can provide another update in this meeting based on latest SA4 LS if possible)

### 8.5.2 XR-awareness

No documents should be submitted to 8.5.2. Please submit to 8.5.2.x

Contributions should take the existing SA2/SA4 decisions into account.

#### 8.5.2.1 PDU sets and data bursts

Including discussion on how RAN2 can make use of PDU sets and/or data bursts in UL or DL direction.

Including discussion on how PDU sets can be mapped to DRBs and whether/how SA2 discussion on PDU set mapping to QoS flows or sub-flows impacts RAN2

By Web Conf (1st Week Wednesday) (3)

PDU set information that is useful to RAN2:

[R2-2210201](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210201.zip) Handling of XR PDU sets in RAN Huawei, HiSilicon discussion Rel-18 FS\_NR\_XR\_enh

*PDU Set integrated handling*

*Observation 1: In case of RAN congestion for DL direction, gNB can discard PDUs within the same PDU set, instead of discarding PDUs randomly, in order to alleviate congestion as well as to ensure the PSER of XR traffic.*

*Observation 2: In order to perform downlink PDU set integrity handling, PSER and PSDB are essential for RAN node.*

*Observation 3: The indication of whether all PDUs are needed by application layer is also beneficial for RAN node to determine which PDUs to discard during the congestion.*

*Observation 4: For downlink integrity handling, PDU set SN and PDU set end flag set are the most useful parameters. PDU SN within a PDU set and number of PDUs within a PDU set are useful if out-of-order N3 transmission can happen and there is no per QoS flow level SN in GTP-U header.*

*Observation 5: There is no motivation to include dynamic PDU set related info, e.g. PDU set SN, in each uplink packet for XR traffic in Uu interface.*

*Differentiated PDU Set handling*

*Observation 6: Currently, RAN can provide differentiated packet handling for QoS flows by mapping them to separate DRBs.*

*Observation 7: From RAN2’s perspective, Option 1 has less RAN impacts than the other two options.*

*PDU Set integrated handling*

*Proposal 1: For downlink PDU set integrity handling, the following information should be provided to RAN from CN:*

*- Semi-static information: PSER and PSDB.*

*- Dynamic information (per PDU): PDU set Sequence Number (SN common to all PDUs of the PDU set), PDU set end flag (i.e. a flag indicating the last PDU of the PDU set). FFS whether PDU SN within the PDU set is needed, depending on whether Qos flow level GTP-U SN can be used instead.*

- CMCC agrees with P1. RAN should be aware of PDU sets dependencies. CATT agrees but thinks PDU set end flag could be also indicated differently (e.g. amount of bytes in the PDU set).

- QC thinks P1 is fine but wonders if this is in RAN2 scope. MTK thinks that we should specify what we want instead of specific solutions. Eg. knowing which packets belong to PDU set and knowing the PDU set end.

- Ericsson thinks this is no comprehensive list, e.g. PDU Set size is missing? Why make a list at all if we dont capture what we think is useful? ZTE thinks It would be better to make it generic "Dynamic information identifying which PDU belongs to which PDUset is also needed”.

- Intel thinks most companies want that this information applies to both UL and DL.

- Nokia thinks to RAN it matters where the burst starts and ends, and how big it is, and what do we need to do with it. MTK wonders what data burst means? Nokia clarifies a burst can contain multiple PDU sets. For example a video frame may contain more than one PDU set e.g. for different quality tiles, or video and audio.

- vivo thinks PSER is related to detailed UE behaviour but is not sure how it’s used. Huawei explains gNB can use this information e.g. in case of congestion to discard packets.

* 1: From RAN2 viewpoint, the following information would be useful for PDU set handling in UL and DL:
* Semi-static information (from CN to RAN): At least PSER and PSDB.
* Dynamic information: At least identifying which PDU belongs to which data burst/PDU set is also needed, including means to determine at least PDU set boundaries.

*Proposal 2: For downlink integrity handling, how the PDU set level assistance information is used by RAN node should be up to the network implementation and does not have to be specified.*

*Proposal 3: RAN2 confirms that PDU set integrity handling is supported for UL direction.*

*Proposal 4: For uplink PDU set integrity handling, PSER and PSDB shall be provided to RAN node by 5GC.*

*Proposal 5: UE should report more detailed data volume and PDB/latency information of the data buffered at the UE on a data burst level, in order to guarantee uplink integrated transmission.*

*Differentiated PDU Set handling*

*Proposal 6: Send an LS to SA2/SA4 to inquire whether AS re-ordering shall be supported for XR traffic.*

- Huawei thinks P6 is not obvious. Intel suggests to assume that NR requirement is maintained i.e. AS should be able to provide in sequence delivery to upper layers understanding that SA4 might not able to guarantee that all XR application can handle out of order delivery.

- Nokia thinks we shouldn’t send LS before we know how to map the PDU sets to LCHs. thinks SA2 already assumes OoD is handled correctly. Thinks splitting the QoS flow can have adverse impacts. MTK thinks reordering happens anyway so it’s not clear why we need to split LCHs.

* Discuss whether to send LS on AS re-ordering once we discuss bearer handling.

*Proposal 7: In order to enable differentiated PDU set handling at RAN, PDU sets with different importance can be served via different logical channels.*

*Proposal 8: RAN2 confirms that differentiated PDU set handling is supported for UL direction.*

*Proposal 9: The same RAN protocol design should be used to handle both DL and UL differentiated PDU set handling, if possible.*

*Proposal 10: It can be up to UE implementation how to identify the packets belonging to the same PDU set, as well as the importance information for each PDU set.*

- Vodafone wonders if UE can provide information for UL? Why does it need to be from AL? Huawei clarifies this is about dynamic information which needs to be provided by UE and is not known by CN. Semi-static information can be provided by CN.

- ZTE wonders that since NAS configures UL filtering (e.g. reflective QoS), so will those not be possible? Huawei clarifies that the information comes from UPF for DL. In UL the information has to be determined by UE (e.g. end of PDU set, traffic periodicity), and UE can report this to gNB. UE will not determine PSER/PSDB by itself – those will come via NAS.

- Lenovo wonders if PDU set integrity is the only thing handled by P1-4. Some more information may be needed for e.g. power saving.

PDU set information that is useful to RAN2, MAC vs. SDAP for XR mapping:

[R2-2209777](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209777.zip) PDU Sets and Mapping of QoS flows and DRBs for XR Apple discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1: In our view Model 1a is preferred for as long as the number of DRBs does not extend beyond what is currently supported by the 5G NR system. RAN2 may consider this model for types of PDU Sets with large QoS differentiation (e.g., I-frames and P-frames can be mapped to different DRBs).*

*Observation 2: Usage of Model 1b would require enhancements potentially both in lower layers (e.g., at MAC) as well as at higher layers (e.g., in SDAP). Therefore, Model 1b is not generally preferred in our view.*

*Observation 3: Although the maximum number of QoS flows can be fairly high in general, the amount of QoS flows required for XR is still well below the maximum number of DRBs.*

*Observation 4: From UE implementation complexity point of view, in order to keep lower layers and time critical functionality close to the existing processing model we’d rather prefer to allocate additional functionality in higher layers.*

*Observation 5: We are open to study AQM and related enhancements in SDAP or a new convergence layer (e.g., Model 2b, approach 1 above).*

*Proposal 1: Awareness of PDU Sets is used to enable differentiated treatment of XR traffic. The media unit of a PDU Set should be used to define parameters for XR.*

*Proposal 2: PDU Set parameters to facilitate RAN awareness of XR include groups of packets, where importance/priority, periodicity, packet arrival time (start/stop), sequence, boundary, size, and jitter of PDU Sets can help schedule and utilize radio resources more efficiently. The information should be available independently for UL and DL.*

*Proposal 3: RAN2 should rely on the existing QoS model for as much as possible. A one to one mapping of PDU Sets to QoS flows to DRBs is the most preferred approach.*

*Proposal 4: If XR traffic requires mapping of PDUs and PDU Sets to streams with different traffic characteristics, then SDAP enhancements are preferred over MAC layer enhancements.*

*Proposal 5: For efficient use of multiple PDU Sets mapped to the same QoS flow with active queue management (AQM), the network restriction that one QoS flow can be mapped to one and only one DRB may be lifted. Coordination with SA2 would be needed.*



- Nokia fully agrees with P3: We shouldn’t touch the path from DRBs to LCH. SDAP should do the QoS differentiation. QC agrees with P3.

- Vodafone thinks P3 doesn’t say anything. We don’t capture that legacy can be used since that gives impression nothing is needed. Thinks model 1 may impact power consumption.

- Lenovo thinks we should spell out what we mean by P3, which means model 2b is not supported. We can still do lower-level enhancements. Vodafone thinks 1A/2A are the only ones supported.

- Apple thinks current QoS model allows model 1B. CATT wonders if PBR works in 1b? Its intent is to carry different frames.

- ZTE wonders if model 1a still allow different PDUsets to be mapped to different Logical channels or not.

- Huawei thinks We should show LCHs on the figure as otherwise it is unclear how QoS enforcement works]

* Capture the models 1a/b, 2a/b in TR and indicate what is possible in current specifications and how. FFS how LCH options work in each case

PDU set information that is useful to RAN2, HARQ/RLC re-transmissions:

[R2-2209450](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209450.zip) Discuss on PDU Sets Qualcomm Incorporated discussion Rel-18 FS\_NR\_XR\_enh

*Delivery deadline vs delay budget*

*Observation 1. If RAN has the knowledge of delivery deadlines of downlink traffic or nominal arrival times of uplink traffic, it can have more delay budget in its scheduling and hence achieve higher system capacity and enable more UE power savings.*

*Observation 2. It is simpler to have UE than 5GC provide delivery deadlines and nominal arrival times to RAN.*

*Observation 3. Delivery deadlines can also simplify RAN’s handling of multi-modal traffic.*

*Handling PDUs in a PDU Set*

*Proposal 1. SDAP maps each data packet in a PDU set to a single PDCP SDU, as in legacy.*

*Proposal 2. All PDUs within the same QoS flow should be mapped to the same DRB, as in legacy.*

*Proposal 3. HARQ and RLC re-/transmissions are based on individual PDUs instead of PDU Sets.*

- Nokia thinks that for P1, we could perform concatenation as discussed for Rel-18 WI to alleviate processing and help with discard. QC thinks concatenation is not always resource-efficient. There can also be impacts to RoHC processing. Xiaomi agrees.

- OPPO, Apple, vivo disagree with P2. OPPO thinks that we should consider all the models first.

- Xiaomi, Lenovo agree with P1-3.

- ZTE wonders if p1 means each packet to a single sdu, or all packet to a single sdu? Thinks this is not clear in the proposal. QC clarifies it’s the former (same as in legacy).

- Nokia wonders if the intention of P2 to kill the sub QoS flow from SA2 ? QC clarifies this is only about inter-PDU set PDUs.

- Samsung thinks P3 is misleading: Legacy HARQ is not based on PDU.

* 1. SDAP maps each data packet in a PDU set to a single PDCP SDU, as in legacy (i.e. each PDU is only mapped to a single SDU).
* 3. HARQ and RLC re-/transmissions for XR traffic are done as in legacy (i.e. they are not based on XR PDU sets).

*Differentiated handling of PDU Sets*

*Proposal 4. If two PDU Sets are associated with the same QoS flow, then they should be mapped to the same DBR, as in legacy.*

*Proposal 5. If SA2 choose to map PDU Sets with different importance levels to different QoS flows, those QoS flows should be mapped to the same DRB.*

*Proposal 6. In Rel-18, RAN2 will not study the use of dependency between PDU Sets in layer-two procedures.*

*Signaling information on PDU Sets*

*Proposal 7. Dynamically signalled PDU Set information should include at least fields that can help identify the association between a PDU and a PDU Set, e.g. sequence number of PDU Set, index of PDU within its associated PDU Set, size or end of a PDU Set, etc.*

*Proposal 8. Dynamically signalled PDU Set information can optionally include content criteria for an PDU Set, if they are not statically configured.*

*Proposal 9. PDU set information is sent in band in PDCP header of each PDU in a PDU set. It is not ciphered and not included in integrity protection.*

*Delivery deadline vs delay budget*

*Proposal 10. RAN uses delivery deadlines (for downlink) and nominal arrival times (for uplink) instead of configured deadlines (i.e. actual arrival time + a fixed delay budget) in its scheduling of PDUs and PDU sets.*

[R2-2210628](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210628.zip) Discussion on PDU sets and data bursts NTT DOCOMO, INC. discussion Rel-18

*Observation1: For XR service, there are PDUs of different importance levels in the same QoS flow.*

*Observation2: In legacy NR network, SDAP layer do the mapping between QoS flows and DRBs based on the QFI.*

*Proposal1: SDAP layer should be aware of PDUs of different importance levels in the same QoS flow and responsible to map them to different DRBs based on QFI/subQFI.*

*Proposal2: Introduce subQFI info in UL/DL data SDAP header.*

[R2-2209414](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209414.zip) On mapping PDU Sets for XR Futurewei discussion Rel-18 FS\_NR\_XR\_enh

*Proposal 1: RAN2 study the various options described in Section 2.1.*

*Proposal 2: RAN2 consider incorporating the text proposed in the Annex into draft TR 38.835.*

[R2-2209555](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209555.zip) PDU Set Identification Details Nokia, Nokia Shanghai Bell discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210008](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210008.zip) Discussion on PDU-Sets handling KT Corp. discussion

[R2-2209698](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209698.zip) Support for XR-aware scheduling AT&T discussion

[R2-2209873](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209873.zip) Number of DRBs for XR VODAFONE Group Plc discussion Rel-18

[R2-2210508](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210508.zip) Considerations on PDU sets and Data bursts in RAN CMCC discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209644](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209644.zip) PDU-set to DRB mapping for XR ZTE Corporation, Sanechips discussion

[R2-2209846](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209846.zip) Discussion on PDU Set for XR-awareness NEC Corporation discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210689](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210689.zip) Discussion on PDU Set and Data Burst Ericsson discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209467](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209467.zip) PDU sets characterization and mapping CATT discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210005](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210005.zip) Discussion on handling and usage of PDU sets and data bursts related information in RAN2 Samsung R&D Institute India discussion Rel-18

[R2-2209485](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209485.zip) Discussion on PDU sets and data bursts for XR awareness vivo discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209631](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209631.zip) DRB mapping for XR traffic Intel Corporation discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209635](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209635.zip) XR related information for awareness in RAN Intel Corporation discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209668](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209668.zip) Discussion on QoS support with PDU Set granularity Xiaomi Communications discussion

[R2-2209686](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209686.zip) Discussion on PDU sets and data bursts InterDigital, Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209937](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209937.zip) Discussion on PDU sets and data burst awareness in RAN Lenovo discussion Rel-18

[R2-2209987](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209987.zip) Discussion on XR-awareness info Spreadtrum Communications discussion Rel-18

[R2-2210021](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210021.zip) Discussion on PDU Set awareness OPPO discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210108](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210108.zip) Considerations on PDU Set handling Fujitsu discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210213](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210213.zip) Considerations on XR awarness Sony discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210360](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210360.zip) Discussion on PDU Sets and Data Bursts for XR Google Inc. discussion

[R2-2210381](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210381.zip) Discussion XR-Awareness for XR services Meta discussion Rel-18

[R2-2210593](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210593.zip) Discussion on PDU sets and data bursts LG Electronics Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210603](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210603.zip) Discussion on PDU Sets mapping to DRBs TCL Communication discussion Rel-18

[R2-2210619](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210619.zip) Discussion on PDU set parameters for XR-awareness III discussion FS\_NR\_XR\_enh

#### 8.5.2.2 PDU prioritization

Including discussion on whether the XR awareness impacts traffic prioritization of XR traffic, e.g. whether there are impacts to LCP mechanism

By Web Conf (1st Week Wednesday) (3)

Use of PDU prioritization (including configurability):

[R2-2210649](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210649.zip) On PDU prioritisation MediaTek Inc. discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1: Simply transmitting different frames from a video stream over different links to prioritise the transmission of certain frames is useless as it breaks the sequential nature of video, and can lead to unpredictable delays as in-order delivery is required by the receiver.*

*Observation 2: There is no need for any form of PDU prioritisation when the video traffic is non real-time in nature.*

*Observation 3: Prioritisation of latest independent frames can be useful in real-time video streams, to provide up to date information to the user.*

*Observation 4: Following the prioritisation of a frame in a real-time stream, the transmission of all earlier frames in the transmission buffer is pointless as they contain outdated information.*

*Proposal 1: The use of PDU prioritisation should be configurable as it is only useful in certain scenarios (e.g. real-time streams).*

*Proposal 2: When a frame is prioritised in a real-time stream, all earlier frames in the transmission buffers of the RAN can be dropped to ease congestion, and to ensure that newly arriving video frames can be provided to the end-user in a timely manner.*

P1

- Nokia thinks this is not something RAN can use. MTK explains this is about non-real time streams, where it doesn’t matter whether the latest frame is sent. Nokia thinks discard will handle this based on PSDB. MTK thinks this enables LIFO use cases where earlier information can be dropped. Discard will happen but this enables faster discard to allow real-time information be provided more quickly. Nokia thinks delay budget handles this so not sure why this is needed? MTK clarifies we could rely on regular discard but this could cause stuttering for user in real-time streaming.

- LGE thinks this is too early to decide.

P2

- vivo thinks this is about RAN buffers, so does this only consider DL. Do we need to specify this? MTK explains that receiver needs to know if something is dropped. This could impact also UE.

* Noted

Do we need to consider split bearers (i.e. >1 RLC bearer per PDCP) for XR even without DC? Is something different needed for existing DRB model?

[R2-2209778](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209778.zip) Enhancements for Traffic Prioritization in XR Apple discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1: In the current 5G NR design the MAC layer cannot identify different QoS flows within a LCH and there is no clear mapping between CGs and QoS flows / QFIs.*

*Proposal 1: RAN2 may consider methods to alter the QoS requirements associated with a DRB or QoS flow on a quasi-periodical basis.*

*Proposal 2: RAN2 may consider the selection of RLC entities for XR traffic.*

*Proposal 3: RAN2 may consider the utilization of DRBs associated with “special” traffic such as Pose or Control Information.*

*Proposal 4: Subject to the DRB mapping decisions in SA2/RAN2, if multiple QoS flows or PDU Sets of different importance are mapped to the same DRB and differentiation of traffic is considered unavoidable in lower layers, the MAC layer has to identify, map and prioritize data with different severity within a LCH.*

*Proposal 5: A congestion indication at the head of the PDCP, RLC or MAC queue may be allowed to reduce delay. Detailed mechanisms can be discussed in the work item phase.*

*Proposal 6: RAN2 may consider congestion detection mechanisms for XR traffic.*

*Proposal 7: RAN2 may utilize an indication of congestion information for complete PDU Sets and apply congestion mitigation policies for XR traffic. Detailed mechanisms can be defined in work item phase.*

Do we need to do something for LCP mechanism?

[R2-2209646](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209646.zip) PDU-set prioritization for XR ZTE Corporation, Sanechips discussion

*Proposal 1: RAN should be aware of the PDU-set delay budget (PSDB) and PDU-set error rate (PSER) associated with the PDU-sets within the XR traffic*

*Proposal 2: For inter-PDU set priority handling in UL, the existing LCP procedure can be used as baseline*

*Proposal 3: If SA2 agree to specify the mechanisms for inter-PDU set dependencies, RAN2 can discuss the enhancements to LCP procedure for inter-PDU set dependency handling*

*Proposal 4: The LCP procedure should be enhanced to prioritize the retransmissions of the unacknowledged higher priority PDU-sets over the transmission of PDU-sets which are dependent on these unacknowledged PDU-sets*

[R2-2209556](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209556.zip) LCP Impacts for XR Nokia, Nokia Shanghai Bell discussion Rel-18 FS\_NR\_XR\_enh

*Proposal 1: LCP does not need to be enhanced to deal with the PDB of XR services.*

*Proposal 2: in tiled stream approach, all tiles should be carried on the same radio bearer, or at least on radio bearers ensuring a similar BLER over the air interface and there is no need to enhance LCP to deal with tiles.*

*Proposal 3: when an XR QoS flow is relocated from an old bearer to a new one, the priority of the old bearer is set equal to the priority of the new bearer for as long as the old bearer has data buffered for that QoS flow.*

[R2-2210202](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210202.zip) Discussion about XR-awareness impacts on LCP Huawei, HiSilicon discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1: In the current LCP mechanism, UE allocates resources only to the selected logical channels.*

*Observation 2: The current LCP mechanism does not consider the remaining PDB of data.*

*Observation 3: UL AR requires significant throughput with quite stringent PDB requirement.*

*Observation 4: The PDB of UL XR traffic is larger than the periodicity of UL XR traffic.*

*Observation 5: For UL AR service, different streams (e.g. I-frame stream and P-frame stream) may be mapped to different LCHs with different priority.*

*Observation 6: Since the current LCP mechanism does not consider the remaining PDB of data, when data on LCH with higher priority arrives, the UE always preferentially transmits data on LCH with higher priority, which may result in the UE being unable to transmit data on LCH with lower priority within the PDB requirement.*

*Proposal 1: In order to solve the impact of arrival of data of a high-priority logical channel on data transmission of a lower-priority logical channel, RAN2 should study the following approaches:*

*1. Consider the remaining PDB of the data buffered in the LCH during LCP procedure.*

*2. Remapping of data to an LCH with higher priority.*

*Proposal 2: RAN2 should study how the resources unused by the current LCP procedure can be reused to carry data of logical channels which would otherwise not be mapped to such resources.*

[R2-2210013](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210013.zip) Discussion on LCP impact Samsung discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1. In XR, packet delay budget (PDB) can vary based on traffic types e.g., video, audio/video, pose/control.*

*Observation 2. In current LCP mechanism when LCH with lower PDB has higher priority, LCH with higher PDB may not get scheduled within its associated packets’ PDB and the packets can be discarded.*

*Proposal 1. RAN2 to define enhanced LCP mechanism to utilize remaining delivery time of XR traffic.*

[R2-2210688](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210688.zip) Discussion on PDU Prioritization Ericsson discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210507](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210507.zip) Impact on PDU Prioritization by XR Awareness CMCC discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209468](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209468.zip) Prioritization of XR traffic CATT discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209451](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209451.zip) Discussion on PDU prioritization Qualcomm Incorporated discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209486](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209486.zip) Discussion on PDU prioritization for XR awareness vivo discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209632](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209632.zip) Handling and in-sequence delivery of XR packets with different priorities Intel Corporation discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209687](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209687.zip) Discussion on PDU prioritization InterDigital, Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209889](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209889.zip) Discussion on PDU prioritization Lenovo discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209990](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209990.zip) Some LCP enhancements based on the traffic awareness Spreadtrum Communications discussion Rel-18

[R2-2210022](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210022.zip) Discussion on PDU prioritization OPPO discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210046](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210046.zip) Discussion on the LCP enhancements for XR ITRI discussion FS\_NR\_XR\_enh

[R2-2210361](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210361.zip) Discussion on PDU prioritization Google Inc. discussion

[R2-2210536](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210536.zip) Discussion on traffic prioritization of XR traffic Beijing Xiaomi Mobile Software discussion

[R2-2210560](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210560.zip) Discussion on the prioritization for XR LG Electronics Inc. discussion FS\_NR\_XR\_enh

[R2-2210620](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210620.zip) Discussion on PDU prioritization for XR-awareness III discussion FS\_NR\_XR\_enh

#### 8.5.2.3 PDU discard

Including discussion on whether the XR awareness impacts PDU discarding of XR traffic, e.g. whether existing PDU discard mechanisms are sufficient

By Web Conf (1st Week Wednesday) (3)

How can packet discarding in PDCP be done for XR traffic?

[R2-2210559](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210559.zip) Discussion on the discard and retransmission for XR LG Electronics Inc. discussion FS\_NR\_XR\_enh

*Proposal 1. The PDCP discardTimer should be performed per PDU set basis.*

*Proposal 2. The RAN2 study that the PDCP discardTimer is managed per SDU for PDU set. i.e., the PDCP discardTimer for a PDCP SDU associated with a PDU set expires, the PDCP entity discards all PDCP SDUs associated with the PDU set.*

*Proposal 3. At PDCP re-establishment for UM DRBs, the PDCP retransmission should be performed per PDU set basis.*

- Samsung thinks PDCP discard should be per PDU set basis i.e. "PDCP discard should be performed per PDU set basis and discardTimer should be operated per PDU set basis

- vivo thinks current PDCP discard is based on SDUs. Could consider PDU discard but not PDU set discard. LGE clarifies that discard timer works on PDU set so that if one PDU is discarded, the whole PDU set is discarded. vivo think then it should be based on PSDB, not PDU set.

- QC thinks P1 is for UL? But for UL, jitter is small compared to DL. So this may not help so much.

- Ericsson agrees that PDCP discarding work on PDU Set basis but disagree that discard timers are the complete solution. In general to see gains it is needed to discard before transmitting much of the PDU Set.

- Huawei supports P1/P2.

- ZTE wonders is the assumption that all PDUs in PDU set arrive at once? vivo thinks this depends on UE implementation. Ericsson this if this doesn’t happen, the service doesn’t work. Lenovo thinks it doesn’t depend whether they arrive at exactly the same time. The main principle still works: If one PDU expires, we discard all PDUs in the same PDU set.

- MTK thinks that if all packets in the PDU set arrive at the same time, will discard as we do it now work as P1 states?

* 1. For UE transmitter, the PDCP discard should be performed per PDU set basis.
* 2. For UE transmitter, The PDCP discard is managed per SDU for PDU set, the PDCP entity discards all PDCP SDUs associated with the PDU set.

Do we need to consider dependency information of XR packet discarding?

[R2-2210687](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210687.zip) Discussion on PDU Discard Ericsson discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1 Dropping solutions should be used to improve the performance of users not performing the dropping*

*Observation 2 The handling of dependent PDU Sets once a leading PDU Set is lost is not universally defined and depends on the operation of the application and likely will create complex solutions*

*Observation 3 Introducing frame/PDU Set dependence show no impact on user satisfaction and doesn’t change the selection of which users packets that are subject to dropping*

*Observation 4 Dropping packets based on dependence or priority is not beneficial.*

*Based on the discussion in the previous sections we propose the following:*

*Proposal 1 RAN2 should specify mechanism for the UE and signalling for NW to support PDU Set dropping solutions assuming application awareness, e.g. information about the PDU Set size and the PDU Set delay budget*

*Proposal 2 RAN2 should not consider PDU Set dependence information*

*Proposal 3 Capture the draft TP in annex about PDU discard in TR 38.835*

Do we consider packet discard at both PDCP and RLC?

[R2-2209557](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209557.zip) PDU Discard for XR Nokia, Nokia Shanghai Bell discussion Rel-18 FS\_NR\_XR\_enh

*Observation: discarding of PDUs can be frequent for XR services.*

*Observation: discarding data at PDCP can trigger reordering delays, unless outOfOrderDelivery is always configured.*

*Observation: requesting RLC to discard SDUs does not always trigger an actual discard.*

*Proposal: the discard procedures in PDCP and RLC should be enhanced to guarantee that discard will actually take place and without triggering additional delays.*

Does AL-FEC play a role in PDU discard and do we need to ask about it from SA2?

[R2-2210375](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210375.zip) PDU Set Handling Meta discussion Rel-18

* Focus on P2

*Observation 1: There are two types of PDU set handling following the loss of a PDU from that same PDU Set, i.e. “should deliver remaining PDUs” vs “can drop remaining PDUs”. SA4 is not aware that within a service data flow, there is different handling following the loss of a PDU from that same PDU Set.*

*Observation 2: A PDU set may be mapped to all source and repair packets of an application layer FEC source block. Typically, for an application layer, source block packets from 0 to K-1 identify the source symbols of a source block in sequential order, where K is the number of source symbols in the source block, using an FEC encoder, e.g., Raptor. Typically, N >= K packets are sent, carrying an FEC source or repair symbols. Typically, the decoder requires only any K or only a small amount more than K packet of the N packets to recover the source packets.*

*Observation 3: The discardTimer has been specified to reflect the QoS requirements of the packets belonging to a service data flow based on the existing QoS framework.*

*Observation 4: The current discard timer setting is very limited and hasn’t taken into account the new 5QI’s agreed in SA2 for XR applications, specifically 5QI 87-90.*

*Proposal 1: RAN2 to adopt the configuration of the PDU Set handling, i.e.”should deliver remaining PDUs” vs “can drop remaining PDUs”, following the loss of PDU as static for a service data flow.*

*Proposal 2: RAN2 to LS SA2 to confirm the need for the additional information for the support of PDU Set based on AL-FEC.*

*Proposal 3: RAN2 to study the discard timer based on PDU Set framework.*

*Proposal 4: RAN2 to discuss additional discard timer settings to support XR services supporting 5QI 87-90.*

- Nokia is not sure we need to ask but the issue is relevant. the latest SA4 LS had an empty section for now. We may stop transmitting PDU set if the already-transmitted packets are sufficient.

- Futurewei explains The latest LS from SA4 to SA2 states that the ratio K/N may be per PDU set.

- Vodafone wonders if some information will come to RAN2 on this?

* Wait for SA2/SA4 to clarify this. No need for LS at this point.

[R2-2209452](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209452.zip) Discussion on PDU discard Qualcomm Incorporated discussion Rel-18 FS\_NR\_XR\_enh

*General criteria for PDU discard*

*Proposal 1. A PDU is subject to discard if it has missed its deadline or the content criteria of its associated PDU set can no longer be met or have already been met.*

*Proposal 2. The decision on whether to discard a PDU associated with a PDU set can be made independently from other PDUs in the same PDU set.*

*PDU discard on UL*

*Observation 3. On uplink, UE needs to have a deadline defined for PDU discard. The 5g-AN\_PDB defined in the current SA2 spec cannot be used for the purpose.*

*Proposal 3. Network can configure a per-DRB delay budget for PDU discard on uplink.*

*Observation 4a. On uplink, not transmitting a PDU which has met the discard criteria can help avoid wasting UL radio resources and save UE power.*

*Observation 4b. On the other hand, SA4 have clarified that network should minimize video packet losses as much as possible to maximize QoE for a XR service.*

*Proposal 4. On uplink, network configures UE whether it should discard or transmit a PDU which has met the discard criteria.*

*Proposal 5. If an uplink MAC PDU contains at least one MAC sub-PDU which has not met the discard criteria, then the MAC PDU is not subject to discard.*

*Proposal 6. RAN2 study MAC-layer enhancement for UE to inform RAN of a discarded MAC PDU.*

*Proposal 7. RAN2 study enhancement to the RLC procedure when a uplink RLC PDU is discarded by either UE or RAN.*

*PDU discard on DL*

*Observation 8. On downlink, UE can obtain delivery deadline for each PDU or PDU set from application client. No additional delay budget or deadline needs to be configured or signalled for UE’s handling of PDUs or PDU sets.*

*Proposal 8. On downlink, if a PDU in UE’s layer-two buffer has met the discard criteria, it is up to UE implementation whether to discard or deliver the PDU to the application.*

*Proposal 9. No downlink MAC PDUs should be discarded by UE.*

*Proposal 10. RAN2 study enhancement to the RLC procedure when a downlink RLC PDU is discarded by either UE or RAN.*

[R2-2210506](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210506.zip) Considerations on PDU Discarding of XR Traffic CMCC discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210627](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210627.zip) Discussion on PDU discard NTT DOCOMO, INC. discussion Rel-18

[R2-2209469](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209469.zip) PDU Discard for XR Services CATT discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209645](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209645.zip) PDU-set discard functionality for XR ZTE Corporation, Sanechips discussion

[R2-2210203](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210203.zip) Discussion on PDU discarding for XR traffic Huawei, HiSilicon discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209586](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209586.zip) PDU Set and PDCP Discard for XR Samsung discussion Rel-18

[R2-2210650](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210650.zip) On the need and impact of PDU discard in the RAN MediaTek Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209487](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209487.zip) Discussion on PDU discard for XR awareness vivo discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209633](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209633.zip) Packet discard optimizations for XR traffic Intel Corporation discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209669](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209669.zip) Discussing on PDU discarding of XR traffic Xiaomi Communications discussion

[R2-2209688](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209688.zip) Discussion on PDU discard InterDigital, Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209779](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209779.zip) Enhancements for PDU Discarding in XR Apple discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209888](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209888.zip) Discussion on PDU discarding Lenovo discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209993](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209993.zip) PDU discard of XR traffic Spreadtrum Communications discussion Rel-18

[R2-2210023](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210023.zip) Discussion on PDU discard OPPO discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210362](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210362.zip) Discussion on PDUs Discarding Google Inc. discussion

[R2-2210371](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210371.zip) Discussion on PDU discard for XR video traffic Futurewei discussion Rel-18 FS\_NR\_XR\_enh

Email discussions ([206])

* [AT119bis-e][206][XR] TP to 38.835 (Nokia)

      Scope: Provide TP to 38.835 on based on online agreements.

 Intended outcome: TP in [R2-2210815](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210815.zip).

 Deadline: EOM (TP)

By Email [206]

[R2-2210815](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210815.zip) TP to 38.835 Nokia pCR Rel-18 38.835 0.2.1 FS\_NR\_XR\_enh

### 8.5.3 XR-specific power saving

No documents should be submitted to 8.5.3. Please submit to 8.5.3.x

#### 8.5.3.1 DRX enhancements

Including discussion on DRX enhancements for XR, e.g. how to handle XR traffic periodicity, jitter and frame-size variations, how frequent changes does XR traffic require for DRX, etc.

By Web Conf (1st Week Wednesday) (1-3)

How do we adjust the DRX pattern: Semi-statically or dynamically?

[R2-2210186](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210186.zip) DRX enhancements for XR Nokia, Nokia Shanghai Bell discussion Rel-18 FS\_NR\_XR\_enh

*Proposal 1: Both RRC pre-configured pattern and dynamic adjustment are beneficial for DRX cycle and XR traffic alignment (due to non-integer periodicity, multi-flows or SFN wraparound).*

*Proposal 2: dynamic adjustment for some DRX parameters is considered as beneficial for jitter handling as well.*

*Proposal 3: Automatic extension of active time when there is no data scheduled during the OnDuration of the DRX cycle is considered as a potential solution to address the jitter issue to allow configuration of short onDurations.*

- CMCC agrees with P1-2 and is fine with P3 but thinks NW should be in control of ActiveTime since network knows about the traffic arrival and can better allow power saving.

- QC supports P1 as both mechanisms are useful. Wonders what dynamic means in P2 – does network send it before each cycle, or is it only occasionally? Nokia clarifies it’s occasionally when needed. QC thinks P1 covers it already. Nokia agrees and thinks we can use the same solution for both use cases.

- Huawei is fine with P1 on pre-configured part but is not sure about dynamic adjustments. RAN1 hasn’t agreed to do anything specific to dynamic adjustments. Thinks jitter can be handled by legacy solutions already. Nokia thinks we need to consider RAN2 aspects first.

- LGE thinks for P1, P2: Agree with dynamic approach for multi-flow, but not for non-integer/SFN wraparound/Jitter, P3: Agree

- Vodafone wonders how P3 works: Why is the OnDuration needed if no data is received? Nokia thinks this assumes we have periodic data so network knows something is needed.

- Apple thinks some existing mechanisms could be used.

- vivo wonders why we need dynamic adjustments? Nokia explains data arrival can happen at any time. vivo thinks this is jitter. Nokia thinks the starting point can still occur at any time.

* 1: At least RRC pre-configuration and switching of configurations of DRX could be considered for enhancements of XR power saving. Other solutions are not precluded and can be further discussed.

How do we handle the non-integer periodicity for DRX cycles?

[R2-2210651](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210651.zip) C-DRX enhancements for XR MediaTek Inc. discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1: It is not possible to align DRX on-duration occasions with XR traffic using legacy DRX cycles with integer values.*

*Observation 2: eC-DRX using rational DRC cycle value matching CG traffic improves both power savings and UE satisfaction rate compared to Rel-17 C-DRX.*

*Observation 3: Using legacy DRX formulas with non-integer (rational number) DRX cycles do not produce expected results when determining the subframes to start the ODT.*

*Observation 4: If C-DRX cycle values that are not factors of 10240ms are introduced in XR and legacy C-DRX formulas are used, DRX on-duration will go out of sync with XR traffic after the SFN wraparound.*

*Observation 5: Stopping ODT early + eC-DRX provides significant power savings with marginal impact on UE satisfaction rate compared to Rel-17 C-DRX.*

*Observation 6: Introducing gaps in ODT + stopping ODT early + eC-DRX provides significant power savings with marginal impact on UE satisfaction rate over Rel-17 C-DRX.*

*Observation 7: CG is suitable for transmitting UL pose/control information.*

*Observation 8: With UL traffic periodicity of 4 ms, UE does not have much opportunity to go to sleep between UL transmissions.*

*Observation 9: UL pose/control traffic does not constitute a bottleneck for capacity for XR deployments.*

*Proposal 1: Introduce non-integer (rational number) DRX cycles to match typical XR traffic patterns.*

*Proposal 2: Enhance C-DRX formulas to support non-integer (rational number) DRX cycles, by replacing modulo operation with the floor function as in Eq6 and Eq7 above.*

*Proposal 3: Enhance legacy C-DRX formulas to resolve the issue with SFN wraparound when DRX cycle is not a factor of 10240ms.*

*Proposal 4: To solve the SFN wraparound issue, introduce a new SFN (E-SFN) and update the C-DRX formulas as in Eq8 and Eq9 above.*

*Proposal 5: Reduce DRX on-duration after the arrival of data by stopping ODT to enable the UE to go to sleep early.*

*Proposal 6: Split the DRX on-duration into groups of smaller on-durations by introducing gaps to maximize opportunities for the UE to go to sleep.*

*Proposal 7: Enhancements for stopping ODT early and splitting DRX on-durations can be combined: The ODT is stopped and remaining on-durations in the group are skipped after the arrival of data.*

*Proposal 8: drx-HARQ-RTT-TimerUL and drx-RetransmissionTimerUL are not started for transmissions performed on specific CG configurations, for example, ones reserved for UL pose/control traffic.*

Do we need multiple DRX configurations for XR?

[R2-2209453](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209453.zip) DRX enhancements for XR Qualcomm Incorporated discussion Rel-18 FS\_NR\_XR\_enh

Non-integer valued DRX cycles

* Focus on P5

*Observation 1. As different options are possible to address the issue of mismatch between non-integer periodicity of XR traffic and integer valued DRX cycles, RAN2 should first agree on a set of criteria for the downselection of different options.*

*Proposal 1. Based on evaluation results provided by RAN1, RAN2 apply the following criteria to down select options for supporting non-integer DRX cycles:*

*- a selected option should be able to support all currently known frame rates of XR applications;*

*- a selected option should enable the most power saving gain;*

*- a selected option should result in the least variations in the start time of DRX on durations;*

*- a selected option should have the least impact on the current DRX procedure and the current RAN1/2/4 specs.*

*Proposal 2. RAN2 study the following options to support DRX cycles with non-integer values:*

*- Option A. Add new values of DRX cycles represented in rational numbers;*

*- Option B. Use cadence instead of periodicity of DRX cycle to calculate the start time of DRX on duration.*

*Observation 2. If DRX cycle has a non-integer value, the start time of DRX on duration can drift irregularly when when SFN wraps around (i.e. returns to 0), which can cause extra delay and higher power consumption for UE.*

*Proposal 3. RAN2 study enhancements to avoid irregular start time of DRX on durations due to SFN wrap around when non-integer valued DRX cycles are configured.*

*Adaptive DRX configurations*

*Observation 3. Many XR applications are capable of adapting their bit/frame rates based on the quality of their connections.*

*Observation 4. RAN/UE need to adapt UE’s DRX configuration to match application’s rate adaptation in a timely manner, to ensure consistent QoS performance.*

*Proposal 4. RAN2 study dynamic adaptation DRX configurations. FFS which DRX parameters should be included in this enhancement.*

*Multiple DRX configurations*

*Observation 5. Traffic flows other than video have small and regular sized data and hence can be efficiently supported by SPS/CG.*

*Observation 6. It is more power efficient to use SPS/CG instead of DRX to serve traffic flows with small and regular data arrivals.*

*Observation 7. A single DRX configuration, together with multiple SPS/CG configurations or power saving features such as PDCCH skipping, is sufficient to support mixed traffic flows with different periodicities.*

*Observation 8. Enhancement for multiple independent DRX configurations has significant impact on the current DRX procedure but does not have clear power saving benefits.*

*Proposal 5. Study on multiple independent DRX configurations is deprioritized in R18.*

*Reduced monitoring at start of DRX on duration*

*Proposal 6. Network can configure UE to always start its DRX on durations with a set of power-optimized configurations that enable reduced PDCCH monitoring by UE. FFS which configurations should be included.*

*End of burst indication for DRX*

*Observation 9. Currently it is not easy for gNB to know when a UL burst ends.*

*Observation 10. With XR traffic’s short periodicity, UE may not be able to have much sleep between two bursts if it relies on DRX inactivity timer to terminate DRX active time.*

*Observation 11. Network will be able to terminate DRX active time sooner if UE can provide indication on when a UL burst ends.*

*Proposal 7. RAN2 study enhancements for UE to indicate either end of a UL burst or its preference to terminate DRX active time.*

*UL skipping and DRX/BWP inactivity timer*

*Observation 12. UL skipping or UL Tx without data is more likely to happen with XR, which causes UE to unnecessarily re-/start DRX/BWP inactivity timer and thus waste power.*

*Proposal 8. RAN2 study whether/when UE should re-/start DRX/BWP inactivity timer when it performs UL skipping or UL Tx without data.*

[R2-2210690](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210690.zip) Discussion on RAN2-specific CDRX aspects Ericsson discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210692](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210692.zip) Discussion on solutions for DRX cycle mismatch and jitter Ericsson discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209470](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209470.zip) DRX Enhancements to Address Cycle Mismatch CATT discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209471](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209471.zip) Serving XR traffic with minimum power consumption CATT discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209515](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209515.zip) Analysis on XR traffic characteristics for C-DRX enhancement Huawei, HiSilicon discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209516](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209516.zip) Further discussion on C-DRX enhancements for XR Huawei, HiSilicon discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209649](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209649.zip) DRX enhancements for XR ZTE Corporation, Sanechips discussion

[R2-2210189](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210189.zip) Candidate Solutions on C-DRX Enhancements NEC Telecom MODUS Ltd. discussion Rel-18

[R2-2210061](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210061.zip) Discussion on power saving scheme for XR Samsung discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209780](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209780.zip) On C-DRX Enhancement for HARQ Handling in XR Apple discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209488](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209488.zip) Discussion on DRX enhancements for XR power saving vivo discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209502](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209502.zip) On DRX enhancements for handling non-integer traffic periodicity Futurewei discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209511](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209511.zip) Discussion on CDRX enhancement for XR based on outputs from RAN1 OPPO discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209512](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209512.zip) Discussion on CDRX enhancement for Power saving OPPO discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209634](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209634.zip) C-DRX enhancements for XR traffic Intel Corporation discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209670](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209670.zip) Discussing on XR-specific C-DRX enhancements Xiaomi Communications discussion

[R2-2209689](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209689.zip) Discussion on DRX enhancements InterDigital, Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209938](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209938.zip) Discussion of DRX enhancement Lenovo discussion Rel-18

[R2-2210009](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210009.zip) DRX enhancement for power saving in XR LG Electronics Inc. discussion FS\_NR\_XR\_enh

[R2-2210144](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210144.zip) Discussion on DRX enhancements for XR-specific power saving CMCC discussion Rel-18 NR\_Mob\_enh2-Core

[R2-2210214](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210214.zip) Considerations on XR specific C-DRX power saving enhancements Sony discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210359](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210359.zip) DRX Enhancement for XR Google Inc. discussion

[R2-2210501](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210501.zip) C-DRX enhancements for XR-specific power saving DENSO CORPORATION discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210705](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210705.zip) Discussion on DRX enhancements for XR-specific power saving III discussion FS\_NR\_XR\_enh

#### 8.5.3.2 Other enhancements

Including discussion on non-DRX power saving enhancements for XR

By Web Conf (2nd Week Tuesday) (1)

PDU set information that is useful for XR power saving purposes:

[R2-2209455](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209455.zip) Information to RAN for UE power savings Qualcomm Incorporated discussion Rel-18 FS\_NR\_XR\_enh

*Proposal 1. Traffic parameters (e.g. periodicity, start offset, etc) are useful to RAN in configuring DRX and can be semi-statically signalled to RAN. FFS the definition of traffic parameters, e.g. whether they are associated with PDU Set or Data Burst or something else.*

*Proposal 2. Jitter statistics (e.g. range) are useful to RAN, e.g. in configuring DRX on duration, and can be semi-statically signalled to RAN. FFS whether the jitter statistics should be associated with PDU Set or Data Burst or something else.*

*Proposal 3. Boundary indication (e.g. start and/or end of a PDU Set or a Data Burst) is useful to RAN, e.g. in timely termination of DRX active time. It can be dynamically signaled to RAN. FFS whether this indication should be signaled by a marker associated with PDU Set or Data Burst or by other methods.*

*Proposal 4. Information for identifying a PDU Set (e.g. sequence number) is useful to RAN and can be dynamically signalled to RAN.*

*Proposal 5. Explicit indications and/or conditions for RAN to decide whether to deliver or discard a media unit is useful to RAN, e.g. to avoid unnecessary re-/transmissions and thus save UE power. FFS whether this media unit should be PDU, PDU Set or both and whether the indications should be signalled semi-statically or dynamically.*

*Proposal 6. For traffic flows not based on PDU Sets, their periodicity, start offset and range of jitters are useful information to RAN, e.g. in DRX configuration.*

[R2-2210145](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210145.zip) Discussion on XR-specific power saving CMCC discussion Rel-18 NR\_Mob\_enh2-Core

[R2-2210187](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210187.zip) Multiple CG configurations for XR Nokia, Nokia Shanghai Bell discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209648](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209648.zip) Other Power Saving enhancements for XR ZTE Corporation, Sanechips discussion

[R2-2210062](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210062.zip) Discussion on XR-awareness for power saving scheme design Samsung discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209454](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209454.zip) Non-DRX power saving enhancements for XR Qualcomm Incorporated discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209489](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209489.zip) XR specific information for RAN power saving vivo discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209690](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209690.zip) Discussion on PDCCH monitoring enhancements InterDigital, Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209781](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209781.zip) XR-Specific Power Saving for Configured Scheduling Apple discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209939](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209939.zip) Discussion of PDCCH monitoring enhancement Lenovo discussion Rel-18

[R2-2209982](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209982.zip) Discussion on power saving in XR Spreadtrum Communications discussion Rel-18

[R2-2210010](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210010.zip) Enhancement in legacy power saving for XR LG Electronics Inc. discussion FS\_NR\_XR\_enh

### 8.5.4 XR-specific capacity improvements

No documents should be submitted to 8.5.4. Please submit to 8.5.4.x

[R2-2210764](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210764.zip) On XR Capacity Enhancements Dell Technologies discussion Rel-18

* Withdrawn

#### 8.5.4.1 Feedback enhancements

Including discussion on UE feedback enhancements for XR capacity, e.g. how BSR can enhance capacity for XR (e.g. new BSR table, how to reflect delay in BSR, etc.)

By Web Conf (1st Week Wednesday) (1-2)

Does XR traffic introduce need for BSR enhancements, and if we do, what would be useful?

[R2-2209558](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209558.zip) BSR for XR Nokia, Nokia Shanghai Bell discussion Rel-18 FS\_NR\_XR\_enh

*Proposal 1: introduce new BS table(s) to reduce the quantisation errors for high bit rates and allow the reporting of the long BSR even when only one bearer has data buffered.*

*Proposal 2: introduce a delay information in the BSR.*

*Proposal 3: the delay information needs to distinguish how much data is buffered for which delay.*

*Proposal 4: a periodic BSR is triggered when the ON-DURATION is started.*

*Proposal 5: PDU discard triggers a BSR.*

[R2-2210686](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210686.zip) Discussion on BSR enhancements Ericsson discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1 Increasing the precision of the buffer sizes reported in the BSR improves the XR capacity*

*Observation 2 PDU Set delay information reported to the network is useful*

*Proposal 1 New BS tables are introduced and are created dynamically using NW signalling*

*Proposal 2 Buffer status information and delay information are provided per PDU set*

*Proposal 3 New short and long BSR formats are created.*

*Proposal 4 Current BSR triggering conditions are the baseline conditions for any new BSR. Further conditions can be discussed in Stage 3.*

[R2-2209456](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209456.zip) UE feedback enhancements for capacity improvement Qualcomm Incorporated discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1. The step size used in the current BSR table can increase exponentially as buffer size increases (e.g. up to several MBs). Large step size can have a negative impact on system capacity for XR applications.*

*Proposal 1. Study enhancements (e.g. new BSR table(s), new encoding algorithm) to reduce granularity of BSR for large buffer sizes.*

*Observation 2. As NW currently does not know how long UL data has been buffered, it may not be able to schedule it in accordance with its deadline.*

*Proposal 2. RAN2 study enhancements for UE to report delay status of its data in L2 buffer.*

*Proposal 3. Network can configure UE to measure and report DL and/or UL delay statistics for selected DRBs.*

[R2-2209636](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209636.zip) Enhancements to Buffer Status Reporting for XR Traffic Intel Corporation discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1. For BSR related enhancements, RAN2 area of interest does not overlap with RAN1’s related discussion which mainly focuses on how to reduce the scheduling latency in the case of dynamic UL grants, i.e. from the initial point when the UE sends a BSR or SR to when the UL grants are scheduled for data transmission.*

*Observation 2. By enhancing BSR reporting to include XR information of the delay or remaining time after which the data in the UL buffer may be unnecessary to transmit, other L2 procedures could be optimized. For example, taking into account this delay/remaining time during the resource scheduling by gNB or for UE to trigger the discard of dependent packets upon exhausting HARQ retransmissions.*

*Observation 3. Network may have outdated BSR information of a given UE when this UE discards packets autonomously i.e. without knowledge of the network.*

*Proposal 1. UE can report delay information on remaining time after which the data in the UL buffer may be unnecessary to transmit. FFS whether existing BSR is updated or a new MAC CE is used to include this delay information. FFS how this delay information is used to enhance other L2 procedures.*

*Proposal 2. It can be beneficial if the UE can report to the network about a reduction in the data volume of the UE’s buffer e.g. in the event of PDU discard for UL data (i.e. when UE discards data packets which were considered part of the UL buffer volume reported in a previous BSR to the network).*

*Proposal 3. If Proposal 2 is agreed, RAN2 to discuss enhancements to buffer status reporting in the event of packet discard for the scenario described in Proposal 2.*

[R2-2210150](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210150.zip) Consideration on BSR enhancement for XR CMCC discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209472](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209472.zip) BSR enhancement for XR capacity CATT discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209650](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209650.zip) UE feedback enhancements for XR capacity ZTE Corporation, Sanechips discussion

[R2-2210191](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210191.zip) Feedback Enhancements for Capacity Improvement NEC Telecom MODUS Ltd. discussion Rel-18

[R2-2210537](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210537.zip) Discussion on BSR enhancement for XR-specific capacity improvement Huawei, HiSilicon discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209828](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209828.zip) Discussion on BSR enhancements for XR Samsung discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209591](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209591.zip) BSR enhancement for XR capacity MediaTek Inc. discussion Rel-18

[R2-2209782](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209782.zip) BSR Enhancements for XR Apple discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209490](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209490.zip) Discussion on feedback enhancements for XR-specific capacity improvements vivo discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209517](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209517.zip) Discussion on buffer status report for XR Google Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209672](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209672.zip) Discussing on UE feedback enhancements for XR capacity Xiaomi Communications discussion

[R2-2209691](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209691.zip) Discussion on XR-specific feedback enhancements InterDigital, Inc. discussion FS\_NR\_XR\_enh

[R2-2209890](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209890.zip) Discussion on UE Feedback enhancements Lenovo discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209983](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209983.zip) Some feedback enhancements on XR capacity Spreadtrum Communications discussion Rel-18

[R2-2210024](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210024.zip) Discussion on feedback enhancement OPPO discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210047](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210047.zip) Discussion on the UE feedback enhancements for XR ITRI discussion FS\_NR\_XR\_enh

[R2-2210215](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210215.zip) Considerations on BSR Sony discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210502](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210502.zip) Discussion on UE feedback enhancements for XR capacity DENSO CORPORATION discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210599](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210599.zip) Discussion on BSR enahancement for timing information in XR LG Electronics Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210621](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210621.zip) Discussion on Feedback enhancements for XR-specific capacity improvements III discussion FS\_NR\_XR\_enh

#### 8.5.4.2 Scheduling enhancements

Including discussion on scheduling enhancements to improve XR capacity, e.g. on CG, how to jointly consider UL and DL traffic, how to allocate multiple TBS, etc.

Including discussion on whether XR traffic would require enhancements to measurement gaps

By Web Conf (2nd Week Tuesday) (2)

Does existing CG mechanism work for XR, and is UE assistance information to network needed?

[R2-2210483](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210483.zip) Discussion on CG enhancement Samsung discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1: The Burst/Multi-modal Data for XR can be handled by the existing CG mechanism. (i.e., by using multiple CG configurations.)*

*Proposal 1: RAN2 is kindly asked to confirm that the current CG configurations can be reused for UL XR traffic.*

*Observation 2: The characteristics of UL XR traffic can be changed at the UE side and thus some assistant data from the UE seem necessary to help the gNB make the proper CG configuration for UL XR traffic.*

*Proposal 2: RAN2 is kindly asked to discuss potential enhancement on UAI to provide some assistant information on UL XR traffic for CG configurations at the gNB.*

How to handle RAN1/RAN2 interactions for CG?

[R2-2210541](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210541.zip) Discussion on scheduling enhancement for XR traffic Huawei, HiSilicon discussion Rel-18 FS\_NR\_XR\_enh

*Observation 1: The issue that measurement gaps will affect traffic transmission/reception is a non-XR specific issue.*

*Proposal 1: Leave CG enhancements discussion to RAN1. RAN2 can evaluate potential RAN2 impacts based on RAN1’s progress.*

*Proposal 2: Potential enhancements for measurement gaps shall be discussed and evaluated in RAN4.*

[R2-2209473](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209473.zip) Discussion on CG enhancements CATT discussion Rel-18 FS\_NR\_XR\_enh

*Proposal 1: CG enhancement should be considered to leverage the performance of XR capacity and power saving.*

*Proposal 2: Non-integer CG periodicity should be introduced and UE will calculate the time occasion of CG as INT (periodicity\*N).*

*Proposal 3: To cope with jitter and packet size variation, multi-CGO in a CG period should be supported.*

*Proposal 4: RAN2 should study time-based HARQ process ID determination for the multi-CGO configuration.*

[R2-2209559](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209559.zip) Capacity Enhancements for XR Nokia, Nokia Shanghai Bell discussion Rel-18 FS\_NR\_XR\_enh

*Observation: RRM measurements might severely impacts XR capacity.*

*Proposal 1: investigate blind retransmissions of RLC PDUs.*

*Proposal 2: investigate the concatenation of PDCP SDUs belonging to the same PDU set at PDCP.*

[R2-2209457](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209457.zip) Scheduling enhancements for capacity improvement Qualcomm Incorporated discussion Rel-18 FS\_NR\_XR\_enh

*New type of CG configuration*

*Observation 1. A single CG with legacy configuration is not able to efficiently support XR traffic.*

*Observation 2. If multiple legacy CGs with periodicity matching that of XR traffic are used, a very large number of them (e.g. 10s) may be needed.*

*Proposal 1. Introduce a new type of CG configuration which can have multiple transmission occasions within one cycle and the cycle length matches that of XR traffic.*

*Periodic DGs*

*Observation 3. XR applications require close adaptation between scheduling and short-term variations in link quality and traffic load. But legacy CG is not flexible enough for such adaptations.*

*Proposal 2. Introduce an enhancement in which UE is pre-configured with a sequence of periodic PUSCH occasions but each occasion is dynamically scheduled by DCI.*

*Enhanced measurement gaps*

*Observation 4. Due to non-integer valued periodicities, XR traffic is more likely to overlap with measurement gaps, which can increase delay and reduce system capacity.*

*Observation 5. With short DRX inactivity timer required for XR, it is more likely for DRX inactivity timer to expire in the middle of a measurement gap, which creates extra delays to data.*

*Proposal 3. RAN2 study enhancements (e.g. dynamic de-/activation or dynamic priority) that can mitigate impacts of measurement gaps on delay performance of XR traffic.*

[R2-2210151](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210151.zip) Consideration on scheduler enhancement for XR CMCC discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209647](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209647.zip) Scheduling enhancements for XR ZTE Corporation, Sanechips discussion

[R2-2210691](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210691.zip) Discussion on Scheduling enhancements Ericsson discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209592](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209592.zip) Scheduling enhancement for XR capacity MediaTek Inc. discussion Rel-18

[R2-2209491](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209491.zip) Discussion on scheduling enhancements XR-specific capacity improvements vivo discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209673](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209673.zip) Discussing on XR-specific scheduling enhancements Xiaomi Communications discussion

[R2-2209692](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209692.zip) Discussion on scheduling enhancements InterDigital, Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209783](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209783.zip) Considerations of Scheduling Enhancement for XR Apple discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209907](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209907.zip) Scheduling and measurement gap enhancements for XR traffic Intel Corporation discussion Rel-18 FS\_NR\_XR\_enh

[R2-2209940](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209940.zip) Discussion of scheduling enhancement Lenovo discussion Rel-18

[R2-2209991](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209991.zip) Some enhancements on XR scheduling Spreadtrum Communications discussion Rel-18

[R2-2209994](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209994.zip) Enhancement to measurement gap Spreadtrum Communications discussion Rel-18

[R2-2210025](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210025.zip) Discussion on scheduling enhancement OPPO discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210216](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210216.zip) Considerations on XR specific capacity improvements Sony discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210358](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210358.zip) Scheduling Enhancement for XR Google Inc. discussion

[R2-2210600](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210600.zip) Discussion on Scheduling enahancement for XR LG Electronics Inc. discussion Rel-18 FS\_NR\_XR\_enh

[R2-2210604](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210604.zip) Further discussion on DG for XR uplink traffic transmission TCL Communication discussion Rel-18

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

(NR\_QoE\_enh-Core; leading WG: RAN3; REL-18; WID: RP-221803)

Time budget: 0.5 TU

Tdoc Limitation: 2 tdocs

### 8.14.1 Organizational

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

By Web Conf (1st Week Friday) (2+1)

[R2-2209323](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209323.zip) LS to SA4 on Rel-18 enhancement of NR QoE (R3-225227; contact: Huawei) RAN3 LS in Rel-18 NR\_QoE\_enh To:SA4 Cc:RAN2

* Noted (handled by contributions under 8.14.3)

[R2-2209330](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209330.zip) LS to RAN2 on RAN3 agreement of QoE reporting in NR-DC (R3-225256; contact: China Unicom) RAN3 LS in Rel-18 NR\_QoE\_enh-Core To:RAN2

*• QoE reports can be transmitted to either MN or SN and the reporting leg (MCG or SCG) can be changed during the application session.*

* Noted (handled by contributions under 8.14.4)

[R2-2210748](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210748.zip) Revised work plan for Rel-18 NR QoE Enhancement China Unicom Work Plan Rel-18 NR\_QoE-Core

* Endorsed

### 8.14.2 QoE measurements in RRC\_IDLE INACTIVE

including discussion on QoE measurements for RRC\_IDLE/INACTIVE for MBS broadcast services.

This agenda item will not be treated in this meeting.

[R2-2209843](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209843.zip) QoE collection for IDLE and Inactive state Qualcomm Incorporated discussion NR\_QoE\_enh-Core

* Withdrawn

[R2-2210754](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210754.zip) Discussion on QoE measurements in RRC\_IDLE and INACTIVE states China Unicom discussion Rel-18 NR\_QoE-Core

* Postponed (this topic will be discussed in RAN2#120)

### 8.14.3 Rel-17 leftover topics for QoE

Including discussion on Rel-17 leftover topics: Whether/how RRC should support per-slice QoE measurement configuration, RAN-visible QoE aspects, or QoE reporting for overload scenario?

By Email [204] (10)

[R2-2210573](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210573.zip) Discussion on QoE Rel-17 leftover issues China Telecom Corporation Ltd. discussion

[R2-2209845](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209845.zip) Discussion on RAN visible QoE trigger event Qualcomm Incorporated discussion NR\_QoE\_enh-Core

[R2-2209784](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209784.zip) Views on QoE Reporting for Overload Scenarios Apple discussion Rel-18 NR\_QoE\_enh-Core

[R2-2209830](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209830.zip) Discussion on Rel-17 leftover features for QoE Lenovo discussion Rel-18 NR\_QoE\_enh-Core

[R2-2209833](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209833.zip) Discussion on Rel-17 leftover issues for QoE ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core

[R2-2209837](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209837.zip) Event-based RAN visible QoE report Samsung discussion Rel-18

[R2-2210015](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210015.zip) Discussion on Rel-17 leftover issues for QoE CATT discussion Rel-18 NR\_QoE\_enh-Core

[R2-2210204](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210204.zip) Support of R17 left-over features Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core

[R2-2210275](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210275.zip) QMC enhancements for RAN overload Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core

[R2-2210306](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210306.zip) Discussion on rel-17 leftovers Ericsson discussion Rel-18 NR\_QoE\_enh-Core

Email discussions ([204])

* [AT119bis-e][204][QoE] Summary of Rel-17 leftovers for QoE (China Telecom)

      Scope: Summarize content of Tdocs under AI 8.14.3. Request company input on the priority of each issue and identify proposals which can be most easily progressed in Rel-18.

 Intended outcome: Report in in [R2-2210813](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210813.zip).

 Deadline: Deadline 1 (report)

By Web Conf (1st Week Friday) (1)

[R2-2210813](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210813.zip) Report of [AT119bis-e][204][QoE] Summary of Rel-17 leftovers for QoE (China Telecom) China Telecom report

For easy agreement:

* 1: From RAN2’s perspective, there is no further work for per-slice-based QoE measurement.
* 2: RAN2 can wait for RAN3 progress on enhancement to per-slice RAN visible QoE measurement.
* 3: RAN2 needs to wait for the progress of RAN3 on RVQoE value.
* 10: The enhancement on UAI message to express the UE’s preference on QoE reporting configurations is not pursued.
* 11: QoE reporting via unlicensed band is out of the WID scope.

- Huawei thinks the following proposals are to wait for RAN3: P2, P3, P7, P8 (related to P7), P9. Some wording improvements may be needed.

For further discussion:

* 7: RAN2 to postpone the discussion of the QoE reporting enhancement for overload scenario to the next meeting (based on the progress of RAN3).

- Lenovo thinks this is the same as “Wait for RAN3”.

* 8: FFS on whether to send the priority information 1) UE and gNB or 2) only to gNB

- Lenovo thinks this proposal is related to P7. And the discussion to Q8 was whether the priority is sent also to UE (Alt1) or only to gNB (Alt2). Wonders why P8 speaks only of UE.

- Huawei thinks some companies thinks UE can buffer the information.

* 9: To wait for RAN3 decision on granularity of priority.

- Lenovo wonders why this proposal needs further discussion considering the majority view for “Wait for RAN3 decision”.

* 4: RAN2 can discuss event-based RVQoE, including possible options, benefits, spec impacts, and complexities based on company contributions.

- Huawei thinks that for event-based RVQoE, most of companies are open for discussing in RAN2, and details are FFS. So we are ok with P4.

- China Telecom explains this means RAN2 needs more discussion on this matter.

- Huawei thinks RAN2 should confirm that we can allow some discussion on this matter and determine the options. QC thinks the benefits of event-based reporting are obvious so good to discuss. Complexity is not so high. Lenovno thinks we should avoid duplicated discussion in RAN3.

* 5: FFS whether to add the QoS flow ID in the RVQoE report. If RAN3 already agreed to this, RAN2 can progress this in the next meeting where we discuss Rel-17 leftovers.

- China Telecom explains that some companies want to wait for RAN3 on this.

- ZTE thinks RAN3 already agreed to this.

*Proposal 6: RAN2 discuss whether to send a LS to CT1/SA4 (related to P5).*

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

Including discussion on support of QoE measurements for NR-DC.

By Web Conf (1st Week Friday) (2)

[R2-2209844](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209844.zip) RAN2 issues to support QoE collection in NR-DC Qualcomm Incorporated discussion NR\_QoE\_enh-Core

*For container based QoE collection in DC operation*

*Observation 1: There is no bearer mapping on UE side for QoE data reporting.*

*Observation 2: There is no different QoS requirements for QoE data, then no different bearer needed.*

*For RVQoE collection in DC operation*

*Observation 3: In Rel-17, RVQoE is configured to the UE only when the the corresponding container-based QoE is provided to the UE.*

*Observation 4: RVQoE measurement should be sent to the RAN node over which the application layer is running.*

*Observation 5: The RAN node (MN or SN) can be derived based on the bearer ID for MCG bearer or SCG bearer*

*For container based QoE collection in DC operation*

*Proposal 1: For container based QoE, It is MN to provide a uniform QoE configuration to UE over SRB1.*

*Propsoal 2: For container based QoE, SN can be involved for unifirm QoE configuration generation, how to involve SN is left to RAN3.*

*Proposal 3: For container based QoE reporting, only one bearer is configured for QoE reporting in NR-DC operation.*

*Proposal 4: QoE data can be reported on MCG bearer or SCG bearer.*

*Proposal 5: RAN2 discusses to introduce a new SCG bearer e.g. SRB5 and configure SRB4 as MN terminated SCG bearer for UE to reporting QoE over SCG link.*

*Proposal 6: Split bearer is not configured for QoE reporting.*

P1/2

- Lenovo thinks these are not aligned with RAN3 agreements. They discussed configuration for signalling and m-based QoE separately. Only m-based QoE needs MN-SN coordination. Ericsson agrees. We shouldn’t state network implementation aspects. Huawei also agrees. CATT thinks this is discussed in RAN3 and we can wait for them.

- ZTE support P1, anyway MN needs to cofigure and it is possible for MN to forward SN configuration.

- Nokia thinks these are in line with RAN3 given that RAN2 has control over radio interface. RAN3 has discussed MN-SN coordination but the generation of SN part is RAN3. Fine with P1/2. Thinks RRC procedures are agnostic to s- and m-based QoE. Chair thinks we make generic design but take restrictions into account. Huawei agrees and thinks P1 is not aligned.

- China Unicom thinks P1 is not aligned with RAN3 and we need to consider both s- and m-based QoE. Fine if it’s just s-based QoE.

- Ericsson thinks we can allow SRB3 for QoE configuration. Huawei, CATT agrees. Nokia thinks this will create differences for s- and m-based QoE. For s-based QoE, only MN sends the configuration.

- QC wonders how RRC ID is assigned with SRB3. How do we coordinate that?

- China Unicom wonders about SRB1.

* Observation: Rel-18 QoE configuration may be created by MN or SN.
* Either SRB1 or SRB3 can be used for providing SN configuration to UE (at least for m-based QoE). FFS if this requires additional MN-SN coordination.

*For RVQoE collection in DC operation*

*Proposal 7: For RVQoE, It is MN to provide a uniform QoE configuration to UE over SRB1.*

*Proposal 8: For RVQoE, SN can be involved for uniform QoE configuration generation, how to involve SN is left to RAN3.*

*Proposal 9: RVQoE measurement should be sent to the RAN node over which the application layer is running.*

*Proposal 10: The UE reports to MN or SN the RVQoE measurement together with the bearer or QoS flow ID for each RVQoE measurement.*

*Propsoal 11: The MN or SN determines which RAN node (MN or SN) each RVQoE measurement should be sent based on the bearer or QoS flow ID, and forwards the RVQoE measurement to the other RAN node (SN or MN) if needed.*

[R2-2210752](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210752.zip) Discussion on QoE configuration and reporting for NR-DC China Unicom discussion Rel-18 NR\_QoE-Core

* 1: In NR-DC scenario, both signalling-based and management-based QoE measurement collection shall be supported.

*Proposal 2: For signalling-based QoE measurement, if the UE is connected to MN only or both MN and SN, only MN can forward the QoE measurement configuration received by the CN to a UE by RRCReconfiguration message without involving the SN.*

*Proposal 3: For m-based QoE measurement, if both MN and SN that UE connected with are in the area scope, and the QoE configurations received by the MN and SN are the same, only MN can forward the QoE configurations to the UE.*

*Proposal 4: For m-based QoE measurement, if both MN and SN that UE connected with are in the area scope, and the QoE configurations received by the MN and SN are different, which node can forward the QoE configurations to the UE can wait for RAN3’s decision.*

*Proposal 5: For m-based QoE measurement, if only MN that UE connected with are in the area scope, only MN can forward the QoE configurations to the UE.*

*Proposal 6: For m-based QoE measurement, if only SN that UE connected with are in the area scope, which node can forward the QoE configurations to the UE can wait for RAN3’s decision.*

*Proposal 7: RAN2 needs to discuss how to define the RRC ID of the corresponding QoE configurations configured by the SN, e.g. define a new RRC ID for SN-QoE or reuse MN-QoE RRC ID.*

*Proposal 8: RAN2 needs to discuss how to map both RRC ID of MN-QoE and SN-QoE configurations to the reference ID. An LS to RAN3 with assumptions is needed.*

- Ericsson thinks we either coordinate (like measIDs) or we have separate ID-space (like CPAC). Prefers coordination. QC thinks AL doesn’t know if this is MN or SN. Can be per UE. Was proposing only to use MN to avoid coordination.

- China Unicom clarifies this is for both AL- and RV-QoE. Wonders if we need to discuss whether we need a new RRC ID or can reuse existing RRC ID? Huawei thinks we can reuse current MeasId-paradigm and it should be unique among nodes.

* RAN2 assumes that there is a unique ID for QoE configurations across MN and SN. This can be accomplished by MN-SN coordination (e.g. similar as was done with measIds for NR-DC)

*Proposal 9: When the UE is connected to both MN and SN, the UE can send all the multiple application layer measurement reports to the MN or SN in the RRC message.*

*Proposal 10: When the UE is connected to both MN and SN and the UE receives the QoE measurement collection pause indication from the MN, the UE can send paused multiple application layer measurement reports to the SN in the RRC message.*

*Proposal 11: RAN2 can discuss the SRB selection on the QoE reporting in the SN from the following two options:*

*Option 1: SRB4 is used for QoE reporting in the SN.*

*Option 2: A new defined SRB which has low priority than SRB4 is used for QoE reporting in the SN, e.g. SRB5.*

- Lenovo thinks RAN3 agreed that it can be configured how UE reports (i.e. MN or SN). for MN we can use SRB4 but for SN we need to discuss. What is currently discussed if we allow simultaneous transmission or not. Prefers split SRB e.g. due to different segmentation capabilities for RRC messages.

- Apple thinks option 1 should be the baseline unless we have clear justification why SRB4 cannot be extended to SN reporting. Ericsson agrees but thinks we could also use SRB3 instead of any new SRB. SRB3 has less priority for RRC messages in general.

- QC thinks this depends on how many bearers we configure for UE reporting. If one, SRB4 could be sufficient. For SRB3 thinks it’s high priority so is not a good idea.

- Huawei thinks all options could be considered and QoE reports are not the same priority as UE reports. For split SRB we could exclude it since it’s used for duplication only and these are low-priority reports. QC agrees.

- Ericsson thinks split SRB is not duplicated DRB. Apple thinks SRB is btu DRB is not.

- Nokia agrees with Huawei and thinks split SRB could be excluded. Agrees with QC mixing in SRB3 may not be a good idea.

* Use SRB4 as baseline for Rel-18 QoE. FFS how we can send QoE reports towards SN (e.g. only SRB4, define new SRB, reuse SRB3, split SRB). Discuss details in the next meeting.

[R2-2209785](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209785.zip) Support of QoE in NR-DC Apple discussion Rel-18 NR\_QoE\_enh-Core

[R2-2209831](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209831.zip) Discussion on support of QoE measurements for NR-DC Lenovo discussion Rel-18 NR\_QoE\_enh-Core

[R2-2209832](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209832.zip) Discussion on Rel-18 QoE measurement for NR-DC ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core

[R2-2209838](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209838.zip) Support of QoE measurements for NR-DC Samsung discussion Rel-18

[R2-2210016](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210016.zip) Discussion on QoE measurement in NR-DC CATT discussion Rel-18 NR\_QoE\_enh-Core

[R2-2210205](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210205.zip) Discussion on QoE measurements in NR-DC Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core

[R2-2210274](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210274.zip) QMC support on NR-DC Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core Late

[R2-2210307](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210307.zip) Support of QoE in NR-DC Ericsson discussion Rel-18 NR\_QoE\_enh-Core

### 8.14.5 Other topics

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

This agenda item will not be treated in this meeting.

## 8.17 Dual Transmission/Reception (Tx/Rx) Multi-SIM for NR

(NR\_DualTxRx\_MUSIM-Core; leading WG: RAN2; REL-18; WID: RP-220955)

Time budget: 1 TU

Tdoc Limitation: 3 tdocs

### 8.17.1 Organizational

By Web Conf (1st Week Tuesday) (1)

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

[R2-2210388](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210388.zip) Work planning of R18 MUSIM vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

- Chair notes that the TU schedule is quite inconvenient and will present some challenges for the work organization.

- Samsung agrees and wonders if the TU plan is realistic.

* Endorsed

### 8.17.2 Temporary capability restriction for MUSIM

No documents should be submitted to 8.16.2. Please submit to.8.16.2.x

#### 8.17.2.1 Scenarios

Including discussion on scenarios to address in this WI: What are the prioritized scenarios? What is assumed from UE and network? Is it assumed that UE supporting dual RRC connection also supports Rel-17 MUSIM?

By Web Conf (1st Week Tuesday) (1)

UE requirements for dual RRC connection for MUSIM:

[R2-2209734](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209734.zip) Discussion of temporary UE capability switching for MUSIM China Telecom discussion Rel-18

* Focus on P1 and P3

*Proposal 1: If MUSIM UE triggers the procedure of maintaining two RRC\_CNNECTED states, it is assumed that service requirement can be satisfied with the temporary capability of both sides.*

- QC thinks service requirements come from SA1 so this may be difficult in RAN2. Vodafone agrees. LGE wonders if the second network can use temporary capability restriction?

- Huawei agrees with QC. Thinks only NW A enhancements are discussed. Nokia also agrees with QC.

*Proposal 2: Dual-RX/Dual-TX UE reuses Rel-17 network switching mechanism if it can not satisfied service requirement from both sides.*

*Proposal 3: RAN3 impact is needed in DC/CA and RAN sharing scenarios.*

- Vodafone thinks we can use legacy mechanisms so is not sure we need RAN3 impacts. Lenovo thinks network coordination is not in the scope.

- ZTE thinks we should clarify how SCG is deactivated before judging if there are RAN3 impacts. Apple thinks there may be RAN3 impacts but agrees it’s too early to consider.

- China Telecom wonders what we need to do before RAN meeting to determine RAN3 impacts.

* The R18 MUSIM solution should work in DC/CA and RAN sharing scenarios (but need not be optimized for RAN sharing).

By Web Conf (1st Week Tuesday) (2)

MUSIM scenarios for dual Rx/Tx:

[R2-2210389](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210389.zip) Scenarios for Rel-18 Multi-SIM vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Observation 1: the below scenarios can be considered in Rel-18 MUSIM:*

*o Senarios 1: the UE in network A in RRC\_CONNECTED indicates/removes its preference on temporary UE capability restriction when UE starts/stops connection with NW B.*

*o Senarios 2: when UE in network A performs RRC connection resumption, UE in network A indicates its temporary UE capability restriction for MUSIM purpose.*

*o Senarios 3: UE in network A indicates/removes its preference on temporary DC related capabilities for MUSIM purpose.*

*o Senarios 4: UE in RRC\_CONNECTED mode in both network A and network B using the two SIMs dynamically adjusts its capabilities according to the actual hardware usage in the two networks.*

*o Senarios 5: UE in network A indicates its constrained band information due to band conflict between two SIMs usage.*

*Proposal 1: the below scenarios should be addressed with high priority:*

*o Senarios 1: the UE in network A in RRC\_CONNECTED indicates/removes its preference on temporary UE capability restriction when UE starts/stops connection with NW B.*

*o Senarios 2: when UE in network A performs RRC connection resumption, UE in network A indicates its temporary UE capability restriction for MUSIM purpose.*

*o Senarios 3: UE in network A indicates/removes its preference on temporary DC related capabilities for MUSIM purpose.*

- QC thinks these are some valid scenarios but we shouldn’t specify what UE does in NW B. We should minimize the work on that and define everything from NW A perspective. vivo thinks all these scenarios are about UE indicating to NW A.

- OPPO thinks scenario 3 is covered by scenario 1 already. UE could be in DC mode and we can consider combined scenario. MTK agrees. Vodafone agrees and thinks these are the same from UE viewpoint. vivo thinks in DC UE may indicate some capabilities from SN to NW B, which may not be the same as in NW A.

- Apple thinks scenario 5 is also important and should be discussed. Also thinks scenario 4 is the main scenario we are interested in. vivo agrees and thinks we can combine them together.

- QC thinks for NW B, we can just say "due to activity on NW B" instead of describing every possible scenario on NW B.

- vivo thinks scenario 3 has potential RAN3 impact, so we want RAN2 to discuss whether to pursue it at the beginning.

- Intel thinks scenario 1 is the main scenario and 3-5 are just about capability restrictions. Scenario 2 is about NW B in CONNECTED mode and includes RRCSetup towards NW A. LGE agrees. Ericsson agrees and thinks Scenario 2 is a bit confusing. vivo explains scenario 2 is not about dynamic capabilities but UE is in RRC with NW B and starts/resumes connection in NW A.

- Xiaomi thinks scenario 3 is an example of how to have detailed description of capability impacts. This could also have impacts to RAN3.

- Huawei thinks Scenario 1 is OK; For Scenario 3, same comment as Oppo; Scenario 2, why we need to have capability restriction during RRC Conn resume procedure?

- Nokia thinks Scenario 1 with clarification that capability restriction for CA/DC can be starting point. Aligned with basic objective of WID.

- Intel thinks “due to activity in NW B” is unclear: Is NW B in CONNECTED or IDLE?

* RAN2 aims to address at least the Scenario 1: the UE in network A in RRC\_CONNECTED indicates (i.e. adds/removes) its preference on temporary UE capability due start/stop connection in NW B. This can be e.g. CA/DC capability restriction.

[R2-2210392](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210392.zip) Scenarios and assumptions for Dual-RX/Dual-TX MUSIM UE Ericsson discussion NR\_DualTxRx\_MUSIM-Core

* Focus on P1-2

*Observation 1 Once the solution for the NR-NR scenario is defined, it is applicable to other scenarios (e.g. when Network B is LTE or when DC/CA is not used), with minor changes.*

*Observation 2 Currently, a UE can indicate its “preference” about a certain feature by sending the UEAssistanceInformation message to the network.*

*Observation 3 When a Dual-RX/Dual-TX MUSIM UE is in RRC\_CONNECTED state Network A, using DC or CA, and in RRC\_IDLE/RRC\_INACTIVE in Network B, the UE uses both the transceivers in Network A, and cannot monitor the Network B for incoming Paging, cell measurements, etc.*

*Observation 4 When a service requires the DC or CA in Network B (e.g high bitrate service), the Dual-RX/Dual-TX MUSIM UE needs to completely leave the Network A to connect to the Network B with full capabilities.*

*Proposal 1 RAN2 should focus on the scenario where Network A is NR SA (with CA) or NR-DC, and Network B is NR. The case where Network B is LTE should be down-prioritized.*

*Proposal 2 The following is assumed when defining the solution:*

*- The two networks are independent (i.e. no inter-network communication);*

*- The two networks have the same priority (i.e., no controller-secondary dependency);*

*- Both the network support this feature;*

*- The Core Network is not aware of the temporary restrictions of the UE capability;*

*- The Dual-RX/Dual-TX MUSIM UE, when not in RRC\_CONNECTED state, can be in RRC\_IDLE or RRC\_INACTIVE in each of the two networks.*

- LGE agrees with P1 and P2.

- Samsung wonders if P1 means that we would specify something for LTE? If we only specify NR impacts to NW A. Ericsson explains that WI describe LTE in NW B.

- Xiaomi thinks we can have NR and EN-DC band combinations and shouldn’t deprioritize LTE.

- Intel thinks for P1, instead of deprioritising LTE, just need to say that capability restriction is not performed in LTE

- Vodafone doesn’t see a need to deprioritize LTE since LTE is there and we may want to use the feature. Ericsson thinks we could start considering NR-NR and then apply that to LTE.

- MTK thinks deprioritizing is only possible if we consider NW B impacts. If we focus on NW A changes, everything works for LTE as well. Nokia thinks NW B as LTE should be considered but without any signalling procedures even if NR has signalling changes.

- vivo wonders how dynamic capability changes can work for LTE if no signalling impacts are allowed?

*Proposal 2 The following is assumed when defining the solution:*

*- The two networks are independent (i.e. no inter-network communication);*

*- The two networks have the same priority (i.e., no controller-secondary dependency);*

*- Both the network support this feature;*

*- The Core Network is not aware of the temporary restrictions of the UE capability;*

*- The Dual-RX/Dual-TX MUSIM UE, when not in RRC\_CONNECTED state, can be in RRC\_IDLE or RRC\_INACTIVE in each of the two networks.*

- OPPO agrees with P2 except for “both network support”.

- QC wonders what “same priority” means? Ericsson thinks it means that UE behaves similarly for both networks.

- Huawei wonders about the last bullet? Ericsson clarifies UE can be in any state in either of the networks. This adds some mechanics we may have to consider.

* 2 The following is assumed when defining the solution:
* The two networks are independent (i.e. no inter-network communication);
* The Core Network is not aware of the temporary restrictions of the UE capability;

*Proposal 3 In order to limit the standardization and implementation impacts, the existing standardized procedures are used: no new message should be introduced, but the existing messages can be extended with new IEs.*

*Proposal 4 The UEAssistanceInformation message is used by the Dual-RX/Dual-TX MUSIM UE to indicate its preference on temporary UE capability restriction and removal of the restriction.*

*Proposal 5 The Dual-RX/Dual-TX MUSIM UE should use the MUSIM gaps (i.e., “Switching procedure without leaving RRC\_CONNECTED” functionality) to be able to monitor the Network B, when using full capabilities (e.g. DC or CA) in Network A.*

*Proposal 6 The Dual-RX/Dual-TX MUSIM UE should use the “Switching procedure for leaving RRC\_CONNECTED” functionality to leave completely Network A and use full capability with Network B.*

*Proposal 7 The “Paging with service indication” functionality can be reused to allow the Dual-RX/Dual-TX MUSIM UE to know the reason why it has been paged in Network B and to decide if connect to that network.*

By Web Conf (1st Week Tuesday) (1 – IF time allows)

MUSIM Gap coordination for NR-DC (sort-of Rel-17 leftover):

[R2-2210738](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210738.zip) Discussion on MN-SN MUSIM gaps coordination in INM Samsung discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

* Focus on P1

*Observation 1: NR-DC is in the scope of RAT concurrency in Rel-18 MUSIM WI.*

*Observation 2: Dual connectivity may require all RF chains available in MUSIM device.*

*Observation 3: MUSIM gaps may be needed even for dual-Tx/dual-Rx MUSIM UE in case one UE's USIM in MUSIM device uses all RF chains.*

*Observation 4: There is no support on MN-SN MUSIM gaps coordiation in INM. It may lead to wasting radio resources in SN as MN is only allowed to configure MUSIM gaps.*

*Based on the above, RAN2 is requested to discuss and agree on the following proposal:*

*Proposal 1: RAN2 to specify MN-SN coordination of MUSIM gaps with MR-DC in Rel-18.*

*Proposal 2: RAN2 to discuss whether UE can indicate its preference on MUSIM gaps to SN in Rel-18.*

- QC supports P1 since MUSIM R17 gaps are inefficient. UE may not always need per-UE gap.

- Nokia also supports the CG specific MUSIM Gap preference and configuration. Dual-Rx UE may not need gaps for both CGs. ZTE agrees we should consider this.

- OPPO wonders if this is anyway in the scope of WI? Also if P1/2 are different solutions? Samsung explains P1 is about NW A coordination and P2 is about UE indicating preference to SN directly. Huawei has similar concerns and thinks this is not in Rel-18 scope. Samsung clarifies UE is CONNECTED in NW A with MR-DC and UE is in IDLE for NW B. Huawei thinks UE should be in CONNECTED for NW B. Samsung thinks WI can be read in different ways.

- MTK thinks per FR gap, per CG gap, MN-SN coordination are 3 different thing. Per-FR and per-CG gaps are not in the scope.

- Vodafone thinks we can come back to this later on.

- OPPO thinks this is not in the scope. vivo disagrees.

By Web Conf (2nd Week Tuesday) (1)

CB: ??? 1: RAN2 can discuss NW A MN-SN coordination of MUSIM temporary capability restrictions (e.g. gaps) with MR-DC in Rel-18.

[R2-2209391](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209391.zip) Consideration on the Dual (Tx/Rx) MUSIM Scenarios ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210000](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210000.zip) Scenarios of Temporary capability restriction for MUSIM NEC discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210017](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210017.zip) Applicable scenarios for R18 MUSIM WI Huawei, HiSilicon discussion

[R2-2210070](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210070.zip) UE Architecture, assumptions and Primary scenarios for Dual TX/RX MUSIM operation Nokia, Nokia Shanghai Bell discussion Rel-18

[R2-2210728](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210728.zip) General considerations on potential scenarios for MUSIM Samsung discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2209422](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209422.zip) Scenarios Clarification for R18 MUSIM OPPO discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2209576](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209576.zip) Scenarios for Dual-Active MUSIM Qualcomm Incorporated discussion

[R2-2209637](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209637.zip) Considerations on Rel-18 MUSIM Intel Corporation discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210059](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210059.zip) Discussion on prioritized scenarios for temporary UE capability restriction Xiaomi discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210421](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210421.zip) eMUSIM Scenarios Sharp discussion

[R2-2210503](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210503.zip) Discussion on R18 MUSIM Scenarios MediaTek Inc. discussion NR\_DualTxRx\_MUSIM-Core

[R2-2210533](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210533.zip) Applicable scenarios for dual Tx/Rx MUSIM devices DENSO CORPORATION discussion NR\_DualTxRx\_MUSIM-Core

[R2-2210582](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210582.zip) Scenarios for Rel-18 MUSIM LG Electronics discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

#### 8.17.2.2 Solutions

Including discussion on mechanism to indicate preference on temporary UE capability restriction and removal of restriction: How is this accomplished: e.g. capability update, release of cells, (de)activation of configured resources? What are the cases when this can occur for MUSIM, i.e. what does "start/stop connection to NW B) for MUSIM purpose" mean?

By Web Conf (1st Week Tuesday) (2)

Solutions for indicating UE needs to connection to the 2nd network:

[R2-2209575](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209575.zip) UE Capability Update for Dual-Active MUSIM Qualcomm Incorporated discussion

*Observation 1: The current mechanisms in the specifications for UE capability restriction or preferences can only be used for the specific features they were introduced.*

*Observation 2: The framework of the current UAI mechanisms are not sufficiently flexible enough to satisfy MUSIM dual-active scenario.*

*Observation 3: UE capability restriction was discussed during Rel-14 NR Study Item as a general NR feature not just limited to MUSIM.*

*Observation 4: A more general solution can be future proof and be even utilized by other NR features.*

* Focus on P2, P4

*Proposal 1: In line with Rel-17 principle, the UE can request UE capability restriction or removal of restriction on Network A without informing about the purpose or activity on Network B.*

*Proposal 2: The MUSIM mechanism in Rel-18 should be flexible enough to signal changes to all UE capabilities which can be impacted by sharing of resources between the MUSIM links.*

*Proposal 3: RAN2 should assume as a baseline that temporary UE capability changes will be transparent to 5GC.*

*Proposal 4: RAN2 to consider the above the following four options and other alternatives and variants and work on a pro/con analysis for them:*

*• Option 1: Delta signaling of UE capability*

*• Option 2: Repeated UE capability procedure*

*• Option 3: Extension of UAI procedure with new parameters*

*• Option 4: Pre-configuring multiple capabilities or profiles*

[R2-2210514](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210514.zip) Discussion on R18 MUSIM Solutions MediaTek Inc. discussion NR\_DualTxRx\_MUSIM-Core

*Proposal 1: RAN2 assumes that the temporary UE capability restriction (for MUSIM) is mainly focus on the number of supported CC in a network.*

*Proposal 2: Introduce new MAC CE for the UE to deactivate / activate an NR SCell for MUSIM purpose.*

*Proposal 2: The MUSIM mechanism in Rel-18 should be flexible enough to signal changes to all UE capabilities which can be impacted by sharing of resources between the MUSIM links.*

- Vodafone thinks flexible mechanism is good as Rel-17 was not very flexible. Xiaomi thinks P2 is different from MTK P1 and would prefer QC direction. Apple supports QC P2 and this opens up the solution space.

- OPPO thinks this is good principle but it’s only one solution. This precludes some solutions in P4.

- Samsung thinks P2 is too flexible. MBS and IDC are similar and we should focus on specific parameters. MTK proposal is too restrictive. Huawei thinks we should focus on MUSIM and not other Wis. Difficult to see what this proposal means. Fine to consider SCell release but more discussion needed. Resource conflict situation needs to be addressed.

- Nokia thinks the set of capabilities depends on the scenarios. Is fine to consider CA/DC restrictions.

- Intel thinks this is too flexible and we need to look at the scenarios and see which restrictions are needed. MTK agrees and wonders if networks are willing to support this.

* RAN2 needs to discuss which UE capabilities can be impacted by sharing of resources between the MUSIM links.

*Proposal 4: RAN2 to consider the above the following four options and other alternatives and variants and work on a pro/con analysis for them:*

*• Option 1: Delta signaling of UE capability*

*• Option 2: Repeated UE capability procedure*

*• Option 3: Extension of UAI procedure with new parameters*

*• Option 4: Pre-configuring multiple capabilities or profiles*

*Proposal 1: RAN2 assumes that the temporary UE capability restriction (for MUSIM) is mainly focus on the number of supported CC in a network.*

*Proposal 2: Introduce new MAC CE for the UE to deactivate / activate an NR SCell for MUSIM purpose.*

* AT-meeting discussion to consider P4 (QC), P1/2 (MTK) and what each proposal entails (including potential RAN3/4 impacts identified). Offline 211 (QC, DL: Monday W2).

Email discussions ([211])

* [AT119bis-e][211][MUSIM] MUSIM solutions for Rel-18 (QC)

      Scope: Discuss the technical details of solutions on the table for Rel-18 MUSIM and whether they may have RAN3/4 impacts. Can consider all documents from this meeting.

 Intended outcome: Report in in [R2-2210823](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210823.zip).

 Deadline: Deadline 2.5 (report)

By Web Conf (2nd Week Tuesday) (1)

[R2-2210823](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210823.zip) Report of [AT119bis-e][211][MUSIM] MUSIM solutions for Rel-18 (QC) Qualcomm Incorporated report

By Web Conf (1st Week Tuesday) (1 – IF time allows)

RAN3/4 impacts:

[R2-2210390](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210390.zip) Potential solutions for Rel-18 Multi-SIM vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

* Focus on P5-6

*Observation 1: The below scenarios can be considered in Rel-18 MUSIM:*

*o Scenario 1: the UE in network A in RRC\_CONNECTED indicates/removes its preference on temporary UE capability restriction when UE starts/stops connection with NW B.*

*o Scenario 2: when UE in network A performs RRC connection resumption, UE in network A indicates its temporary UE capability restriction for MUSIM purpose.*

*o Scenario 3: UE in network A indicates/removes its preference on temporary DC related capabilities for MUSIM purpose.*

*o Scenario 4: UE in RRC\_CONNECTED mode in both network A and network B using the two SIMs dynamically adjusts its capabilities according to the actual hardware usage in the two networks.*

*o Scenario 5: UE in network A indicates its constrained band information due to band conflict between two SIMs usage.*

*Observation 2: The restriction information of below capabilities can be indicated in NW A for Rel-18 MUSIM:*

*o UL MIMO layer or Tx number;*

*o DL MIMO layer or Rx number;*

*o max CC number;*

*o max Tx power.*

*Observation 3: The metrics of NW A communication interruption, Latency, Forward scalability, Specification impact, Siganlling overhead can be used to compare the different solutions.*

*Observation 4: The solutions of DC related capability change may have RAN3 impact on MN-SN interface.*

*Proposal 1: RAN2 to compare the metrics performance of UE capability signaling and UAI for indicating capability restriction information.*

*Proposal 2: RAN2 to discuss whether UE capability switching for MUSIM purpose is under NW control or UE control.*

*Proposal 3: RAN2 to consider the below solutions:*

* Solution 1: When UE needs to switch its capabilities from NW A to NW B (e.g., upon the UE triggers RRC connection setup in NW B), the UE sends capability update preference to the NW A via UAI or UE capability.*

* Solution 2: The UE indicates its capabilities used for MUSIM purpose with NW A in advance by Preconfiguring multiple capability profiles. When to use the MUSIM capabilities are based on UE’s request.*

*Proposal 4: If scenario 3 is supported, UE requested SCG (de)activation enhancement can be studied for MUSIM purpose.*

*Proposal 5: RAN2 to decide in this meeting whether to pursue DC related capability change (Scenario 3), and if yes, identify what the RAN3 impact is.*

*Proposal 6: Send an LS to RAN4 that RAN2 has identified at least NW A interruption impact due to capability switching between two SIMs.*

- QC thinks we will have some RAN3 impacts and possible also RAN4. Huawei thinks it’s premature without the solutions.

* Noted (partly discussed under [211])

[R2-2210730](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210730.zip) Discussion on capability coordination for MUSIM Samsung discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Observation 1: A MUSIM device can be implemented such that one UE's USIM occupies/uses all operable RF chains in on-demand manner.*

*Observation 2: UE assistance seems necessary to avoid performance degradation from dynamic sharing of multiple RF chains between USIMs in MUSIM device.*

*Proposal 1: RAN2 to discuss how to indicate UE assistance on temporary UE capability restriction and removal of restriction*

*- Approach 1 (explicit): Each UE's USIM in MUSIM device can indicate the network to the independent set of explicit UE capabilites based on RF chains that it is currently using. Then, network reacts accordignly (i.e. release of SCells/SCG based on current UE capabilities).*

*- Approach 2 (implicit): Each UE's USIM in MUSIM device can indicate any preference on RRC configuration update (i.e. release of SCells/SCG) based on current UE capabilites. Then, network (re-)configures it accordingly.*

[R2-2209596](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209596.zip) Discussion on Dual Tx/Rx Multi-SIM for NR Vodafone discussion Rel-18

*Observation 1: The existing mechanisms such as SCell activation/deactivation and SCG activation/deactivation can be used to free up transmitter/receiver for dynamic transmitter/receiver sharing in RRC\_Connected mode.*

*Proposal 1: The UE in RRC\_Connected should be able to switch the networks to receive communications from another network without leaving the current network.*

*Proposal 2: The approach used in Rel-17 for providing UE preference for scheduling gap could be extended to support of dynamic sharing of transmitter/receiver in RRC\_Connected in Rel-18.*

*Proposal 3: To reduce signalling overhead due to frequent activation/deactivation of cell, a SCell or SCG activation/deactivation could be represented by an activation/deactivation pattern.*

[R2-2209392](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209392.zip) Consideration on the Temporary UE Capability Restriction for the Dual (Tx/Rx) MUSIM ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210001](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210001.zip) Solutions of Temporary capability restriction for MUSIM NEC discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210007](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210007.zip) Discussion on UE capability update for MUSIM Huawei, HiSilicon discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210018](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210018.zip) Discussion on UE-initiated SCell deactivation and activation Huawei, HiSilicon discussion

[R2-2210071](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210071.zip) Candidate solutions for Dual TX/RX MUSIM operation Nokia, Nokia Shanghai Bell discussion Rel-18 Late

[R2-2210393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210393.zip) Support of Dual-RX/Dual-TX MUSIM UE Ericsson discussion NR\_DualTxRx\_MUSIM-Core

[R2-2209423](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209423.zip) Potential Solutions on temporary UE capability restriction and removal of restriction OPPO discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2209638](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209638.zip) Possible solutions to indicate temporary capability reduction for Rel-18 MUSIM Intel Corporation discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2209856](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209856.zip) Discussion on Dual Tx/Rx Multi-SIM ASUSTeK discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210060](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210060.zip) Capability sharing issue for SRS Tx switching capability Xiaomi discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210422](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210422.zip) eMUSIM Solutions Sharp discussion

[R2-2210534](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210534.zip) Possible solution for dual Rx/Tx MUSIM devices DENSO CORPORATION discussion NR\_DualTxRx\_MUSIM-Core

[R2-2210583](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210583.zip) General soluion for Rel-18 MUSIM LG Electronics discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210596](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210596.zip) Analysis on dual Tx/Rx Multi-SIM Lenovo Information Technology discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210446](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210446.zip) [Draft] LS on DLUL interruption due to capability switching vivo LS out NR\_DualTxRx\_MUSIM-Core To:RAN4

* Withdrawn

### 8.17.3 Other

Including any other aspects of dual Tx/Rx Multi-SIM.

By Web Conf (1st Week Tuesday) (2 – IF time allows)

Band conflict (Rel-17 leftover):

[R2-2210485](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210485.zip) Band Conflict Issue and Mitigation for MUSIM Apple discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Observation 1: Based on UL and DL bands in which the MUSIM UE operates in RRC IDLE/INACTIVE/CONNECTED modes, there are scenarios in which both Dual-Rx/Single-Tx and Dual-Rx/Dual-Rx mode of operation are impaired due to RF band conflict across the MUSIM instances.*

*Observation 2: Autonomous MUSIM UE based solution to mitigate band conflict would result in sub-optimal and non-standard behaviour.*

*Proposal 1: RAN2 to consider such Band conflict scenarios for MUSIM to arrive at a graceful specification-based solution intended to mitigate such conflicts.*

- QC wonders if this includes IDLE-IDLE or IDLE-INACTIVE. Apple confirms those can still happen. Some solutions there can also apply to CONNECTED. Nokia agrees.

- Xiaomi thinks if we focus on CONNECTED this is in scope and MTK solution address these. Huawei agrees.

- MTK thinks band conflict is a valid case but we should focus on CONNECTED only.

- ZTE agrees we can consider this as it can impact BCs for NW A in CONNECTED.

* 1: RAN2 can consider such Band conflict scenarios for MUSIM in CONNECTED to arrive at a graceful specification-based solution intended to mitigate such conflicts.

Gap collisions (Rel-17 leftover):

[R2-2210391](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210391.zip) Discussion on MUSIM gap collision handling vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1: The priority of MUSIM gap is configured by the network.*

*Proposal 2: Priority based solution is used for gap collision handling between MUSIM gap and legacy measurement gaps, and between different MUSIM gaps.*

*Proposal 3: UE provides gap priority preference information for MUSIM gaps to the network.*

- QC wonders if this is about Rel-17 or Rel-18? Thinks RAN4 may ask this for Rel-17 already.

- Lenovo RAN4 agreed only one type of gap is configured at the same time in Rel-17.

- vivo thinks MUSIM gaps can be configured with other gaps.

* Wait for RAN4 feedback.

[R2-2209393](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209393.zip) Considering on the Scheduling Gap Enhancement for the MR-DC ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

[R2-2210072](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210072.zip) Additional scenarios for Dual TX/RX MUSIM UE Nokia, Nokia Shanghai Bell discussion Rel-18

*(moved from 8.17.2.2)*

[R2-2210394](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210394.zip) Discussion on MUSIM gaps for a Dual-RX/Dual-TX UE Ericsson discussion NR\_DualTxRx\_MUSIM-Core

## 8.18 R18 Other

Misc Impacts from Other RAN WGs and TSGs (incl MC Enhancements). LS ins for Rel-18 topics that has no RAN WI.

Time budget: 0.5 TU

Tdoc Limitation: -

By Web Conf (1st Week Monday) (1+1)

RAN slicing aspects related to SA2 LS [R2-2209355](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209355.zip):

[R2-2209355](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209355.zip) LS Out on RAN dependency of FS\_eNS\_Ph3 (S2-2207435; contact: ZTE) SA2 LS in Rel-18 FS\_eNS\_Ph3 To:RAN2, RAN3

*For Key Issue #3: Network Slice Area of Service for services not mapping to existing TAs boundaries, and Temporary network slices, SA2 has following questions:*

*1. Whether NG-RAN can broadcast one or more Secondary TAIs (up to a number RAN2 agrees, we note that for NTN is already possible to broadcast TWO TACs) via an updated SIB or new SIB, and report them to the CN and between gNBs as per existing Tracking Area related information exchange procedures but with indication they are secondary. The additional TAIs are associated with specific S-NSSAI(s) like the existing TAs and will be treated by UEs supporting secondary TAs as a normal Tracking area from RM standpoint (as described in solution#9)*

*2. Whether the NG-RAN can be configured with a slice availability on a per-cell basis and*

*a) inform AMF and other gNBs in NGAP messages (as described in solution#11 and others)*

*b) Whether in Constrained Service Area the network slice is still supported but since no dedicated resources are allocated for the network slice the SLA of the network slice is not guaranteed.(as described in solution#45).*

*3. The NG-RAN receives in solution 29 (but conceivably this would be needed for similar solutions) the partially allowed S-NSSAIs in addition to the Allowed NSSAI. Can the NG-RAN in principle trigger handover procedure to a supporting TAI of the partially allowed S-NSSAIs when it is possible to do so? this can happen while in connected mode or when the UE is engaged in transition from Idle to connected mode. The reason is to enable the support of the maximum number of S-NSSAIs in the Allowed and partly allowed S-NSSAIs lists.*

* Noted

[R2-2210669](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210669.zip) Consideration on RAN dependency of FS\_eNS\_Ph3 ZTE corporation, Sanechips discussion Rel-18

*Observation 1: Whether the one or more Secondary TAIs can be reported to the CN and between gNBs as per existing Tracking Area related information exchange procedures with indication they are secondary is within RAN3 scope.*

*Proposal 1: RAN2 understand NG-RAN can now broadcast more than one TAIs per PLMN per cell, with the association between TAIs and NSAGs provided but not differentiate which is the primary TAI and which are the secondary TAI(s). RAN2 impact is foreseen if such differentiation is required when broadcasting the TAIs.*

*Proposal 2: RAN2 understand slice availability on a per cell basis can be supported in the Uu interface but whether the NG-RAN can inform AMF and other gNBs in NGAP messages the slice availability per cell basis or whether in Constrained Service Area the network slice is still supported but since no dedicated resources are allocated for the network slice the SLA of the network slice is not guaranteed is within RAN3 scope.*

*Proposal 3: RAN2 understand whether the NG-RAN can trigger handover procedure to a supporting TAI of the partially allowed S-NSSAIs should be evaluated by RAN3 while any enhancement to the MT procedure requiring paging triggered cell reselection or indication of preferred band or slice information via paging would have RAN2 impact and requires further discussion.*

*Proposal 4: Agree the draft reply LS [3] to SA2 addressing the RAN dependency of FS\_eNS\_Ph3 from RAN2’s perspective.*

- Intel thinks multiple TAI is only for NTN and not for TN. It doesn’t even have UE capability so it might create problems. Samsung agrees.

- Lenovo thinks it’s important to understand what SA2 wanted: They wanted to allow more granular slice support within TA.

- OPPO thinks in R17 slicing, only TAI assoicated with NSAG is broadcasted, not TAI assoicated with S-NSSAI. the case of broadcasting more than one TAI is for NTN case, not TN case. so, RAN can not support more than one TAI broadcasting

* RAN2 work may be needed to address the issues and there is no corresponding dedicated WI. RAN3 is responsible for some of the questions.
* Offline [210] (ZTE, DL2) to discuss if we can send LS from this meeting to SA2 and what to answer.

[R2-2210670](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210670.zip) [Draft] Reply LS on RAN dependency of FS\_eNS\_Ph3 ZTE corporation, Sanechips LS out Rel-18 To:SA2 Cc:RAN3

[R2-2209900](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209900.zip) Discussion on RAN dependency of FS\_eNS\_Ph3 Huawei, HiSilicon discussion Rel-18 NR\_ENDC\_SON\_MDT\_enh2-Core

[R2-2210103](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210103.zip) Proposed answers to SA2 LS on RAN dependency of FS\_eNS\_Ph3 ([R2-2209355](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209355.zip)/SA2-2207435) Nokia, Nokia Shanghai Bell discussion Rel-18 FS\_eNS\_Ph3

[R2-2210206](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210206.zip) Discussion on LS on RAN dependency of FS\_eNS\_Ph3 Lenovo discussion NR\_slice-Core

[R2-2210229](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210229.zip) Draft reply LS to SA2 on FS\_eNS\_Ph3 Lenovo LS out NR\_slice-Core To:SA2 Cc:RAN3

[R2-2210397](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210397.zip) On FS\_eNS\_Ph3 Ericsson discussion FS\_eNS\_Ph3

[R2-2210403](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210403.zip) Considerations on SA2 Key issue #3 NEC discussion Rel-18 FS\_eNS\_Ph3

[R2-2210622](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210622.zip) Draft Reply LS Out on RAN dependency of FS\_eNS\_Ph3 Ericsson discussion FS\_eNS\_Ph3

[R2-2210647](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210647.zip) Discussion on the LS on RAN dependency of FS\_eNS-Ph3 CATT discussion Rel-18 FS\_eNS\_Ph3

Email discussions ([210])

* [AT119bis-e][210][R18 Slicing] RAN dependency of FS\_eNS\_Ph3 (ZTE)

      Scope: Discuss RAN2 reply LS to [R2-2209355](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209355.zip) and provide agreeable LS.

 Intended outcome: Report in in [R2-2210821](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210821.zip) and LS out in [R2-2210822](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210822.zip).

 Deadline: Deadline 2 (report)

By Web Conf (2nd Week Tuesday) (2)

[R2-2210821](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210821.zip) Report of [AT119bis-e][210][R18 Slicing] RAN dependency of FS\_eNS\_Ph3 (ZTE) ZTE report

[R2-2210822](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210822.zip) [Draft] Reply LS on RAN dependency of FS\_eNS\_Ph3 ZTE corporation, Sanechips LS out Rel-18 To:SA2 Cc:RAN3