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

## Agreed NBC CRs:

[R2-2501346](file:///D:\3GPP\Extracts\R2-2501346%20Corrections%20on%20QoE.docx) Corrections on QoE Samsung, Ericsson CR Rel-18 38.331 18.4.0 5232 1 F NR\_QoE\_enh-Core

This CR needs to be implemented by UEs and networks that support SRB5.

## 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) 🡪 Closed

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 configuration (Ericsson) 🡪 Closed

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) 🡪 Closed

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)

* [AT129][504][XR] Data volume calculation for DSR (LGE) 🡪 Closed

Scope: P9 and P10 from [R2-2501243](file:///D:\3GPP\Extracts\R2-2501243%20Discussion%20on%20DSR%20enhancement%20for%20XR.docx), can also consider other proposals

Intended outcome: Report with proposals

Deadline: Report ready for CB session on Thursday

* [AT129][505][XR] LS to SA2/RAN3 on CN assistance information (Nokia) 🡪 Closed

Scope: LS to SA2/RAN3 on CN assistance information

Intended outcome: Agreeable LS in R2-2501347

Deadline: LS available for e-mail approval: Friday 2025-02-21, 10:00

## List of POST-meeting offline discussions

* [POST129][506][QoE] Reply LS to RAN3 on QMC Coordination for RRC Segmentation in NR-DC (ZTE)

Scope: Reply LS to RAN3 with replies to their questions and RAN2 agreement

Intended outcome: Agreeable LS

Deadline: short

* [POST129][507][QoE] Revision of R2-2500774 (ZTE)

Scope: Revision of R2-2500774 according to the discussion in the meeting

Intended outcome: Agreeable CR

Deadline: short

* [POST129][508][XR] Stage-2 running CR (Nokia)

Scope: Update and review the CR

Intended outcome: Running CR for endorsement in the next meeting

Deadline: Long

* [POST129][509][XR] MAC running CR (Qualcomm)

Scope: Update and review the CR

Intended outcome: Running CR for endorsement in the next meeting

Deadline: Long

* [POST129][510][XR] RRC running CR (Huawei)

Scope: Update and review the CR

Intended outcome: Running CR for endorsement in the next meeting

Deadline: Long

* [POST129][511][XR] PDPC running CR (LGE)

Scope: Update and review the CR

Intended outcome: Running CR for endorsement in the next meeting

Deadline: Long

* [POST129][512][XR] RLC running CR (vivo)

Scope: Update and review the CR

Intended outcome: Running CR for endorsement in the next meeting

Deadline: Long

## 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)

[R2-2501341](file:///D:\3GPP\Extracts\R2-2501341%20LS%20reply%20on%20%20Update%20of%20Broadcast%20MCCH%20Information.docx) Reply LS on Update of Broadcast MCCH Information RAN2 LS out Rel-18 NR\_MBS\_enh-Core To:RAN3

* LS is approved

**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

[R2-2501342](file:///D:\3GPP\Extracts\R2-2501342%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 1 F NR\_MBS\_enh-Core

* The CR is agreed

[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

R2-2501343 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 1 F NR\_MBS\_enh-Core

[CB]

#### 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

* Noted

**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 configuration (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

[R2-2501344](file:///D:\3GPP\Extracts\R2-2501344%20RRC%20segmentation%20indication.docx) Report of [AT129][502][QoE] SRB4/SRB5 segmentation configuration (Ericsson) Ericsson discussion Rel-18 NR\_QoE\_enh-Core

Proposal 1: Discuss whether to go for option 1 or option 2 of the following two options:

Option 1: To change the need code of the parameters rrc-SegAllowedSRB4 and rrc-SegAllowedSRB5 to Need S and to clarify the UE behavior in the field descriptions.

Option 2: To introduce network signaling to exchange information about support of RRC segmentation between network nodes.

Summary of pros and cons:

Option 1:

Requires NBC change of the rel-18 specification. However, not for the rel-17 specification.

Option 2:

Requires introduction of network signaling with the cost of implementation, test and possibly inter-vendor testing. However, no NBC change is needed.

DISCUSSION:

* Chair: We have NBC change for SRB4/SRB5 anyway, so perhaps it is a good opportunity to correct this.
* Lenovo prefers option 1 and we anyway do an NBC change for QoE. Another option is to let RAN3 discuss and decide what to do depending on impacts they have.
* Huawei thinks it will be strange to have different need codes for different releases, so would prefer to leave this to RAN3.
* Samsung would also like to minimize NBC changes and thinks RAN3 already has CRs.
* ZTE agrees with Huawei and Samsung.
* We do not correct this in RAN2 and let RAN3 make corrections
* [POST129][506][QoE] Reply LS to RAN3 on QMC Coordination for RRC Segmentation in NR-DC (ZTE)

Scope: Reply LS to RAN3 with replies to their questions and RAN2 agreement

Intended outcome: Agreeable LS

Deadline: short

**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.

[R2-2501345](file:///D:\3GPP\Extracts\R2-2501345%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 1 F NR\_QoE\_enh-Core

* The CR is agreed

[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
* Change 1 to be revised according to offline discussions during the meeting (short post-meeting discussion)

After offline report:

* ZTE indicates companies do not want to change need code and add condition, but they wanted to address this via procedural text change
* Ericsson thought we could also change the need code, but it is OK to handle via procedural text
* [POST129][507][QoE] Revision of R2-2500774 (ZTE)

Scope: Revision of R2-2500774 according to the discussion in the meeting

Intended outcome: Agreeable CR

Deadline: short

[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)

[R2-2501346](D:\\3GPP\\Extracts\\R2-2501346 Corrections on QoE.docx" \o "D:\3GPP\Extracts\R2-2501346 Corrections on QoE.docx) Corrections on QoE Samsung, Ericsson CR Rel-18 38.331 18.4.0 5232 1 F NR\_QoE\_enh-Core

* CR is agreed
* Note: This CR needs to be implemented by UEs and networks that support SRB5.

[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 (change to be included in R2-2501346)

## 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%.

[R2-2501508](file:///D:\3GPP\Extracts\R2-2501508_R3-250805.docx) Reply LS on XR UL Rate Control RAN3 LS in Rel-19 NR\_XR\_Ph3-Core To:RAN2 Cc:SA4

* Noted
* CATT understands that both options have impact on F1 and that RAN2 should make the decision.
* QCM thinks we cannot wait for plenary decision, we need to decide ourselves and we may need to use per DRB design.
* Meta indicates both options have F1 impact and option 1 is simpler and we can add RAN3 TUs in March.
* ZTE is surprised with F1 impact from RRC option and agrees that in this case per-QoS flow is cleaner. ZTE, vivo indicates we can expect RAN plenary to add TUs for RAN3.
* Vivo, LGE, Samsung would also like to make a decision and prefers option 1.
* Ericsson thinks the impact may not be the same and we should wait.

*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

* Noted

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

* Noted

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

* Noted

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

|  |
| --- |
| **Agreements on MG skipping**   1. From MAC perspective, the UE behaves as if there is no activated measurement gap during a skipped/cancelled measurement gap occasion. 2. “Cancelled” or “skipped” terminology will be aligned with RAN1 specifications when implementing changes in MAC. 3. 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

* Noted

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

* Noted

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

DISCUSSION on one or multiple additional priorities:

* Huawei supports having multiple additional priorities as there are situations where lower priority data may have more urgent data, so in this case this data should use a grant.
* NEC does not see strong motivation for multiple priorities.
* OPPO prefers a single priority, because multiple will complicate UE behaviour.
* LGE supports Xiaomi proposal, multiple is too complex for the UE.
* Fujitsu agrees with Xiaomi proposal, no need to optimize.
* Nokia prefers to have multiple priorities, not sure about additional complexity.
* Lenovo thinks one priority is enough as we need to specify which priority is used.
* QCM, ZTE also prefer one priority.
* CMCC asks why we have multiple reporting thresholds for DSR and only one for LCP.
* Huawei thinks if we have one priority, then there will be unfairness issues the network is not able to solve.
* Only one additional priority is configured to an LCH for LCP enhancement.

[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

* Noted

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.

DISCUSSION:

* QCM thinks this proposal is too restrictive. QCM think this may impact power adjustment for different carriers. QCM does not see any issues with per-LCH threshold.
* LGE prefers to keep an existing agreement as LCP procedure is executed at MAC layer, so it is natural to configure at MAC layer.
* OPPO agrees with QCM and LGE. Presented issues are not big ones, some of them also exist for DSR, but are manageable. Some others depend on UE implementation.
* We keep an existing agreement (remaining time threshold is configured per LCH)

**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

* Noted

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

* Noted

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

DISCUSSION on P5 from [R2-2500092](file:///D:\3GPP\Extracts\R2-2500092%20Discussion%20on%20LCP%20enhancements_v1.docx):

* Lenovo is not clear about meaning of the proposal. For DSR and BSR we can just keep what we have. IDT has similar view, but for urgent data we have DSR so such optimization is not needed.
* QCM clarifies that this may be useful for BSR, for DSR it is not an issue as we report remaining time anyway.
* Ericsson is not sure what this proposal means.
* Nokia proposes to agree that there is no impact on BSR triggering and reporting due to adjusted priority.
* Samsung thinks that for BSR triggering we should use an adjusted priority.
* Nokia thinks priority check is only checked upon LCP, not during BSR. Samsung clarifies that this is still useful. Ericsson, Huawei, LGE is not sure about usefulness, there is already DSR and the remaining time is known by the network. QCM thinks that when new data arrives at the LCH, then it is useful for the network to know that. Huawei indicates just triggering BSR earlier will not help the network.

DISCUSSION on P6 from [R2-2500092](file:///D:\3GPP\Extracts\R2-2500092%20Discussion%20on%20LCP%20enhancements_v1.docx):

* Apple thinks LCHs (not LCH priorities) are mapped to SR configuration. Lenovo agrees.
* LGE thinks there may be impact on intra-UE UE prioritization involving SR collision.

DISCUSSION on impact to intra-UE prioritization:

* Sharp agrees with Samsung that intra-UE prioritization should consider additional priority.
* Nokia thinks this might be already covered by the current specifications. Nokia thinks for UL grant prioritization additional priotiy should be used, not sure for SR.
* Xiaomi thinks it is natural to use additional priority for grant priority determination.
* Lenovo thinks we need to additionally consider retransmission case.
* Apple agrees with the intention, but they might not be any spec impact.
* QCM would prefer to leave this to UE implementation and relax the specs.
* Lenovo thinks we cannot leave this to UE and sees no additional complexity because the UE has anyway done LCP already. QCM is worried on testing.
* LGE thinks we need specified behaviour as this allows the network to know which priority is applied by the UE in different situations.
* CMCC thinks there will be impact on specs, e.g. on retransmission case. CMCC wonders about inter-UE collision case.
* Sharp clarifies we focus on MAC layer intra-UE prioritization.
* Ericsson thinks that if there are issue, then we may always use default, but not leave this to UE implementation, but prefer to apply adjusted priority.
* Nokia thinks maybe there is no impact on specs.
* Interdigital thinks the use case for SR is unclear. Nokia, Lenovo, Ericsson agrees as there will be no LCP at the time of SR.
* Huawei, Samsung indicates that SR actually gives some information to the network, so it is useful.
* There is no impact on BSR/SR/DSR triggering and reporting due to adjusted priority.
* Intra-UE prioritization shall also use the additional LCP priority for UL grant priority determination. FFS whether this has specifications impact
* FFS Intra-UE prioritization shall also use the additional LCP priority for SR priority determination

**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

* Noted

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

* Noted

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

* Noted

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.

DISCUSSION:

* Ericsson encourages to check their paper for different traffic cases. Just changing the priority will not address all cases and would like to have some additional possibilities to configure additional PBR.
* LGE agrees with P6 1) from IDT. LGE think having additional PBR may not work in some cases.
* Xiaomi thinks PBR should be set properly in the first place so no need for additional PBR. Xiaomi thinks no optimization for the first round is needed.
* Nokia agrees with Xiaomi, option 2) from IDT is enough.
* Lenovo thinks we can only focus on negative Bj case, so option 1) from IDT is enough.
* QCM is worried about fairness issue.
* Apple thinks this is optimization, should not happen often.
* Huawei agrees the situation should not happen often, in this case IDT option 1) is sufficient.
* Fujitsu supports option 1) from IDT.
* QCM does not support second proposal
* No additional PBR is needed for priority adjusted data
* FFS Allow an LCH with an upgraded priority to be transmitted even if Bj is negative (if configured by the network), while the remaining time is less the configured threshold.

**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.

* P1 and P2 from R2-2500853 and P1 from R2-2500479 to be considered during MAC CR review.

|  |
| --- |
| **Agreements on LCP enhancements**   1. Only one additional priority is configured to an LCH for LCP enhancement. 2. We keep an existing agreement (remaining time threshold is configured per LCH) 3. There is no impact on BSR/SR/DSR triggering and reporting due to adjusted priority. 4. Intra-UE prioritization shall also use the additional LCP priority for UL grant priority determination. FFS whether this has specifications impact 5. FFS Intra-UE prioritization shall also use the additional LCP priority for SR priority determination 6. No additional PBR is needed for priority adjusted data 7. FFS Allow an LCH with an upgraded priority to be transmitted even if Bj is negative (if configured by the network), while the remaining time is less the configured threshold. |

[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

* Noted

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

* Noted

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.

DISCUSSION on P4:

* Nokia, Samsung thinks we need to assume option 1), this is for XR so the grant needs to be big enough.
* Xiaomi, Fujitsu, OPPO thinks we can assume option 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.
* FFS New DSR MAC CE will (always) be used when at least one LCG is configured with multiple thresholds.
* We do not support truncated DSR nor fallback to legacy DSR in case of limited PUSCH grant size.

**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

* Noted

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.

DISCUSSION on P4-5:

* Samsung asks about the case where DSR is triggered but there is no data under reporting threshold.
* Ericsson thinks we can rely on proper network configuration.
* LGE, QCM also indicates about specifications complexity, it is easier when thresholds are separated.
* LGE, Huawei indicate any restrictions can be captured, e.g. in field descriptions.

DISCUSSION on P6:

* Ericsson is not sure about the gain of this. It would limit a number of DSRs a bit, but the gain is unclear.
* OPPO is also not sure about the use case. CMCC agrees such configuration is weird.
* Sharp supports this.
* Nokia thinks this means DSR is used as BSR, but BSR cannot be turned off anyway.
* LGE thinks this is an optimization but the use is unclear.
* Different LCGs may be configured with different number of reporting thresholds.
* If UE is configured to use R19 DSR, then any LCG with a triggering threshold shall be configured with at least one reporting threshold.
* Triggering threshold is not used as a reporting threshold (but one of reporting thresholds can be configured to the same value as triggering threshold).
* Do not support a configuration of an LCG without any triggering threshold but with DSR reporting threshold(s).

**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.

* Relevant proposals from [R2-2501243](file:///D:\3GPP\Extracts\R2-2501243%20Discussion%20on%20DSR%20enhancement%20for%20XR.docx) to be discussed as part of e-mail discussion on PDCP CR
* [AT129][504][XR] Data volume calculation for DSR (LGE)

Scope: P9 and P10 from [R2-2501243](file:///D:\3GPP\Extracts\R2-2501243%20Discussion%20on%20DSR%20enhancement%20for%20XR.docx), can also consider other proposals

Intended outcome: Report with proposals in R2-2501348

Deadline: Report ready for CB session on Thursday

* LGE points out the new terminology that was introduced and it may be needed to be used in other specifications as well.

[R2-2501348](file:///D:\3GPP\Extracts\R2-2501348%20Report%20of%20%5bAT129%5d%5b504%5d%5bXR%5d%20Data%20volume%20calculation%20for%20DSR.docx) Report of [AT129][504][XR] Data volume calculation for DSR LG Electronics discussion Rel-19 NR\_XR\_Ph3-Core

* Noted

Proposal: Choose one of the followings.

Option 1. Both PDCP and RLC consider Control PDU and retransmitted data into the shortest reporting threshold included in the DSR, and discuss further about the issue of LCH only having the control PDU and retransmitted data at the next meeting.

Option 2. Both PDCP and RLC consider Control PDU and retransmitted data into the shortest configured reporting threshold.

Option 3. PDCP considers Control PDU and retransmitted data into the shortest reporting threshold included in the DSR, and discuss further about how RLC considers Control PDU and retransmitted data at the next meeting.

* LGE clarifies that there was an agreement to put C-PDU and retransmitted data in the shortest reported threshold included in the remaining time data. But then an issue arose what to do with the LCH only having the control PDU and retransmitted data at the next meeting. LGE suggest to postpone the issue.
* OPPO thinks that in this case there will be no DSR triggered, so we do not have to consider this issue. Sharp clarifies this situation may happen in case DSR is triggered for an LCH which has data, but another LCH has only C-PDUs.
* Nokia thinks in Rel-18 DSR already there is the same issue and C-PDU will not be indicated in the DSR in this case.
* Apple clarifies that now we have different reporting thresholds which can be different from triggering threshold. There may not be data for lowest threshold, but DSR is still triggered.
* Samsung prefers to postpone the discussion.
* Lenovo asks about the problem with retransmitted data. Vivo thinks the issue is the same as for C-PDU.
* Continue the discussion in the next meeting

|  |
| --- |
| **Agreements on DSR enhancements**   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. 2. FFS New DSR MAC CE will (always) be used when at least one LCG is configured with multiple thresholds. 3. We do not support truncated DSR nor fallback to legacy DSR in case of limited PUSCH grant size. 4. Different LCGs may be configured with different number of reporting thresholds. 5. If UE is configured to use R19 DSR, then any LCG with a triggering threshold shall be configured with at least one reporting threshold. 6. Triggering threshold is not used as a reporting threshold (but one of reporting thresholds can be configured to the same value as triggering threshold). 7. Do not support a configuration of an LCG without any triggering threshold but with DSR reporting threshold(s). |

[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

* Noted

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.

|  |
| --- |
| **Agreements on RLC enhancements**  **Autonomous retransmissions and polling enhancements**   1. 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 2. Only a single autonomous retransmission will be triggered per RLC SDU. 3. There is no dynamic activation/deactivation of the autonomous retransmission mechanism. 4. We have separate thresholds for autonomous reTx and for polling   **Unnecessary retransmissions avoidance**   1. 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. 2. A new RLC timer at the TX is not introduced to determine outdated RLC SDUs. 3. The new RLC timer at the RX is per RLC entity 4. The duration of the new RLC timer is not lower than that of t-reassembly 5. Proposals 4 and 6 from R2-2500380 and P3 and 4 from R2-2500401 will be discussed together with RLC CR review |

[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

* Noted

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

* Noted

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.

DISCUSSION:

* LGE, Lenovo support proposal from Nokia. Information from CN should be a baseline and we can discuss UAI on top.
* CATT asks if UE should use MAC or RRC signalling. CATT thinks we can support both. CMCC prefers RRC signalling.
* ZTE thinks we should first agree this information is beneficial, even though not essential. We can ask SA2/RAN3 to specify this.
* Sony also thinks this should come from CN.
* Huawei thinks this should come from UE as the application is running on the UE.
* Ericsson thinks UE solution is incomplete and prefers to have this information from CN.
* Meta, vivo supports having info from UE, because this is for UL, so UE has all information.
* Nokia, Ericsson indicates the gNB will control this, so also relevant information should come from NW. Ericsson thinks for L4S there are already mechanism defined which can be reused.
* ZTE underlines UAI is not used to control the rate, it is just an information to the gNB and gNB is in control.
* RAN2 assumes 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.
* We may revisit UAI option based on SA2/RAN3 reply
* [AT129][505][XR] LS to SA2/RAN3 on CN assistance information (Nokia)

Scope: LS to SA2/RAN3 on CN assistance information

Intended outcome: Agreeable LS in R2-2501347

Deadline: LS available for e-mail approval: Friday 2025-02-21, 10:00

[R2-2501347](file:///D:\3GPP\Extracts\R2-2501347%20LS%20on%20uplink%20rate%20control.docx) LS on uplink rate control RAN2 LS out Rel-19 NR\_XR\_Ph3-Core To: SA2,RAN3

* LS is approved

**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

* Noted

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

* Noted

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.

DISCUSSION on whether to have a new table:

* Ericsson asks if the table should work symmetrically for both for rate increasing and decresing.
* Sony agrees with Ericsson, we can have a new table.
* ZTE thinks the table needs to work in both directions, not clear yet whether this requires exponential distribution.
* Lenovo prefers to have a new table.
* Futurewei thinks we can combine the table with multipliers.
* QCM thinks gNB knows the available bandwidth, so increase and decrease do not have to be symmetrical. We cannot reuse current table as the quantization error is too high.
* Futurewei indicates an existing table may be OK with proper multiplier values.
* Ericsson would like to limit the code points to 6 bits to avoid too much overhead.
* LGE thinks current table may be insufficient. We may need to have additional multiplier values.
* Specify a new table for XR rate control. FFS distribution (exponential, linear), codepoints etc.

DISCUSSION on whether to have (new) multipliers:

* Ericsson thinks with new table we do not need multipliers
* ZTE indicates that whether we need multiplier may depend on whether we can also use old table, maybe for the new on it is not needed.
* Nokia thinks that with new table we may not need multipliers.
* LGE thinks new multipliers with smaller values may be useful, but perhaps it depends on how the table looks like.
* Lenovo agrees with Nokia, Ericsson.
* We will try to design a table first and check whether it is possible to meet the required range/granularity. Afterwards, we can check whether multipliers are needed

**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

* Noted

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

* Noted

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.

DISCUSSION:

* Nokia indicates that congestion is known the gNB and asks how the UE can know what bitrate is available.
* Fujitsu clarifies this is from end to end application point of view and UE may ask for a desired bit rate.
* Futurewei indicates that rate is based on individual links which is different from VoIP case.
* QCM indicates that for conversational XR services the situation is similar as telephony. Another use case is just request query when service starts.
* ZTE indicates that can also be recommended rate from peer entity, so then the UE may also provide this to gNB. The idea was to reuse existing framework and currently it is bi-directional. We can just reuse.
* Lenovo is not certain about the use cases. Lenovo thinks whether to have this may also depend on MAC CE granularity.
* CATT agrees with FTW, Lenovo. CATT asks why we cannot use RRC signalling for this.
* Samsung thinks we can just reuse what’s available and the gNB anyway makes the final decision so it makes no harm.
* Ericsson indicates that we are more and more features now. It is unclear what the intention of this is.
* OPPO agrees with the use case mentioned by QCM, so it is useful to limit the impact on the UE experience. Sharp agrees and indicates that this useful when the peer is outside 3GPP network.
* Ericsson thinks that the gNB should anyway increase the rate once the congestion is over.
* HONOR is not sure about the use case for XR. Sony agrees.
* QCM has bad experience in the field with fully trusting the network to handle the bit rate without UE’s request. Ericsson thinks that in this case there are also requirements from application level, so the network will have to increase.
* BT thinks it is a good compromise to have the query mechanism with an assumption that the network may always ignore this, if needed.
* Nokia indicates there is already a prohibit timer and the network can switch the query MAC CE off.
* Ericsson asks whether we need to check how the recommended bit rate is determined by the UE, we may need to check with SA4 colleagues.
* Working assumption:
  + - Support rate query MAC CE with the target to use same design that we will agree for rate indication MAC CE.
    - The rate query MAC CE is configurable by the network, i.e. the network may turn it off completely (same as legacy).
* Companies to check with their SA4 colleagues whether there are any issues with this

|  |
| --- |
| **Agreements on XR rate control**   1. RAN2 assumes 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.   We may revisit UAI option based on SA2/RAN3 reply   1. Specify a new table for XR rate control. FFS distribution (exponential, linear), codepoints etc. 2. We will try to design a table first and check whether it is possible to meet the required range/granularity. Afterwards, we can check whether multipliers are needed 3. Working assumption:    1. Support rate query MAC CE with the target to use same design that we will agree for rate indication MAC CE.    2. The rate query MAC CE is configurable by the network, i.e. the network may turn it off completely (same as legacy).   Companies to check with their SA4 colleagues whether there are any issues with this |

**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