3GPP TSG-RAN WG2 Meeting #129 DRAFT\_R2-2501335

Athens, Greece, Feb. 17th – 21st, 2025

Source: Session chair (Huawei)

Title: Report from session on R18 MBS, R18 QoE and R19 XR

## List of AT-meeting offline discussions

* [AT129][500][XR] Organizational – Session on R18 MBS, R18 QoE and R19 XR (Session chair)

Scope:

* + - Share plans and list of ongoing email discussions for the session on R18 MBS, R18 QoE and R19 XR
    - Share meeting notes and agreements for review and endorsement
* [AT129][501][MBS] Reply to RAN3 on MRB modification (Nokia)

Scope: Agree reply LS to RAN3

Intended outcome: LS for offline agreement in R2-2501341

Deadline: Friday 2025-02-21, 10:00 (document ready for approval by e-mail)

* [AT129][502][QoE] SRB4/SRB5 segmentation conifguration (Ericsson)

Scope: Discuss whether/how we can correct the behaviour for SRB4/5 segmentation configuration in RAN2 or whether we need NW-based solution for this.

Intended outcome: Report with proposal in R2-2501344

Deadline: Document ready for Thursday CB session

* [AT129][503][QoE] Update of CR on corrections for SRBs (Samsung)

Scope: Update the CR to cover only changes related to SRB5

Intended outcome: Agreeable CR in R2-2501346

Deadline: Friday 2025-02-21, 10:00 (CR ready for approval via e-mail)

## 2.4 Instructions

CRs

* Use latest CR template version 12.3 for all CRs submitted to RAN2 meeting

Rel-18 and earlier maintenance CRs

* Only essential/critical corrections are expected
* Editorial and clarification corrections should be sent to be reviewed and approved by spec rapporteurs prior to submission.
* Editorials corrections should be collected and submitted by spec rapporteurs.
* NOTE: the tdoc limit applies to all CRs (i.e. WI spec rapporteurs are NO longer expected to submit individual contributions). They can submit a company CR where they also include miscellaneous corrections that have been sent to them.

Rel-18 UE capabilities

- EUTRA UE capabilities corrections are covered by separate CRs

- RAN1/RAN4 NR UE capabilities (new) and corrections are covered in Rel-18 common MegaCRs (38306 and 38331) covering all rel-18 WIs (end outcome).

- UE capabilities in LPP 37355 and SLPP 38355 are covered in the main CRs for the Positioning WI.

During the work on NR UE caps:

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

- In WI-specific Rel-18 Agenda Items: RAN2 features/corrections are handled per WI and agreed as individual CRs

Tdoc limitations

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

- Assigned summary rapporteur input of the summary.

- Email / offline discussions outcomes by discussion rapporteur,

- Limit of 1 WI/SI rapporteurs input for WI planning. The work plan is not expected to be updated/submitted every meeting, unless needed. It can include progress of other WG groups in the same Tdoc (i.e. separate Tdocs on other WG agreements are not required).

- TS rapporteur input for TS maintenance.

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

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

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

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

Postponed CRs still count towards tdoc limit unless 3 or more companies are co-sourcing it.

Tdoc request/submission for RAN2#129 deadlines:

* Tdoc Submission deadline: Feb. 7th, 1000 UTC

## 2.5 Others

**Rapporteur Changes**

**Spec Former Rapporteur Proposed New Rapporteur**

38.306 ZiYi Li (Intel) ZiYi Li (Xiaomi)

38.355 Yi Guo (Intel) Yi Guo(Xiaomi)

[R2-2500003](file:///D:\3GPP\TSGR2\TSGR2_129\Docs\R2-2500003.zip) RAN2 Handbook MCC discussion

[R2-2501248](file:///D:\3GPP\Extracts\R2-2501248.docx) Improvements to specification handling Ericsson discussion

### 7.0.2 Rel-18 corrections

*Essential corrections only. For smaller corrections please contact CR editor / Rapporteur directly. Coordinate with rapporteurs and chair if input above limit is required*

*Tdoc limitation: 5*

#### 7.0.2.14 Enhancements of NR Multicast and Broadcast Services

(NR\_MBS\_enh-Core; leading WG: RAN2; REL-18; WID: RP-231829)

**Incoming LS(es)**

[R2-2500024](file:///D:\3GPP\Extracts\R2-2500024_R3-247892.doc) LS on Update of Broadcast MCCH Information (R3-247892; contact: Nokia) RAN3 LS in Rel-18 NR\_MBS\_enh-Core To:RAN2

**ACTION:** RAN3 kindly asks RAN2 to confirm whether it is possible for the network to force the re-establishment of PDCP of all UEs in a cell by an update of parameter broadcast in MCCH Information.

* Noted

[R2-2500139](file:///D:\3GPP\Extracts\R2-2500139%20Draft%20LS%20reply%20on%20%20Update%20of%20Broadcast%20MCCH%20Information.docx) Reply LS on Update of Broadcast MCCH Information Nokia Corporation LS out Rel-18 NR\_MBS\_enh-Core To:RAN3

* Noted

[R2-2500830](file:///D:\3GPP\Extracts\R2-2500830%20Discussion%20on%20the%20LS%20of%20Broadcast%20MCCH%20update.doc) Discussion on the LS of Broadcast MCCH update ZTE Corporation, Sanechips discussion Rel-18 NR\_MBS\_enh-Core

Proposal 1 RAN2 LS back to RAN3, “Yes, it is possible for the network to force the re-establishment of PDCP of all UEs in a cell by an update of parameter broadcast in MCCH Information”.

* Noted

DISCUSSION:

* Nokia clarifies that according to specs MRB modification is up to Ue implementation so the answer to RAN3 LS should be “No”.
* In ZTE view there are some parameters in MRB config which require the UE to re-establish PDCP regardless of UE implementation. ZTE think we should answer "Yes".
* Samsung agrees with ZTE, i.e. some parameters will force PDCP re-establishment.
* CATT thinks we should reply that this is up to UE implementation.
* LGE thinks new signalling would be needed to force re-establishment as currently it is up to UE implementation.
* Huawei agrees with ZTE, some critical parameters require PDCP re-establishment or at least re-initiation of some parameters. Nokia thinks that is not mentioned anywhere in the specifications.
* QCM agrees with ZTE and Huawei. There are some parameters that will force re-establishment.
* RAN2 replies to RAN3 that:
  + - according to RAN2 specifications it is up to UE implementation whether to perform PDCP re-establishment upon MRB modification
    - there are some parameters in PDCP configuration which normally require PDCP re-establishment (e.g. RoHC, PDCP SN), but RAN2 specifications do not capture exact UE behaviour upon change of these parameters for MRB
* [AT129][501][MBS] Reply to RAN3 on MRB modification (Nokia)

Scope: Agree reply LS to RAN3

Intended outcome: LS for offline agreement in R2-2501341

Deadline: Friday 2025-02-21, 10:00 (document ready for approval by e-mail)

**Corrections**

[R2-2500205](file:///D:\3GPP\Extracts\R2-2500205%20Clarification%20on%20the%20terminology%20of%20the%20new%20cell.docx) Clarification on the terminology of new cell Huawei, HiSilicon, Ericsson, Sharp, Samsung, Nokia, CATT, ZTE CR Rel-18 38.331 18.4.0 5202 - F NR\_MBS\_enh-Core

* Remove highlight from “(i.e., different from the cell where the UE was configured to receive multicast in RRC\_CONNECTED)”
* With that the CR is agreed unseen in R2-2501342

[R2-2500699](file:///D:\3GPP\Extracts\R2-2500699%20On%20multicast%20MCCH%20information%20acquisition.docx) On multicast MCCH information acquisition Samsung discussion Rel-18 38.331

* Noted

Proposal 1: RAN2 to discuss and select one of the options:

Option 1: Upon receiving group paging, UE acquires multicast MCCH in immediate next modification period. (Adopt TP1)

Option 2: Network ensures to page UE only after multicast MCCH is updated with PTM configuration. (Adopt TP2)

Option 3: Upon receiving group paging, UE acquires multicast MCCH in immediate next repetition period and if PTM configuration for group-paged session is not included, ensure to acquire multicast MCCH in next modification period. (Adopt TP3)

* Huawei thinks option 2 is enough and nothing is needed in specs. Paging can also be missed which is more serious but we did not solve thisl
* Ericsson agrees with Option 2 and no need for clarification. CATT agrees.
* RAN2 assumes network ensures to page UE only after multicast MCCH is updated with PTM configuration and there is no need to clarify this in specifications

[R2-2500829](file:///D:\3GPP\Extracts\R2-2500829%20Clarification%20on%20determining%20the%20cell%20in%20which%20Multicast%20was%20configured%20in%20RRC_CONNECTED.docx) Clarification on determining the cell in which Multicast was configured in RRC\_CONNECTED ZTE Corporation, Ericsson, Nokia, Samsung CR Rel-18 38.331 18.4.0 5233 - F NR\_MBS\_enh-Core

* Change GR to Greece
* Put the correct date for CR date
* With these changes the CR is agreed unseen in R2-2501343

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

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

**Incoming LS(es)**

[R2-2500054](file:///D:\3GPP\TSGR2\TSGR2_129\Docs\R2-2500054.zip) LS Reply on MBS Communication Service Type (S4-242151; contact: Huawei) SA4 LS in Rel-18 NR\_QoE\_enh-Core To:RAN3 Cc:RAN2, SA5

* Noted

[R2-2500022](file:///D:\3GPP\Extracts\R2-2500022_R3-247888.docx) LS on QMC Coordination for RRC Segmentation in NR-DC (R3-247888; contact: ZTE) RAN3 LS in Rel-18 NR\_QoE\_enh-Core To:RAN2

**Reply LS discussion**

[R2-2500775](file:///D:\3GPP\Extracts\R2-2500775%20Reply%20LS%20on%20QMC%20Coordination%20for%20RRC%20Segmentation%20in%20NR-DC.docx) Reply LS on QMC Coordination for RRC Segmentation in NR-DC ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core

* Noted

Proposal 1: Reply to Questions 1/2 that UE can receive an AppLayerMeasConfig-r17 IE for MCG configuration containing rrc-SegAllowedSRB5-r18 parameter and UE can receive an AppLayerMeasConfig-r17 IE for SCG configuration containing rrc-SegAllowedSRB4-r17.

Proposal 2: For Questions 3/4 of LS, reply to RAN3 that if the UE receives from the MN the AppLayerMeasConfig-r17 IE which does not include the rrc-SegAllowedSRB5-r18/rrc-SegAllowedSRB4-r17 parameter, the UE considers that the RRC segmentation function for SRB5/SRB4 is disabled respectively.

[R2-2500850](file:///D:\3GPP\Extracts\R2-2500850%20-%20Discussion%20RRC%20issues%20for%20QoE.docx) Discussion on RRC issues for QoE Ericsson discussion Rel-18 NR\_QoE\_enh-Core

* Noted

Proposal 1 Change the need code to Need S and update the field descriptions of the fields rrc-SegAllowedSRB4 and rrc-SegAllowedSRB5.

Proposal 2 Send a reply LS to RAN3 with the above proposed text.

[R2-2500546](file:///D:\3GPP\Extracts\R2-2500546%20Discussion%20on%20RRC%20segmentation%20coordination%20for%20QoE%20reporting%20in%20NR-DC.docx) Discussion on RRC segmentation coordination for QoE reporting in NR-DC Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core

* Noted

Proposal 1: In NR-DC, one node shall report its own SRB segmentation status to the peer node, which can be done either via RRC INM message or XnAP message.

Proposal 2: RAN2 acknowledges the issue raised by RAN3 and confirms that the exchange of SRB4/5 segmentation status is required in NR-DC.

Proposal 3: Reply to the RAN3 LS and let RAN3 to decide whether the XnAP message will be used for the SRB4/5 segmentation status exchange.

* ZTE proposes to reply that UE can receive different configuration from different nodes and will apply this configuration.
* Ericsson thinks that absence of the parameters in the configuration of one cell group should not affect configuration from other cell group. Ericsson thinks we need to clarify this in specs and we also need to change need code.
* Nokia thinks that according to current specs there is no restriction on different nodes configuring these parameters for another cell group, so we need some fix.
* ZTE thinks RAN3 can find a solution and Ericsson’s proposal is an NBC change. ZTE does not think we break principles of having independent cell group configurations.
* Qualcomm would like to avoid NBC change and prefers NW-based solution. We can have some MN-SN coordination to handle this.
* Huawei agrees with the intention from Ericsson, i.e. segmentation for SRB4 can only be configured by MN and for SRB5 – only by SN.
* Samsung share understanding with ZTE, Nokia, QCM. Samsung prefers to separate the indicators.
* [AT129][502][QoE] SRB4/SRB5 segmentation conifguration (Ericsson)

Scope: Discuss whether/how we can correct the behaviour for SRB4/5 segmentation configuration in RAN2 or whether we need NW-based solution for this.

Intended outcome: Report with proposal in R2-2501344

Deadline: Document ready for Thursday CB session

**Corrections**

[R2-2500386](file:///D:\3GPP\Extracts\R2-2500386%20Corrections%20on%20stage%202%2038300%20QMC.docx) Clean-up corrections on stage 2 description of QMC Lenovo CR Rel-18 38.300 18.4.0 0960 - F NR\_QoE\_enh-Core

* Start a new paragraph after “QoE measurement collection continuity for intra-system inter-RAT handover is supported.”
* With this change, the CR is agreed unseen in R2-2501345
* Ericsson agrees with the CR.
* Nokia is generally OK, but would like to split some paragraphs on handover.

[R2-2500774](file:///D:\3GPP\Extracts\R2-2500774_Miscellaneous%20corrections%20for%20QoE.docx) Miscellaneous corrections for QoE report ZTE Corporation, Sanechips CR Rel-18 38.331 18.4.0 5225 - F NR\_QoE\_enh-Core

* Ericsson thinks the change in the note is OK, but if we modify the conditional presence description will require more modifications and is NBC change.
* Samsung agrees with first change, for the second change prefers to clarify in field description that if the field is absent SRB4 is used.
* Xiaomi thinks that if we apply Samsung’s approach, this will pose new requirement for the UE.
* Change 2 from cover page is agreed
* Offline on whether Change 1 is needed or if procedural text already clarifies what the UE should do (ZTE) – CB on Thursday

[R2-2500828](file:///D:\3GPP\Extracts\R2-2500828%20Corrections%20on%20QoE_SRB.docx) Corrections on SRB(s) for QoE measurements Samsung, Ericsson CR Rel-18 38.331 18.4.0 5232 - F NR\_QoE\_enh-Core

* Lenovo indicates this is related to Rel-17 CR which covers SRB4 and suggests to wait with the conclusion for SRB4, just focus on SRB5 part. Lenovo agrees with the changes related to SRB5.
* The changes related to SRB5 are agreeable
* Update the CR to cover only changes related to SRB5
* [AT129][503][QoE] Update of CR on corrections for SRBs (Samsung)

Scope: Update the CR to cover only changes related to SRB5

Intended outcome: Agreeable CR in R2-2501346

Deadline: Friday 2025-02-21, 10:00 (CR ready for approval via e-mail)

[R2-2500850](file:///D:\3GPP\Extracts\R2-2500850%20-%20Discussion%20RRC%20issues%20for%20QoE.docx) Discussion on RRC issues for QoE Ericsson discussion Rel-18 NR\_QoE\_enh-Core

Proposal 3 Update Note 0 in RRC chapter 5.7.16.2 according to the proposed TP.

* Update Note 0 in RRC chapter 5.7.16.2 according to the TP proposed in R2-2500850
* TBD whether we have a separate CR for this or we merge with another CR – CB Thursday

## 8.7 XR Enhancements Ph3

(NR\_XR\_Ph3-Core; leading WG: RAN2; REL-19; WID: RP-243318)

Time budget: 2 TU

Tdoc Limitation: 5 tdocs

### 8.7.1 Organizational

LS, Rapporteur input, workplan, etc.

CR rapporteurs of 38.300, 38.321, 38.323 and 38.331 are requested to provide first drafts of the running CRs for this meeting.

**Incoming LS(es)**

*Multi-modality*

[R2-2500020](file:///D:\3GPP\Extracts\R2-2500020_R3-247874.docx) Reply LS on multi-modality awareness (R3-247874; contact: Huawei) RAN3 LS in Rel-19 NR\_XR\_Ph3-Core To:SA2, RAN2 Cc:SA4

* Noted

[R2-2500057](file:///D:\3GPP\Extracts\R2-2500057_S4-242223.docx) LS Reply on multi-modality awareness (S4-242223; contact: Huawei) SA4 LS in Rel-19 NR\_XR\_Ph3-Core To:RAN2, RAN3, SA2

* Noted

[R2-2500060](file:///D:\3GPP\Extracts\R2-2500060_SP-241921.docx) LS on multi-modality awareness (SP-241921; contact: CMCC) SA LS in Rel-19 XRM\_Ph2, NR\_XR\_Ph3-Core To:RAN, RAN2, RAN3, SA2 Cc:SA4

* Noted

*Measurement gaps*

[R2-2500037](file:///D:\3GPP\Extracts\R2-2500037_R4-2420198.docx) Response LS on gaps/restrictions that are caused by RRM measurements (R4-2420198; contact: Qualcomm) RAN4 LS in Rel-19 NR\_XR\_Ph3-Core To:RAN1 Cc:RAN2

* Noted
* Xiaomi asks why alt. 1 does not apply to EN-DC?
* CATT thinks this is because the time to the gap is short which is too stringent for EN-DC.
* Ericsson thinks that EN-DC and NE-DC is out of scope of the WI, not because there are any technical issues.
* ZTE asks if there will be no skipping in case of NR-DC as well?
* Huawei clarifies RAN4 did not mention NR-DC, so they might be still discussing. There might be impacts to RRC to disallow non-supported configurations

*XR rate control*

[R2-2500056](file:///D:\3GPP\Extracts\R2-2500056_S4-242182.doc) Reply to LS on appropriate range and granularity of bit rate adaptation for XR applications (S4-242182; contact: Qualcomm) SA4 LS in Rel-19 NR\_XR\_Ph3-Core, FS\_5G\_RTP\_Ph2, FS\_XRM\_Ph2 To:RAN2

* Noted
* Futurewei thinks that with 64 codepoints we can get close to 1% granularity. Thinks multiplier coefficient is not appropriate for XR.
* QCM indicates current table has linear distribution, so with that we cannot come close to 1%.

*Other*

[R2-2500021](file:///D:\3GPP\Extracts\R2-2500021_R3-247875.docx) Reply LS to SA2 for PDU Set Information Marking Support without QoS parameters (R3-247875; contact: ZTE) RAN3 LS in Rel-19 NR\_XR\_Ph3-Core, XRM\_Ph2 To:SA2 Cc:RAN2

* Noted

**Rapporteur input**

[R2-2500488](file:///D:\3GPP\Extracts\R2-2500488%20XR%20Rapporteur%20Inputs.docx) Rapporteur Inputs Nokia, Qualcomm (Rapporteurs) discussion Rel-19 NR\_XR\_Ph3-Core

* Noted

**Running CRs**

[R2-2500090](file:///D:\3GPP\Extracts\R2-2500090%20Introduction%20of%20XR%20enhancements.docx) Introduction to R19 XR enhancements Qualcomm Incorporated draftCR Rel-19 38.321 18.4.0 NR\_XR\_Ph3-Core

[R2-2500489](file:///D:\3GPP\Extracts\R2-2500489%20Draft%20Stage%202%20CR%20XR%20Rel-19.docx) Draft Stage 2 CR for XR Nokia (Rapporteur) draftCR Rel-19 38.300 18.4.0 B NR\_XR\_Ph3-Core

[R2-2500808](file:///D:\3GPP\Extracts\R2-2500808%20Rapporteur%20MAC%20CR%20for%20RACH-less%20HO%20and%20LTM%20%5bRACH-lessHO%5d.docx) Draft runnnig RRC CR for R19 XR Huawei, HiSilicon draftCR Rel-19 38.331 18.4.0 B NR\_XR\_Ph3-Core

=> Revised in [R2-2501246](file:///D:\3GPP\Extracts\R2-2501246%20Running%20RRC%20CR%20for%20R19%20XR.docx)

[R2-2501246](file:///D:\3GPP\Extracts\R2-2501246%20Running%20RRC%20CR%20for%20R19%20XR.docx) Draft runnnig RRC CR for R19 XR Huawei, HiSilicon draftCR Rel-19 38.331 18.4.0 B NR\_XR\_Ph3-Core [R2-2500808](file:///D:\3GPP\Extracts\R2-2500808%20Rapporteur%20MAC%20CR%20for%20RACH-less%20HO%20and%20LTM%20%5bRACH-lessHO%5d.docx)

[R2-2501147](file:///D:\3GPP\Extracts\R2-2501147%20PDCP%20Running%20CR%20for%20R19%20XR.docx) PDCP running CR for R19 XR LG Electronics Inc. (Rapporteur) draftCR Rel-19 38.323 18.4.0 NR\_XR\_Ph3-Core Withdrawn

[R2-2501197](file:///D:\3GPP\Extracts\R2-2501197%20PDCP%20Running%20CR%20for%20R19%20XR.docx) PDCP running CR for R19 XR LG Electronics Inc. (Rapporteur) draftCR Rel-19 38.323 18.4.0 NR\_XR\_Ph3-Core

[R2-2501205](file:///D:\3GPP\Extracts\R2-2501205_Running%20RLC%20CR%20for%20XR.docx) RLC running CR for XR vivo draftCR Rel-19 38.322 18.2.0 B NR\_XR\_Ph3-Core

* Running CRs to be reviewed via post-meeting e-mail discussions after this meeting (considering the agreements from this meeting as well)

### 8.7.2 Multi-modality support

**No contributions are expected for this AI for RAN2#129**

### 8.7.3 RRM measurement gaps/restrictions related enhancements

Focus on RAN2 impacts from solutions considered by RAN1/RAN4, discuss the need of semi-static solutions.

**DCI based solution**

[R2-2500349](file:///D:\3GPP\Extracts\R2-2500349_Discussion%20on%20RRM%20measurement%20gaps%20enhancements.docx) Discussion on RRM measurement gaps enhancements vivo discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1 The UE behaves as if there is no activated measurement gap during a skipped measurement gap occasion.

Proposal 2 An explicit indication per DCI format is configured by RRC. Details are based on RAN1 parameters.

* Lenovo thinks P1 is OK. Clarifies this is from MAC perspective.
* Huawei agrees with P1.
* Nokia, ZTE, QCM prefers not to agree on P2, we can wait for RAN1 parameters list.
* QCM would like to clarify that the UE may be scheduled both during gap and TA duration (it has no impact on MAC though). QCM prefers “cancelled” over “skipped”
* Nokia, Ericsson, Lenovo thinks RAN1 used skipped so we can align.
* ZTE would like to clarify that the gap is only skipped in MAC, but the configuration is kept in RRC. Ericsson, Huawei think this is common understanding and perhaps there is no need to capture this. Vivo agrees with Ericsson, Huawei.
* From MAC perspective, the UE behaves as if there is no activated measurement gap during a skipped/cancelled measurement gap occasion.
* “Cancelled” or “skipped terminology will be aligned with RAN1 specifications when implementing changes in MAC.

**RRC based solution**

[R2-2500924](file:///D:\3GPP\Extracts\R2-2500924.docx) RRM Measurement Gap/Restriction Enhancements Ericsson discussion Rel-19

Observation 1 For CG, network configuration can ensure there is no or minimum overlap between CG and MG.

Observation 2 Autonomous UE skipping of MG for overlapping CG occasions results in lost UL transmissions and false detections since gNB assumes there is no transmission during a MG. This approach would also lead to an unacceptable increase of the blind decodings at the gNB.

Observation 3 Such data arrival periods of ~1ms are corner cases and need not optimize for them.

Observation 4 DCI based solution can override a CG occasion overlapping with measurement gap to ensure required uplink transmissions.

Proposal 1 Follow and focus only on RAN1’s explicit indication by DCI to skip a particular gap/restriction solution. i.e., DCI based skipping solution.

Proposal 2 No other solutions are needed for the MG enhancements.

[R2-2500678](file:///D:\3GPP\Extracts\R2-2500678%20Views%20on%20Enhancements%20relating%20to%20Measurement%20Gaps.docx) Views on Enhancements Relating to RRM Measurement Gaps Apple discussion Rel-19 NR\_XR\_Ph3-Core

Observation 1: From RAN4 perspective, the DCI-based MG skipping approach alone cannot fulfil RRM requirements in EN-DC and NE-DC scenarios.

Observation 2: Both RAN2 and RAN4 are discussing the need to introduce RRC-based MG skipping approach.

Observation 3: Typical XR traffics are periodic, and it is feasible for the gNB to have the knowledge of packet arrival times and configure MG skipping patterns accordingly.

Observation 4: Solely relying on DCI for MG skipping may create some UE implementation problems for some L2 functionalities such as UTO-UCI determination, that may have been overlooked by RAN1.

Proposal 1: In addition to DCI-based MG skipping control, RRC-based MG skipping control should also be supported in Rel-19.

* Lenovo thinks RAN4 indicated in their LS they are discussing semi-static solutions, so we can wait for their conclusion.
* Huawei agrees with Apple’s comment that DCI-based approach has some issues when working with UTO-UCI.
* Nokia thinks there is no need to have UTO-UCI working with DCI gap skipping. Nokia wonders why non-integer periodicity would be impacted by DCI-based solution.
* QCM thinks RRC solution can work without any impact on RRM requirements. QCM think RRC based solution is more friendly for UE, it allows to prepare RF etc. in advance.
* Xiaomi thinks RAN1 excluded RRC based solutions because they thought it was too hard for gNB to come up with a proper pattern.
* Vivo supports having RRC based solution as a complimentary solution. In vivo’s understanding RAN1 just agreed DCI-based solution but did not exclude other solutions.
* ZTE thinks RAN1 has discussed already while RAN2 was supposed to only support RAN1/4 work on this objective.
* LGE thinks RAN2 should consider benefits of RRC solution from RAN2 point of view. It is useful as the gNB may not know whether the UE has urgent data.
* CMCC thinks RAN2 is better expert on RRC and we can discuss as well.
* Interdigital indicates RAN2 was supposed to focus on DCI-based solution.
* Samsung would like to consider RRC based solution, but gNB should only configure MG UE is allowed to skip and then UE makes final decision.
* CATT supports semi-static solution to minimize UE complexity.
* Ericsson thinks we are repeating RAN1 discussion. Ericsson thinks we gan very little with this additional solution.
* Nokia thinks we cannot decide on the befits without understanding how this affect RRM measurement requirements.
* Apple does not think the discussion is repeated, there were new issues brought up in RAN2. Apple believes that RAN1 did not consider how some things are captured in MAC.
* RAN2 will not work on semi-static MG skipping solutions unless requested by RAN4/RAN1

[R2-2500091](file:///D:\3GPP\Extracts\R2-2500091%20Discussion%20on%20measurement%20gap%20enhancements_v1.docx) Discussion on measurement gap cancelation Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500099](file:///D:\3GPP\Extracts\R2-2500099_RRM_measurement_gaps_restrictions_related_enhancements.docx) RRM measurement gaps/restrictions related enhancements Fraunhofer IIS, Fraunhofer HHI discussion Rel-19

[R2-2500182](file:///D:\3GPP\Extracts\R2-2500182%20Discussion%20on%20enabling%20TX%20RX%20for%20XR%20during%20RRM%20measurements.docx) Discussion on Enabling TX/RX for XR during RRM Measurements CATT discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500196](file:///D:\3GPP\Extracts\R2-2500196%20-%20Discussion%20on%20Measurement%20Gap%20enhancements.docx) Discussion on Measurement Gap enhancements OPPO discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500377](file:///D:\3GPP\Extracts\R2-2500377%20XR%20Gap%20Enh.docx) RAN2 impacts of measurement gap enhancements Sharp discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500478](file:///D:\3GPP\Extracts\R2-2500478_xr_mg.doc) Discussions on measurement gap related enhancements Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core R2-2409844

[R2-2500500](file:///D:\3GPP\Extracts\R2-2500500.docx) RRC-based semi-static MG skipping solution NEC Corporation discussion NR\_XR\_Ph3-Core

[R2-2500651](file:///D:\3GPP\Extracts\R2-2500651%20Discussion%20on%20RRM%20Measurement%20Gaps%20Enhancements.docx) Discussion on RRM Measurement Gaps Enhancements HONOR discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500715](file:///D:\3GPP\Extracts\R2-2500715.docx) Enabling TX/RX for XR during measurement gaps/restrictions Lenovo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500746](file:///D:\3GPP\Extracts\R2-2500746_XRMeas_v1_Final.docx) Discussion on enabling TX/RX for XR during RRM measurements Sony discussion Rel-19 NR\_XR\_Ph3

[R2-2500764](file:///D:\3GPP\Extracts\R2-2500764%20RRM%20measurement%20gaps%20related%20enhancements.docx) RRM measurement gaps/restrictions related enhancements Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500781](file:///D:\3GPP\Extracts\R2-2500781_XR%20rrm.docx) Measurement gap skipping for XR ZTE Corporation, Sanechips discussion

[R2-2500793](file:///D:\3GPP\Extracts\R2-2500793%20(R19%20XR%20WI%20AI873%20L2%20impact%20of%20measurement%20gaps).docx) RRM measurement gap related enhancements for XR InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500806](file:///D:\3GPP\Extracts\R2-2500806%20Discussion%20on%20RRM%20enhancements%20for%20XR_final.docx) Discussion on RRM enhancements for XR Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500824](file:///D:\3GPP\Extracts\R2-2500824_Discussion%20on%20enhancement%20for%20MG%20skipping.docx) Discussion on enhancement for MG skipping LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500839](file:///D:\3GPP\Extracts\R2-2500839%20Remaining%20Issues%20on%20RRM%20Measurement%20Enhancements.docx) Remaining Issues on RRM Measurement Enhancements China Telecom discussion

[R2-2500862](file:///D:\3GPP\Extracts\R2-2500862%20Discussion%20on%20RRM%20measurement%20operation%20for%20XR%20enhancements.docx) Discussion on RRM measurement operation for XR enhancements Hanbat National University discussion

[R2-2501039](file:///D:\3GPP\Extracts\R2-2501039_RRC-based MG skipping solution.docx) RRC-based MG skipping solution CMCC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2501144](file:///D:\3GPP\Extracts\R2-2501144%20Measurement%20Gap%20Skipping.docx) Discussion on RRM measurement gaps/restrictions enhancements for Rel-19 XR Samsung discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2501234](file:///D:\3GPP\Extracts\R2-2501234%20XR%20RRM%20measurement%20gaps.docx) Discussion on XR RRM measurement gaps/restrictions related enhancements III discussion NR\_XR\_Ph3-Core

### 8.7.4 Scheduling enhancements

#### 8.7.4.1 LCP enhancements

Further details of handling of the additional priority for LCH, e.g. configuration details, impact on the existing LCP procedure (Bj, PBR etc.), impact on intra-UE prioritization.

**Configuration details**

[R2-2500145](file:///D:\3GPP\Extracts\R2-2500145%20%20Discussion%20on%20LCP%20enhancements%20of%20XR%20traffic.doc) Discussion on LCP enhancements of XR traffic Xiaomi Communications discussion

Proposal 5 Only one additional priority is configured to an LCH for LCP enhancement.

[R2-2501014](file:///D:\3GPP\Extracts\R2-2501014%20Consideration%20on%20LCP%20enhancement%20for%20XR.docx) Consideration on LCP enhancement for XR CMCC discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2a: For fairness and efficiency, RAN2 agrees that multiple (up to 3) additional priorities can be configured for a single LCH,

Proposal 2b: UE can select one additional priority from multiple priorities based on minimal remaining time among PDUs and/or the ratio of delay-critical and non-delay-critical data.

Proposal 2c: The maximum number of additional priorities per LCH can be signalled via UE capability

[R2-2501267](file:///D:\3GPP\Extracts\R2-2501267%20Views%20on%20Delay-Based%20Logical%20Channel%20Priority%20Adjustment.docx) Views on Delay-based Logical Channel Priority Adjustment Apple, Lenovo, Xiaomi discussion Rel-19 NR\_XR\_Ph3-Core

Observation 1: RAN2 has agreed that impacts to UE complexity should be considered for any delay-aware LCP enhancement.

Observation 2: If the remaining time threshold for LCH priority adjustment is configured per LCH, there may be several UE complexity issues, including:

• Cross-layer checking (between MAC and PDCP) of remaining time status of each PDCP SDU,

• Cross-layer checking (between MAC and PDCP) of PDU Set identification and packet dependency,

• Handling of potentially different remaining time thresholds across multiple LCHs on one DRB, and

• Cross-MAC entity interaction for LCH priority adjustment in split bearer.

Proposal 1: RAN2 should change the agreement of “per-LCH remaining time threshold” to “per-DRB remaining time threshold” (e.g. configuration in pdcp-Config), as it would avoid a lot of complexity issues if the triggering condition of LCH priority adjustment is checked by PDCP rather than MAC.

Proposal 2: PDCP can detect the triggering conditions for LCH priority adjustment (based on PDCP discard timer remaining time and/or PDU Set information) and send the indication to the lower layer to enable LCH priority adjustment if needed.

**Impact on intra-UE prioritization and other MAC procedures**

[R2-2500092](file:///D:\3GPP\Extracts\R2-2500092%20Discussion%20on%20LCP%20enhancements_v1.docx) Discussion on LCP enhancements Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 5. If an LCH has priority-adjustable data when a MAD PDU containing DSR or BSR MAC CE is assembled, the priority-adjustable data should be reported according to the adjusted LCH priority.

Proposal 6. If an LCH has priority-adjustable data when it triggers an SR, UE should transmit the SR in the SR configuration corresponding to the adjusted priority of the LCH.

Proposal 7. In intra-UE prioritization, it is up to UE implementation in determining the priority of a PUSCH transmission which contains data from an LCH that applied its additional priority during LCP.

[R2-2500912](file:///D:\3GPP\Extracts\R2-2500912%20LCP%20Enhancements%20v4%20-cln.docx) Outstanding issues on LCP enhancements for Rel-19 XR Samsung R&D Institute UK discussion

Proposal 1. RAN2 to agree that procedures such as BSR triggering and intra-UE prioritization shall also use the additional LCP priority.

**Bj/PBR impact**

[R2-2500197](file:///D:\3GPP\Extracts\R2-2500197%20-%20Discussion%20on%20LCP%20enhancements%20for%20XR.docx) Discussion on LCP enhancements for XR OPPO discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3 Not to consider the enhancement of PBR/Bj in case of LCH with LCH priority-adjusted data.

[R2-2500652](file:///D:\3GPP\Extracts\R2-2500652%20Discussion%20on%20LCP%20enhancements.docx) Discussion on LCP enhancements HONOR discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2: RAN2 considers introducing additional PBR for the LCH to temporarily increase Bj.

[R2-2500792](file:///D:\3GPP\Extracts\R2-2500792%20(R19%20XR%20WI%20AI874%20LCP_XR).docx) LCP enhancement for XR InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 6: RAN2 to discuss the following options to ensure an LCH with upgraded priority is served in LCP:

1) allow an LCH with an upgraded priority to be transmitted even if Bj is negative, while the remaining time is less the configured threshold.

2) rely on the network implementation, e.g. by configuring a proper value for PBR considering bursty traffic and dimensioning the grant size.

**MAC procedure details**

[R2-2500853](file:///D:\3GPP\Extracts\R2-2500853%20Discussion%20on%20additional%20priority%20based%20LCP%20enhancement_clean.docx) Discussion on additional priority based LCP enhancements in XR Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1: When LCP procedure is initiated for a new transmission, additional priority is applied for the LCH when the smallest remaining value of the running PDCP discardTimers of the PDCP SDU among all the UL data available for transmission in the LCH is below the LCP remaining time threshold for the LCH.

Proposal 2: The smallest remaining value of the running PDCP discardTimer of the PDCP SDU among all the UL data available for transmission in the LCH (to be compared with the LCP remaining time threshold for deciding on whether additional priority is applied for an LCH during the resource allocation of the LCP procedure) is determined at the time of scheduled MAC PDU transmission.

[R2-2500479](file:///D:\3GPP\Extracts\R2-2500479_xr_lch_priority.doc) Discussions on enhancements for LCH priority-adjusted data Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2: If two LCHs have equal priority, the LCH which has LCH priority-adjusted data is prioritized.

[R2-2500183](file:///D:\3GPP\Extracts\R2-2500183%20Consideration%20on%20LCP%20Enhancement.docx) Consideration on LCP Enhancement CATT discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500281](file:///D:\3GPP\Extracts\R2-2500281.docx) Discussion on the adjustment of Bj/PBR for delay-aware LCP TCL discussion

[R2-2500350](file:///D:\3GPP\Extracts\R2-2500350_Remaining%20Issues%20on%20LCP%20enhancement%20for%20XR.docx) Remaining issues on LCP enhancements for XR vivo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500378](file:///D:\3GPP\Extracts\R2-2500378%20XR%20LCP%20Enh.docx) Issues on Additional LCH Priority and Prioritization Sharp discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500511](file:///D:\3GPP\Extracts\R2-2500511_Considerations%20on%20LCP%20enhancements.docx) Considerations on LCP enhancements NEC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500541](file:///D:\3GPP\Extracts\R2-2500541.docx) Discussion on LCP enhancements for XR DENSO CORPORATION discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500679](file:///D:\3GPP\Extracts\R2-2500679%20Views%20on%20Delay-Based%20Logical%20Channel%20Priority%20Adjustment.docx) Views on Delay-based Logical Channel Priority Adjustment Apple, Lenovo discussion Rel-19 NR\_XR\_Ph3-Core Withdrawn

[R2-2500721](file:///D:\3GPP\Extracts\R2-2500721.docx) Further details on Enhanced Logical channel prioritization for XR Lenovo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500765](file:///D:\3GPP\Extracts\R2-2500765%20LCP%20Enhancements.docx) LCP Enhancements for XR Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500782](file:///D:\3GPP\Extracts\R2-2500782_xrLcpEnh.docx) LCP enhancements for XR ZTE Corporation, Sanechips discussion

[R2-2500840](file:///D:\3GPP\Extracts\R2-2500840%20Remaining%20Issues%20on%20LCP%20Enhancements.docx) Remaining Issues on LCP Enhancements China Telecom discussion

[R2-2500983](file:///D:\3GPP\Extracts\R2-2500983%20-%20LCP%20enhancements.docx) LCP enhancements Ericsson discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2501007](file:///D:\3GPP\Extracts\R2-2501007%20Discussion%20on%20enhanced%20LCP%20for%20XR.docx) Discussion on enhanced LCP for XR ITRI discussion NR\_XR\_Ph3-Core

[R2-2501242](file:///D:\3GPP\Extracts\R2-2501242%20Discussion%20on%20LCP%20enhancement%20for%20XR.docx) Discussion on LCP enhancement for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2501283](file:///D:\3GPP\Extracts\R2-2501283.docx) Discussion on remaining issues related to LCP enhancements Rakuten Mobile, Inc discussion

#### 8.7.4.2 DSR enhancements

Including aspects such as MAC CE design, interworking with legacy DSR etc.

**MAC CE format and procedure**

[R2-2500844](file:///D:\3GPP\Extracts\R2-2500844%20%20Leftover%20Issues%20for%20DSR%20Enhancements.docx) Leftover Issues for DSR Enhancements China Telecom discussion

Proposal 1: One extension bit (e.g. by redefining the reserved R bit) can be used to indicate whether a further pair of remaining time and buffer size information is present for the associated LCG in the enhanced DSR MAC CE.

Proposal 2: New DSR MAC CE will be used when at least one LCG is configured with multiple reporting thresholds.

Proposal 3: The legacy DSR MAC CE can be considered a special case of the proposed new DSR MAC CE, so there is no need to configure both the legacy and new DSR MAC CEs simultaneously.

[R2-2500184](file:///D:\3GPP\Extracts\R2-2500184%20Consideration%20on%20DSR%20Enhancement.docx) Consideration on DSR Enhancement CATT discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1: The reserved bit in Rel-18 DSR MAC CE is used to indicate whether a further pair of remaining time information and buffer size information is present in the enhanced DSR MAC CE.

Proposal 2: It is network implementation to configure either legacy remainingTimeThreshold for legacy DSR or new reporting threshold(s) for new DSR to the same LCG.

Proposal 3: The UE will use new DSR in case that at least one LCG configured with new reporting threshold(s) needs to report the delay status.

Proposal 4: RAN2 to discuss and perform the down selection among the below three options for limited PUSCH resource case:

⁻ Option 1, there is no spec impact, UE will transmit Rel-19 DSR in the following UL grant;

⁻ Option 2, a truncated DSR will be introduced for Rel-19 DSR;

⁻ Option 3, new procedure is introduced, such as fallback to Rel-18 DSR.

**Configuration details**

[R2-2500093](file:///D:\3GPP\Extracts\R2-2500093%20Discussion%20on%20DSR%20enhancements_v1.docx) Discussion on DSR enhancements Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3. Different LCGs may be configured with different number of reporting thresholds.

Proposal 4. If UE is configured to use R19 DSR, then any LCG with a triggering threshold shall be configured with at least one reporting threshold.

Proposal 5. Triggering threshold is not used as a reporting threshold.

Proposal 6. An LCG without any triggering threshold may also be configured with DSR reporting threshold(s). Such an LCG never triggers a DSR itself but its delay status is included in a DSR MAC CE.

**Data volume calculation**

[R2-2501243](file:///D:\3GPP\Extracts\R2-2501243%20Discussion%20on%20DSR%20enhancement%20for%20XR.docx) Discussion on DSR enhancement for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1. For discussion purpose, use following terminologies for Rel-19 DSR:

- delay-reporting data: PDCP/RLC data associated with a reporting threshold.

- delay-reporting data volume: data volume to be reported in Rel-19 DSR MAC CE associated with a reporting threshold.

Proposal 2. Clarify RAN2#128 agreement as “the UE may also support including other data (i.e., which is not identified as a delay-reporting data) ahead of delay-reporting data for buffer size calculation of Rel-19 DSR, based on the capability indication”

Proposal 3. When the multiple reporting thresholds are configured, the reporting thresholds are configured in ascending order.

Proposal 4. If PDU set discard is not configured, delay reporting data associated with i:th reporting threshold is defined as follows:

- For i > 1, PDCP/RLC data whose remaining time till PDCP discard timer expiry is less than i:th reporting threshold and larger than or equal to (i-1):th reporting threshold.

- For i = 1, PDCP/RLC data whose remaining time till PDCP discard timer expiry is less than i:th reporting threshold and larger than 0.

Proposal 5. If PDU set discard is configured, delay-reporting data associated with i:th reporting threshold is defined based on the shortest remaining time till PDCP discard timer expiry among the PDCP SDUs belonging to the PDU Set:

- For i > 1, PDCP/RLC data belonging to a PDU set, when the shortest remaining time till PDCP discard timer expiry of the PDU Set is less than i:th reporting threshold and larger than or equal to (i-1):th reporting threshold.

- For i = 1, PDCP/RLC data belonging to a PDU set, when the shortest remaining time till PDCP discard timer expiry of the PDU Set is less than i:th reporting threshold and larger than 0.

Proposal 6. When the UE does not include other data ahead of delay-reporting data in Rel-19 DSR, the UE should consider delay-reporting data associated with i:th reporting threshold for delay-reporting data volume calculation associated with i:th reporting threshold.

Proposal 7. In the Rel-19 DSR configuration, the network may configure whether to include other data ahead of delay-reporting data for delay-reporting data volume calculation, based on UE capability signalling.

Proposal 8. When the UE includes other data ahead of delay reporting data in Rel-19 DSR, the UE should consider followings for delay-reporting data volume calculation associated with i:th reporting threshold:

- delay-reporting data associated with i:th reporting threshold, and are not considered as delay-reporting data volume associated with any of the k:th reporting threshold where k < i

- PDCP SDUs associated with a COUNT value smaller than the largest COUNT value of the delay-reporting PDCP SDU associated with i:th reporting threshold, and are not considered as delay-reporting data volume associated with any of the k:th reporting threshold where k < i

Proposal 9. The PDCP layer should consider followings for delay-reporting PDCP data volume calculation associated with first reporting threshold:

- the PDCP Control PDUs;

- for AM DRBs, the PDCP SDUs to be retransmitted according to clause 5.1.2 and clause 5.13;

- for AM DRBs, the PDCP Data PDUs to be retransmitted according to clause 5.5.

Proposal 10. The RLC layer should consider followings for delay-reporting RLC data volume calculation associated with first reporting threshold:

- RLC data PDUs that are pending for retransmission (RLC AM).

- Estimated size of STATUS PDU.

[R2-2500146](file:///D:\3GPP\Extracts\R2-2500146%20Discussion%20on%20DSR%20enhancements%20of%20XR%20traffic.doc) Discussion on DSR enhancements of XR traffic Xiaomi Communications discussion

[R2-2500198](file:///D:\3GPP\Extracts\R2-2500198%20-%20Discussion%20on%20DSR%20enhancements%20for%20XR.docx) Discussion on DSR enhancements for XR OPPO discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500293](file:///D:\3GPP\Extracts\R2-2500293%20Discussion%20on%20delay%20status%20report.docx) Discussion on Delay status report CANON Research Centre France discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500351](file:///D:\3GPP\Extracts\R2-2500351_Remaining%20issues%20on%20DSR%20enhancement%20for%20XR.docx) Remaining issues on DSR enhancements for XR vivo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500379](file:///D:\3GPP\Extracts\R2-2500379%20XR%20DSR%20Enh.docx) Issues on New DSR MAC CE Sharp discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500480](file:///D:\3GPP\Extracts\R2-2500480%20Discussions%20on%20DSR%20enhancements.docx) Discussions on DSR enhancements Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500512](file:///D:\3GPP\Extracts\R2-2500512_Considerations%20on%20DSR%20enhancements.docx) Considerations on DSR enhancements NEC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500543](file:///D:\3GPP\Extracts\R2-2500543.docx) Discussion on DSR enhancements for XR DENSO CORPORATION discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500628](file:///D:\3GPP\Extracts\R2-2500628%20DSR.docx) Enhanced delay status reporting for XR Lenovo discussion Rel-19

[R2-2500653](file:///D:\3GPP\Extracts\R2-2500653%20Discussion%20on%20DSR%20enhancements.docx) Discussion on DSR enhcancements HONOR discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500680](file:///D:\3GPP\Extracts\R2-2500680%20Views%20on%20DSR%20Enhancements.docx) Views on DSR Enhancements Apple discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500718](file:///D:\3GPP\Extracts\R2-2500718%20(R19%20NR%20XR%20AI8742)%20DSR%20enhancements%20for%20UL%20scheduling.docx) DSR enhancements for UL scheduling InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500766](file:///D:\3GPP\Extracts\R2-2500766%20DSR%20Enhancements.docx) DSR Enhancements for XR Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500783](file:///D:\3GPP\Extracts\R2-2500783_xrDsrEnh.docx) DSR enhancements for XR ZTE Corporation, Sanechips discussion

[R2-2500854](file:///D:\3GPP\Extracts\R2-2500854%20Discussion%20on%20DSR%20enhancements%20in%20XR_clean.docx) Discussion on DSR enhancements in XR Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500982](file:///D:\3GPP\Extracts\R2-2500982%20-%20DSR%20enhancements.docx) DSR enhancements Ericsson discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2501015](file:///D:\3GPP\Extracts\R2-2501015%20Consideration%20on%20DSR%20enhancement%20for%20XR.docx) Consideration on DSR enhancement for XR CMCC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2501136](file:///D:\3GPP\Extracts\R2-2501136_DSR%20enhancements%20for%20UL%20scheduling_v0206.docx) DSR enhancements for UL scheduling ETRI discussion

[R2-2501139](file:///D:\3GPP\Extracts\R2-2501139%20Remaining%20issues%20of%20data%20reporting%20for%20enhanced%20DSR.doc) Remaining issues of data reporting for enhanced DSR Xiaomi Communications, Apple discussion

[R2-2501143](file:///D:\3GPP\Extracts\R2-2501143%20DSR%20Enhancements.docx) DSR enhancements for Rel-19 XR Samsung discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2501153](file:///D:\3GPP\Extracts\R2-2501153-MAC%20CE%20for%20DSR%20enhancement%20and%20interworking%20with%20legacy%20DSR.docx) MAC CE for DSR enhancement and interworking with legacy DSR TCL discussion Rel-19

[R2-2501235](file:///D:\3GPP\Extracts\R2-2501235%20Discussion%20on%20XR%20DSR%20enhancements.docx) Discussion on XR DSR enhancements III discussion NR\_XR\_Ph3-Core

[R2-2501282](file:///D:\3GPP\Extracts\R2-2501282.docx) Further discussion on Rel-19 DSR enhancements Rakuten Mobile, Inc discussion Rel-19

[R2-2501311](file:///D:\3GPP\Extracts\R2-2501311%20Discussion%20on%20DSR%20Enhancements.docx) Discussion on DSR Enhancements for XR Meta discussion

### 8.7.5 RLC enhancements

Including aspects such as:

* how to avoid unnecessary retransmissions, e.g. details of the combined approach
* how to ensure timely RLC retransmissions for XR, e.g. details of the solution covering both autonomous retransmission and polling enhancements

**Autonomous retransmission details**

[R2-2500352](file:///D:\3GPP\Extracts\R2-2500352%20Discussion%20on%20RLC%20enhancement%20for%20XR.docx) Discussion on RLC enhancement for XR vivo discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 5: Autonomous retransmission should be triggered when the remaining time of an RLC SDU falls below a specified threshold.

Proposal 6: The maximum number of autonomous retransmissions should be configured per RLC bearer by the network.

Proposal 7: The autonomous retransmission counter should increment by 1 each time all bytes of the associated RLC SDU that have not been positively acknowledged are delivered to the lower layer.

Proposal 8: The transmitting RLC entity should stop autonomous retransmission for the associated RLC SDU when it is positively acknowledged in the STATUS report or when the maximum number of autonomous retransmissions is reached.

Proposal 9: A new MAC CE is introduced to activate/deactivate the autonomous retransmission mechanism.

DISCUSSION on P5:

* Nokia is OK with a timer but it should be clear it is not the same timer as for DSR.
* QCM support this proposal, QCM thinks there should be one auto reTx based on one threshold and multiple threshold can be configured to trigger multiple reTx.
* LGE thinks we should only have one reTx and then rely on SR/polling.
* Huawei thinks we should not use “remaining time”.
* Ericsson also does not think multiple reTx are needed.

DISCUSSION on P6:

* Xiaomi thinks single retransmission is sufficient.
* Lenovo has no strong view but would prefer having multiple reTx.
* Samsung is OK with single retransmission.
* Samsung thinks we need some other threhsolds for polling, e.g. pollByte, not to trigger polling for each PDU.
* LGE thinks Samsung would lie to have another set of pollByte for “delay-critical”, but what we agreed should be enough in their view.
* Nokia thinks it is too restrictive to only allow a single reTx, several should be allowed (not too many).
* Vivo thinks that autonomous can work without polling and NW should be able to ask for multiple reTx. Huawei agrees with vivo.
* ZTE thinks we should first wait for HARQ to have a chance to retransmit and then there may be no time for another retransmission at RLC.
* Ericsson thinks we do not have much time for multiple retransmissions.
* CMCC indicates we could have retransmissions across different carriers or CGs.
* Samsung, Apple indicates RLC does not decide carriers for data transmission.
* Huawei thinks the timer should be at the RLC as the PDCP SDU may be forwarded to RLC at a late time.
* LGE indicates we now have a lot of indications from PDCP.
* Nokia would also prefer having a timer in RLC to avoid cross-layer indications.
* Ericsson thinks it’s easier to reuse an existing timer.
* Autonomous retransmission and/or polling should be triggered when the remaining time of an RLC SDU falls below a specified threshold. FFS if remaining time is determined based on discardTimer at PDCP or new timer at RLC
* Only a single autonomous retransmission will be triggered per RLC SDU.
* There is no dynamic activation/deactivation of the autonomous retransmission mechanism.

**Polling details and co-existence with autonomous reTx**

[R2-2500195](file:///D:\3GPP\Extracts\R2-2500195%20-%20Discussion%20on%20RLC%20re-transmission%20related%20enhancements.docx) Discussion on RLC re-transmission related enhancements OPPO discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3 For the polling enhancement in RLC AM, RAN2 discuss the following two options:

Option 1: Define new polling trigger condition: UE triggers polling if the remaining delay budget of the packet is below a threshold.

Option 2: Based on legacy spec, rely on smaller value for small remaining delay budget data.

Proposal 6 If both Polling enhancement and autonomous retransmission with new trigger condition are configured, they operate independently at the UE side.

[R2-2500925](file:///D:\3GPP\Extracts\R2-2500925.docx) Even More Discussions on RLC AM Enhancements Ericsson discussion Rel-19

Proposal 11 For autonomous retransmission and polling enhancements considering the remaining time threshold of a PDU:

a. Configure two thresholds to trigger the enhanced polling mechanism and autonomous retransmissions respectively.

b. Configure a single timer to monitor the remaining time of an RLC PDU for the enhanced polling mechanism and autonomous retransmission. Or configure two timers respectively.

c. By setting one of the two thresholds to zero, the gNB can configure either the enhanced polling mechanism or autonomous retransmission.

DISCUSSION on “FFS whether we have separate thresholds for autonomous reTx and for polling.”

* Ericsson thinks network should be able to configure two thresholds, but they can be set to the same value.
* We have separate thresholds for autonomous reTx and for polling

**Unnecessary retransmissions avoidance**

[R2-2500380](file:///D:\3GPP\Extracts\R2-2500380%20XR%20RLC%20Enh.docx) Discussion on RLC Enhancements Sharp discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1 When the TX RLC entity receives a discard indication of the SDU from PDCP, the TX RLC entity considers the SDU as an obsolete SDU. The TX RLC entity does not perform any transmission and retransmission of the SDU.

Proposal 2 A new RLC timer at the TX is not introduced to determine obsolete RLC SDUs.

Proposal 3 The new RLC timer at the RX is per RLC entity.

Proposal 4 A new RLC RX state variable is introduced to indicate the value of the SN which triggered the new timer.

Proposal 5 The duration of the new RLC timer is larger than that of t-reassembly.

Proposal 6 The new RLC timer at the RX starts if

- RX\_Next\_Highest> RX\_Next +1 or

- RX\_Next\_Highest = RX\_Next + 1 and there is at least one missing byte segment of the SDU associated with SN = RX\_Next before the last byte of all received segments of this SDU.

DISCUSSION:

* Ericsson thinks P1 is OK as it does not require to remove anything from retransmission buffer.
* Lenovo, Apple supports P1.
* QCM thinks whether it is possible to stop retransmission should be a UE capability.
* Sharp thinks what QCM wants is purely Rx based solution.
* Ericsson agrees we will need some capability and is OK to have separate ones for Rx and Tx side.
* Lenovo would prefer not to decouple the two parts.
* Xiaomi asks what the purpose is of the new proposed state variable.
* Ericsson, Nokia would prefer to have a discussion on P4-P6 together with CR review.
* When the TX RLC entity receives a discard indication of the SDU from PDCP, the TX RLC entity considers the SDU as an outdated SDU. The TX RLC entity does not perform any transmission and retransmission of such SDU/SDU segment.
* A new RLC timer at the TX is not introduced to determine outdated RLC SDUs.
* The new RLC timer at the RX is per RLC entity
* The duration of the new RLC timer is not lower than that of t-reassembly
* Proposals 4 and 6 from R2-2500380 and P3 and 4 from R2-2500401 will be discussed together with RLC CR review

[R2-2500401](file:///D:\3GPP\Extracts\R2-2500401.docx) RLC AM retransmission enhancements Xiaomi discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3: RLC Rx timer is stopped when the start condition is not satisfied.

Proposal 4: Upon RLC Rx timer expiry, RX\_Next is advanced. FFS to which value RX\_Next is advanced to.

[R2-2500094](file:///D:\3GPP\Extracts\R2-2500094%20Discussion%20on%20RLC%20enhancements_v1.docx) Discussion on RLC enhancements Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500185](file:///D:\3GPP\Extracts\R2-2500185%20Consideration%20on%20XR-specific%20RLC%20Enhancement.docx) Consideration on XR-specific RLC Enhancement CATT discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500292](file:///D:\3GPP\Extracts\R2-2500292%20%20Discussion%20on%20RLC%20AM%20Enhancements.docx) Discussion on RLC AM Enhancements CANON Research Centre France discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500481](file:///D:\3GPP\Extracts\R2-2500481%20Discussions%20on%20RLC%20enhancements.docx) Discussions on RLC enhancements Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500490](file:///D:\3GPP\Extracts\R2-2500490%20RLC%20enhancements.docx) RLC enhancements Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500538](file:///D:\3GPP\Extracts\R2-2500538%20Further%20details%20of%20RLC%20enhancements%20for%20XR.docx) Further details of RLC enhancements for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500544](file:///D:\3GPP\Extracts\R2-2500544.docx) Discussion on RLC enhancements DENSO CORPORATION discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500629](file:///D:\3GPP\Extracts\R2-2500629%20AM%20RLC%20enhancement_v01.docx) AM RLC enhancement Lenovo discussion Rel-19

[R2-2500654](file:///D:\3GPP\Extracts\R2-2500654%20Discussion%20on%20RLC%20enhancements.docx) Discussion on RLC enhancements HONOR discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500681](file:///D:\3GPP\Extracts\R2-2500681%20Views%20on%20Fast%20RLC%20Retransmission.docx) Views on Fast RLC Retransmissions Apple discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500684](file:///D:\3GPP\Extracts\R2-2500684.docx) RLC AM enhancement NEC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500698](file:///D:\3GPP\Extracts\R2-2500698%20RLC%20Enhancements%20for%20XR.docx) RLC Enhancements for XR Samsung discussion Rel-19

[R2-2500719](file:///D:\3GPP\Extracts\R2-2500719%20(R19%20NR%20XR%20A875)%20RLC%20enhancement.docx) Discussion on RLC enhancements InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500747](file:///D:\3GPP\Extracts\R2-2500747_8.7.5%20XR_RLC_v1.docx) RLC AM enhancements for timely retransmissions Sony discussion Rel-19 NR\_XR\_Ph3

[R2-2500784](file:///D:\3GPP\Extracts\R2-2500784_xrRlcEnh.docx) RLC enhancements ZTE Corporation, Sanechips discussion

[R2-2500846](file:///D:\3GPP\Extracts\R2-2500846%20%20Leftover%20Issues%20for%20RLC%20AM%20Enhancements.docx) Leftover Issues for RLC AM Enhancements China Telecom discussion

[R2-2501038](file:///D:\3GPP\Extracts\R2-2501038.docx) Discussion on the RLC AM enhancements for XR CMCC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2501060](file:///D:\3GPP\Extracts\R2-2501060%20Discussion%20on%20RLC%20AM%20enhancements.docx) Discussion on RLC AM enhancements Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2501154](file:///D:\3GPP\Extracts\R2-2501154-Leftover%20issues%20for%20RLC%20AM%20enhancement.docx) Leftover issues for RLC AM enhancement TCL discussion Rel-19

[R2-2501229](file:///D:\3GPP\Extracts\R2-2501229%20Discussion%20on%20RLC%20retransmission%20for%20XR.docx) Discussion on RLC retransmission for XR Quectel discussion

[R2-2501251](file:///D:\3GPP\Extracts\R2-2501251%20Combined%20approach%20to%20avoid%20unnecessary%20RLC%20transmissions.docx) Combined approach to avoid unnecessary RLC retransmissions Futurewei discussion Rel-19 NR\_XR\_Ph3-Core

### 8.7.6 XR rate control

Including details of per QoS flow indication, bit rate values indication enhancements (considering the reply from SA4), indication/assistance from UE/CN to gNB, whether to support rate query MAC CE etc.

**Assistance information**

[R2-2501202](file:///D:\3GPP\Extracts\R2-2501202%20XR%20rate%20control.docx) XR rate control Nokia, Nokia Shanghai Bell discussion NR\_XR\_Ph3-Core

Proposal 1: For XR rate control, the gNB receives QoS flow information from the CN, specifying which QoS flows are subject to uplink rate control (i.e., Option 2). Send an LS to RAN3 and SA2.

[R2-2501016](file:///D:\3GPP\Extracts\R2-2501016%20Consideration%20on%20XR%20rate%20control.docx) Consideration on XR rate control CMCC discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 5: RAN2 agrees that it’s beneficial if UE can gather and report assistance information to gNB about which DRBs or QoS flows are capable of rate control and/or the fixed code rate levels support by UE codec, if exists.

**Rate value signalling**

[R2-2500095](file:///D:\3GPP\Extracts\R2-2500095%20Discussion%20on%20XR%20rate%20control.docx) Discussion on XR rate control Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 6. Apply exponential distribution to encode the bit rates required by SA4. FFS The number of code points (e.g. after all fields in the MAC CE are finalized).

Proposal 7. No rate multiplier is needed.

[R2-2501141](file:///D:\3GPP\Extracts\R2-2501141%20UL%20rate%20control.docx) Discussion on UL rate control for Rel-19 XR Samsung discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3: RAN2 to consider reusing the legacy bit rate table for the XR bit rate indication.

Proposal 4: RAN2 to introduce smaller multiplier(s) for legacy bit rate table to serve XR bit rate indication.

**UE bit rate query**

[R2-2500539](file:///D:\3GPP\Extracts\R2-2500539%20Rate%20control%20signaling%20for%20XR.docx) Rate control signaling for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3. Unless a clear useful scenario is identified, rate query MAC CE from the UE is not supported.

[R2-2500482](file:///D:\3GPP\Extracts\R2-2500482%20Discussions%20on%20XR%20rate%20control.docx) Discussions on XR rate control Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 4: ULMAC CE for rate query/preference is supported.

Proposal 5: A new UL MAC CE is introduced for enhanced UL rate query for XR rate control.

**Per QoS flow vs. per DRB MAC CE**

[R2-2500785](file:///D:\3GPP\Extracts\R2-2500785_XR%20rate%20control.docx) XR Rate control ZTE Corporation, Sanechips discussion

Proposal 1: For the RRC based solution, when more than one QoS flow is mapped to a given DRB, RRC can configure which one of these QoS flows is subject to rate control

Proposal 2: MAC level signalling is used then to enable XR rate control on a per DRB basis

[R2-2500095](file:///D:\3GPP\Extracts\R2-2500095%20Discussion%20on%20XR%20rate%20control.docx) Discussion on XR rate control Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3. RRC configured per-QoS-flow rate indication is the baseline. Support for per-QoS-flow rate indication within MAC CE is a UE capability.

Proposal 4. If rate indication for a DRB is based on RRC configuration, network configures UE with a ratio for allocating rates among QoS flows in the DRB.

[R2-2500186](file:///D:\3GPP\Extracts\R2-2500186%20Discussion%20on%20XR%20Rate%20Control.docx) Discussion on XR Rate Control CATT discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500353](file:///D:\3GPP\Extracts\R2-2500353_Discussion%20on%20XR%20rate%20control.doc) Discussion on XR rate control vivo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500381](file:///D:\3GPP\Extracts\R2-2500381%20XR%20Rate%20Control.docx) Discussion on XR Rate Control Sharp discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500402](file:///D:\3GPP\Extracts\R2-2500402.docx) XR rate control Xiaomi discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500514](file:///D:\3GPP\Extracts\R2-2500514_Uplink%20rate%20control%20for%20XR.docx) Uplink rate control for XR NEC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500655](file:///D:\3GPP\Extracts\R2-2500655%20Discussion%20on%20XR%20rate%20control.docx) Discussion on XR rate control HONOR discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1: Use MAC CE to indicate QoS flows that need to be throttled.

[R2-2500682](file:///D:\3GPP\Extracts\R2-2500682%20Views%20on%20XR%20Rate%20Control.docx) Views on XR Rate Control Apple discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500720](file:///D:\3GPP\Extracts\R2-2500720%20(R19%20NR%20XR%20AI876)%20Discussion%20on%20UL%20congestion%20signaling.docx) Discussion on UL congestion signaling InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500736](file:///D:\3GPP\Extracts\R2-2500736%20-%20Discussion%20on%20XR%20Rate%20Control.docx) Discussion on XR rate control OPPO discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500748](file:///D:\3GPP\Extracts\R2-2500748_XR%20UL%20congestion.docx) Recommended bit rate based XR rate control Sony discussion Rel-19 NR\_XR\_Ph3

[R2-2500794](file:///D:\3GPP\Extracts\R2-2500794.docx) XR Rate Control Lenovo discussion NR\_XR\_Ph3-Core

[R2-2500807](file:///D:\3GPP\Extracts\R2-2500807%20Discussion%20on%20XR%20rate%20control_final.docx) Discussion on XR rate control Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2500926](file:///D:\3GPP\Extracts\R2-2500926.docx) Even More on XR Rate Control Ericsson discussion Rel-19

[R2-2501063](file:///D:\3GPP\Extracts\R2-2501063%20Further%20Discussion%20on%20Rate%20Control%20for%20XR.docx) Further Discussion on Rate Control for XR China Telecom discussion

[R2-2501312](file:///D:\3GPP\Extracts\R2-2501312%20Discussion%20on%20RAN%20Awareness%20and%20UL%20Rate%20Control%20for%20XR.docx) Discussion on RAN Awareness and UL Rate Control for XR Meta discussion