3GPP TSG-RAN WG2 Meeting #130 DRAFT\_R2-2504675

St. Julian’s, Malta, May 19th – 23rd, 2025

Source: Session chair (Huawei)

Title: Report from session on R19 XR and LTE Broadcast

* [AT130][500][XR] Organizational – Session on R19 XR and LTE Broadcast (Session chair)

Scope:

* + - * Share plans and list of ongoing email discussions for the session
      * Share meeting notes and agreements for review and endorsement
* [AT130][501][XR] Reply LS on TTNB (QCM)

Scope: Find proper wording to express the RAN2 agreement in the LS

Intended outcome: Agreeable LS in R2-2504812

Deadline: Friday 2025-05-23, 08:00

* [AT130][502][XR] Reply to SA4 LS on RTP retransmission (Nokia)

Scope: Discuss the reply LS considering the online discussion

Intended outcome: Agreeable reply LS in R2-2504813

Deadline: CB session on Thursday

## 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.

For each R19 feature, 1 additional tdoc on top of the limit is allowed for a primary co-sourcing company for co-sourced contribution with 4 or more companies.

**Open issues**

* CR Rapporteurs (as indicated in email discussion scope) are expected to provide open issue list
* Please refer to RAN2 chair guidance document in [POST129bis][001][Organizational] Open issue list
* Companies should focus on addressing these open issues first and clearly indicate the open issue number they are addressing in their section and proposal, e.g. Proposal x: (RRC-1) Agree to bla bla
* Companies can discuss UE capabilities in their topic-specific Tdocs

Tdoc request/submission for RAN2#130 deadlines:

* Tdoc Submission deadline: May. 9th, 1000 UTC

### 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: 7*

#### 7.0.2.16 XR Enhancements for NR

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

**IPA XR**

[R2-2503842](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_130\Docs\R2-2503842.zip) Correction to UE capability for retx-less CG Huawei, HiSIlicon, Apple, Futurewei, Qualcomm CR Rel-18 38.306 18.5.0 1279 - F NR\_XR\_enh-Core

* CR is agreed

[R2-2503843](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_130\Docs\R2-2503843.zip) Correction to RRC for retx-less CG Huawei, HiSIlicon, Apple, Futurewei, Qualcomm CR Rel-18 38.331 18.5.1 5348 - F NR\_XR\_enh-Core

* CR is agreed

**Other**

[R2-2504597](file:///D:\3GPP\Extracts\R2-2504597%20-%20Discussion%20on%20DSR%20cancellation.docx) Discussion on DSR cancellation Ericsson, Qualcomm Incorporated discussion Rel-18 NR\_XR\_enh-Core

* The CR is not pursued
* Nokia disagrees with the observations. Prefer not to change behaviour because there are no issues with the existing text.
* LGE thinks that intention was not to include both all data and DSR.
* NEC, Samsung agrees with Nokia and LGE.
* Samsung sees no contradiction in the current text.
* Xiaomi see this as an optimization and it was discussed already.
* MTK thought it was useful and sees some contradiction in the current text.
* QCM thinks such relaxation in the UE behaviour is beneficial. Zero DSR can be used as an indication to the network. It requires the UE to perform LCP twice in case it turns out all data can be in the MAC PDU.

## 8.7 XR Enhancements Ph3

(NR\_XR\_Ph3-Core; leading WG: RAN2; REL-19; WID: RP-250107)

Time budget: 2 TU

Tdoc Limitation: 5 tdocs

**General guidelines:**

1. **Contributions should focus on the open issues identified in the post-meeting CR review discussions**
2. **Companies can discuss UE capabilities in their topic-specific Tdocs**

### 8.7.1 Organizational

LS, rapporteur input, workplan, running CRs, open issues lists etc.Including outcome of [POST129bis][507][XR] Incoming LS(es) from SA4 (Qualcomm)

**Incoming LSes**

[R2-2503323](file:///D:\3GPP\Extracts\R2-2503323_R3-252491.doc) Reply LS on uplink rate control (R3-252491; contact: Meta) RAN3 LS in Rel-19 NR\_XR\_Ph3-Core To:RAN2, SA2

* Noted

[R2-2503328](file:///D:\3GPP\Extracts\R2-2503328_R4-2504972.docx) Reply LS on UE assistance information (R4-2504972; contact: Nokia) RAN4 LS in Rel-19 NR\_XR\_Ph3-Core To:RAN1, RAN2

* Noted
* RAN2 assumes granularity of indication should be decided by RAN4. If no input from RAN4 is received, then we will decide this in RAN2 next meeting.
* Nokia thinks that it is a bit unclear whether granularity is supposed to be discussed in RAN2 or in RAN4.
* QCM thinks granularity can be discussed in RAN2, because of time constraints. There is enough expertise in RAN2.
* Huawei indicates that RAN4 is discussing this and this is R4 feature. Lenovo, Ericsson agrees.
* ZTE thinks that some agreement is needed, but it seems there is not much input on this in RAN4.

[R2-2503336](file:///D:\3GPP\Extracts\R2-2503336_S2-2504252.docx) LS reply on uplink rate control (S2-2504252; contact: vivo) SA2 LS in Rel-19 XRM\_Ph2, NR\_XR\_Ph3-Core To:RAN2 Cc:RAN3, SA4

* Noted

[R2-2503339](file:///D:\3GPP\Extracts\R2-2503339_S4-250736.doc) LS on the accuracy of PDU Set size and data burst size indication (S4-250736; contact: Qualcomm) SA4 LS in Rel-19 5G\_RTP\_Ph2 To:RAN2 Cc:SA2, RAN3

* Noted

[R2-2503340](file:///D:\3GPP\Extracts\R2-2503340_S4-250737.doc) LS on Indicating Time to the Next Data Burst (TTNB) (S4-250737; contact: Qualcomm) SA4 LS in Rel-19 5G\_RTP\_Ph2 To:RAN2 Cc:SA2, RAN3

* Noted

**Draft reply LSes**

[R2-2503362](file:///D:\3GPP\Extracts\R2-2503362%20draft%20reply%20LS%20to%20SA4%20on%20accuracy%20of%20PDU%20Set%20size%20and%20burst%20size%20indication_v2.doc) Draft reply LS to SA4 on accuracy of PDU Set size and data burst size Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

* Change the last sentence in bullet 1 to: “An accuracy of 5% is sufficient.”
* With this change the LS is approved in R2-2504811

[R2-2503363](file:///D:\3GPP\Extracts\R2-2503363%20draft%20reply%20LS%20to%20SA4%20on%20indicating%20time%20to%20the%20next%20data%20burst_v2.doc) Draft reply LS to SA4 on accuracy of TTNB Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

* Most of the contents of the LS are agreeable
* We will clarify that in case 0.125ms is infeasible, it is acceptable for RAN2 to have less accurate indication.
* Exact wording to be discussed offline
* [AT130][501][XR] Reply LS on TTNB (QCM)

Scope: Find proper wording to express the RAN2 agreement in the LS

Intended outcome: Agreeable LS in R2-2504812

Deadline: Friday 2025-05-23, 08:00

DISCUSSION on two LSes above:

* QCM indicates there were some comments from Ericsson and Futurewei.
* Huawei thinks that for scheduling purposes accuracy of 2% would be better.
* Futurewei thinks it is important to note that accuracy should not be increased at an expense of packet delay. We should make sure that there is balance between accuracy and additional delay.
* Lenovo thinks that there are some inaccuracies for BSR as well, so we do not have to be too detailed.
* Nokia clarifies that so far it seems it was not accurate, so the point from SA4 is to get some order of magnitude, not exact number.
* Ericsson thinks that we can simply say 5% is sufficient and we do not need more accuracy.
* LGE thinks just indicating no more than 5% is OK, we do not have to be very detailed.
* Huawei reminds that CT will use this to specify the codepoints.
* FTW thinks the unit in SA4 specs for TTNB is in ms, so now we are asking them to do better than that. Xiaomi shares the concern, not sure if we need to be that accurate. Ericsson agrees.

[R2-2504609](file:///D:\3GPP\Extracts\R2-2504609_Discussion%20on%20SA2%20LS%20on%20UL%20rate%20control.doc) Discussion on SA2 LS on UL rate control vivo discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1 Rate control applies for both GBR and non-GBR bearers.

Proposal 2 When gNB sends the rate control to UE, it could inform SMF/UPF in order to coordinate with CN for congestion handling.

* OPPO agrees with proposal 1. P2 is not needed, we can focus on questions SA2 asked us.
* LGE, Huawei, Samsung, Nokia, ZTE agrees we should focus on P1.
* Vivo thinks if we indicated something to SA2, it could help them.
* QCM agrees that we may focus on the question but thinks some coordination between L4S and XR rate control mechanisms is needed.
* Ericsson agrees we should focus on P1 and asks whether we will capture sth in stage-2 regarding this.
* From RAN2 perspective rate control applies for both GBR and non-GBR bearers.
* [AT130][503][XR] Reply LS to SA2 on GBR/non-GBR (vivo)

Scope: Agree reply LS

Intended outcome: Agreeable LS

Deadline: Friday 2025-05-23, 08:00

**Rapporteur input**

[R2-2503563](file:///D:\3GPP\Extracts\R2-2503563%20XR%20Rapporteur%20Inputs.docx) Rapporteur Inputs Nokia, Qualcomm (Rapporteurs) discussion Rel-19 NR\_XR\_Ph3-Core

* Noted

**Running CRs**

[R2-2503360](file:///D:\3GPP\Extracts\R2-2503360%20R19%20XR%20MAC%20running%20CR.docx) Introduction to R19 XR enhancements Qualcomm Incorporated draftCR Rel-19 38.321 18.5.0 NR\_XR\_Ph3-Core

[R2-2503564](file:///D:\3GPP\Extracts\R2-2503564%20XR%20Draft%20Stage%202%20CR.docx) Draft Stage 2 CR for XR Nokia (Rapporteur) draftCR Rel-19 38.300 18.5.0 B NR\_XR\_Ph3-Core

[R2-2503620](file:///D:\3GPP\Extracts\R2-2503620_RLC%20running%20CR%20for%20R19%20XR.docx) RLC running CR for R19 XR vivo draftCR Rel-19 38.322 18.2.0 B NR\_XR\_Ph3-Core

[R2-2503696](file:///D:\3GPP\Extracts\R2-2503696%20PDCP%20running%20CR%20for%20R19%20XR_Final.docx) PDCP running CR for R19 XR LG Electronics Inc. (Rapporteur) draftCR Rel-19 38.323 18.5.0 NR\_XR\_Ph3-Core

[R2-2503787](file:///D:\3GPP\Extracts\R2-2503787%20Running%20RRC%20CR%20for%20R19%20XR_v04_Rapp.docx) Running RRC CR for R19 XR Huawei, HiSilicon draftCR Rel-19 38.331 18.5.1 B NR\_XR\_Ph3-Core

[R2-2503436](file:///D:\3GPP\Extracts\R2-2503436.docx) Draft 38.306 CR for Rel-19 XR UE capabilities Xiaomi draftCR Rel-19 38.306 18.5.0 B NR\_XR\_Ph3-Core

[R2-2503437](file:///D:\3GPP\Extracts\R2-2503437.docx) Draft 38.331 CR for Rel-19 XR UE capabilities Xiaomi draftCR Rel-19 38.331 18.5.1 B NR\_XR\_Ph3-Core

* The CRs above are endorsed as baseline for further updates after this meeting
* In MAC CR, FFS whether some changes are needed due to using single/multiple entry DSR MAC CE terminology

**Open issues lists**

[R2-2503361](file:///D:\3GPP\Extracts\R2-2503361%20List%20of%20open%20issues%20in%20MAC.docx) List of open issues in MAC Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

* Noted
* CR Rapporteur: whether to use multiple entry DSR MAC CE and enhanced DSR MAC CE needs to be decided. There are 3 options:
  1. Single and multiple entry DSR MAC CE
  2. Enhanced DSR MAC CE and legacy stays as DSR MAC CE
  3. ~~We have a separate section for the new DSR~~
* Ofinno thinks that sometimes new DSR will only have one entry, so multiple entry DSR MAC CE is not appropriate. Option 2 is preferred.
* Apple would like to rule out option 3. Option 2 is preferred.
* LGE thinks it’s important to differentiate between legacy and new DSR. Otherwise
* Samsung thinks we should not spend too much time on this
* Ofinno indicates that option 1 impacts R18 DSR. Sharp indicates it is just a name.
* We go with option 1, i.e. Single and multiple entry DSR MAC CE

[R2-2503438](file:///D:\3GPP\Extracts\R2-2503438.docx) Open issues of Rel-19 XR UE capabilities Xiaomi discussion Rel-19 NR\_XR\_Ph3-Core

* Noted
* An optional UE capability with signalling (e.g. delayStatusReportNonDelayReportingData-r19) is introduced to indicate the support of including non-delay-reporting data ahead of delay-reporting data in the buffer size calculation for enhanced delay status report. A UE supporting this feature shall also indicate support of enhanced delay status report (enhancedDelayStatusReport-r19). The capability is per UE, not FDD-TDD DIFF, not FR1-FR2 DIFF.
* An optional UE capability with signalling (e.g. ul-RateQuery-r19) is introduced to indicate the support of bit rate query message (in UL Rate Control MAC CE) from the UE to the gNB. A UE supporting this feature shall also indicate support of UL rate control MAC CE (ul-RateControl-r19). The capability is per UE, not FDD-TDD DIFF, not FR1-FR2 DIFF.

[R2-2503565](file:///D:\3GPP\Extracts\R2-2503565%20XR%20Stage%202%20Open%20Issues.docx) Stage 2 Open Issues Nokia (Rapporteur) discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1 (Stage2-1): send an LS to SA2 to clarify PDU set handling when the gNB is not provided with any PDU Set QoS Parameters from the SMF but still being provided with PDU Set information from the UPF.

* Nokia clarifies that SA2 agreed to update their specs, so there should be no ambiguity any more and we can close this open issue.
* FTW indicates that we should also update our stage-2 specs.
* We will update 38.300 in line with SA2 updated specs

[R2-2504649](file:///D:\3GPP\Extracts\R2-2504649%20draft%20LS%20to%20SA2%20on%20gNB%20PDU%20Set%20based%20handling%20without%20QoS%20parameters.doc) Draft LS to SA2 on gNB PDU Set based handling without QoS parameters Futurewei LS out Rel-19 NR\_XR\_Ph3-Core To:SA2 Cc:RAN3

[R2-2503697](file:///D:\3GPP\Extracts\R2-2503697%20Discussion%20of%20%5bPOST129bis%5d%5b504%5d%5bXR%5d%20PDCP%20running%20CR%20(LGE)_Final.docx) Discussion of [POST129bis][504][XR] PDCP running CR LG Electronics Inc. (Rapporteur) report Rel-19 NR\_XR\_Ph3-Core

* Noted

[R2-2503767](file:///D:\3GPP\Extracts\R2-2503767_Discussion%20summary%20and%20list%20of%20RLC%20open%20issue%20for%20R19%20XR.docx) Discussion summary and list of RLC open issue for R19 XR vivo discussion Rel-19 NR\_XR\_Ph3-Core

**Open issue RLC-1 (essential): Terminology for avoiding unnecessary retransmission, e.g. “obsolete”, or “outdated”, or “discard”**

**Proposal 1: (10/13) Use the term of “discard” for avoiding unnecessary retransmission, e.g. “*stopReTxDiscardedSDU”*, “*t-RxDiscard*”.**

**Other specifications will be updated accordingly, e.g. the corresponding RRC parameter(s), and corresponding description in TS 38.300.**

Rapporteur: The latest running CR will reflect this proposal. Companies have concern/different views on it could provide your further comments during the meeting.

**Open issue RLC-2 (not essential, but important): whether further changes are needed for SR triggered by t-RxDiscard expires.**

Rapporteur suggests to follow the majority, i.e. there is no need on further change for SR triggered by t-RxDiscard expires.

Rapporteur: The latest running CR will reflect this suggestion. Companies have concern/different views on it could provide your further comments during the meeting.

**Open issue RLC-3 (essential): whether use the terminology of “autonomous retransmission” or others.**

**Proposal 2: (7/13) The term “remaining time based retransmission” is used for autonomous retransmission in RLC.**

**Other specifications will be updated accordingly, e.g. the corresponding RRC parameter(s), and corresponding description in TS 38.300.**

Rapporteur: The latest running CR will reflect this proposal. Companies have concern/different views on it could provide your further comments during the meeting.

**Open issue RLC-4 (essential): whether merge the autonomous retransmission procedure in clause 5.x into 5.3.2 or capture it separately.**

Rapporteur suggests to follow the clear majority, i.e. merge autonomous retransmission procedure in 5.x into section 5.3.2 “retransmission”.

Rapporteur: The latest running CR will reflect this suggestion. Companies have concern/different views on it could provide your further comments during the meeting.

RLC rapporteur clarifies that open issues RLC-2 and RLC-4 are already closed so there is no need to discuss them.

* Use the term of “discard” for avoiding unnecessary retransmission, e.g. “stopReTxDiscardedSDU”, “t-RxDiscard”.

Other specifications will be updated accordingly, e.g. the corresponding RRC parameter(s), and corresponding description in TS 38.300.

* The term “remaining time based retransmission” is used for autonomous retransmission in RLC.

Other specifications will be updated accordingly, e.g. the corresponding RRC parameter(s), and corresponding description in TS 38.300.

[R2-2503788](file:///D:\3GPP\Extracts\R2-2503788%20Summary%20of%20%5bPOST129bis%5d%5b503%5d%5bXR%5d%20RRC%20running%20CR%20(Huawei)_v14_Rapp.docx) Summary of [POST129bis][503][XR] RRC running CR (Huawei) Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

* Noted

### 8.7.2 Multi-modality support

**No contributions are expected for this AI**

### 8.7.3 RRM measurement gaps/restrictions related enhancements

Focus on remaining details of UAI as agreed by RAN4 (see LS in R4-2504972), e.g. when to trigger UAI, need of prohibit timer etc.

**UAI triggering and configuration (RRC-5, RRC-6)**

[R2-2504121](file:///D:\3GPP\Extracts\R2-2504121%20Discussion%20on%20UAI%20for%20MG%20skipping_final.docx) Discussion on UAI for MG skipping Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2: (RRC-05) UE reports the assistance information of recommended gap cancellation ratio when the configuration is received or when the assistance information changes since the last report.

Proposal 3: (RRC-05) It is left to UE implementation to decide whether the recommended gap cancellation ratio changes.

Proposal 4: (RRC-06) A prohibit timer is used to limit frequent transmission of the UAI with recommended gap cancellation ratio.

Proposal 5: RAN2 to wait for RAN4 progress on the granularity (e.g., per FR or per UE) for the recommended gap cancellation ratio.

**UE capability (UE capability-03)**

[R2-2503653](file:///D:\3GPP\Extracts\R2-2503653%20Discussion%20on%20RRM%20measurement%20gaps%20enhancements%20of%20XR%20traffic.doc) Discussion on RRM measurement gaps enhancements of XR traffic Xiaomi Communications discussion

Proposal 5 RAN2 defines a UE capability for reporting the ratio of gap occasions. And its prerequisite condition is that it supports enabling TX/RX during measurement gap scheduling restrictions by DCI.

[R2-2503364](file:///D:\3GPP\Extracts\R2-2503364%20Discussion%20on%20measurement%20gap%20enhancements.docx) Discussion on measurement gap enhancements Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503425](file:///D:\3GPP\Extracts\R2-2503425%20Discussion%20on%20RRM%20Measurement%20Gaps%20Restrictions.docx) Discussion on RRM Measurement Gaps Restrictions Related Enhancements CATT discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503494](file:///D:\3GPP\Extracts\R2-2503494%20-%20Discussion%20on%20Measurement%20Gap%20enhancements.docx) Discussion on Measurement Gap enhancements OPPO discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503508](file:///D:\3GPP\Extracts\R2-2503508%20XR%20Gap.docx) UAI and Measurement Gap Enhancements Sharp discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503521](file:///D:\3GPP\Extracts\R2-2503521%20RRM%20Measurement%20Gaps%20Enhancements%20for%20XR.docx) RRM Measurement Gaps Enhancements for XR Ofinno discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503621](file:///D:\3GPP\Extracts\R2-2503621%20Discussion%20on%20RRM%20measurement%20gaps%20enhancements.docx) Discussion on RRM measurement gaps enhancements vivo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503792](file:///D:\3GPP\Extracts\R2-2503792%20Discussion%20on%20RRM%20measurement%20Gaps%20Restrictions%20related%20Enhancements.docx) Discussion on RRM measurement gaps/restrictions related enhancements China Telecom discussion Rel-19

[R2-2503892](file:///D:\3GPP\Extracts\R2-2503892.docx) Enabling TX/RX for XR during measurement gaps/restrictions Lenovo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503971](file:///D:\3GPP\Extracts\R2-2503971_XR%20rrm_v00.docx) Measurement gap enhancements for XR ZTE Corporation, Sanechips discussion Rel-19

[R2-2504341](file:///D:\3GPP\Extracts\R2-2504341_Discussion%20on%20UE%20Assistance%20Information%20(UAI)%20for%20Measurement%20Gaps.docx) Discussion on UE Assistance Information (UAI) for Measurement Gaps Ericsson discussion Rel-19

[R2-2504409](file:///D:\3GPP\Extracts\R2-2504409%20RRM%20measurement%20gaps%20enhancements.docx) RRM measurement gaps/restrictions related enhancements Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504436](file:///D:\3GPP\Extracts\R2-2504436%20UAI%20for%20measurement%20gap%20cancellation.docx) Discussion on UAI for Measurement Gap Enhancements Samsung discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504442](file:///D:\3GPP\Extracts\R2-2504442_Discussion%20on%20RAN4%20LS%20on%20UE%20assistance%20information.docx) Discussion on RAN4 LS on UE assistance information CMCC discussion Rel-19 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 Bj etc.

**SR priority [MAC-01]**

[R2-2503690](file:///D:\3GPP\Extracts\R2-2503690%20SR%20priority%20determination_v1.docx) TP for using additional LCP priority for SR priority determination Huawei, HiSilicon, ZTE Corporation, Samsung, Sharp, NEC, CATT discussion Rel-19 NR\_XR\_Ph3-Core

Proposed TP: [MAC-01]

When the MAC entity is configured with lch-basedPrioritization, the MAC entity considers the value of additionalPriority, if configured, as the priority for the logical channel triggering an SR, if the running PDCP discardTimer of an PDCP SDU buffered for the LCH has the remaining value below additionalPriorityThreshold at the time of the SR transmission.

[R2-2503361](file:///D:\3GPP\Extracts\R2-2503361%20List%20of%20open%20issues%20in%20MAC.docx) List of open issues in MAC Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

[MAC-01] SR priority adjustment

The current agreement is to evaluate the potential spec impact of SR priority adjustment and then decide whether to adopt it (i.e. only if it is simple enough to capture). Companies can use the following TP as the baseline for further discussion:

For the MAC entity configured with *lch-basedPrioritization*, the MAC entity shall for a pending SR:

1> if the SR is triggered by a logical channel configured with *additionalPriority*; and

1. if the smallest remaining value of the running PDCP *discardTimer*s among the data available for transmission in this logical channel, evaluated at the time of the first symbol of the next PUCCH resource for the SR transmission, is below or at *priorityAdjustmentThreshold* configured for the logical channel:

2> consider additionalPriority as the priority of the SR transmission.

[R2-2503452](file:///D:\3GPP\Extracts\R2-2503452%20-%20Discussion%20on%20LCH%20priority%20adjustment%20for%20XR.docx) Discussion on LCH priority adjustment for XR OPPO discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1 [MAC-01] The additional LCP priority is NOT used for SR priority determination in intra-UE prioritization.

DISCUSSION:

* OPPO is concerned that we also need to address SR retransmission, so the procedure is more complex than proposed.
* LGE is concerned that SR transmission suffers from RTT anyway, so it is not that useful to prioritize it.
* Xiaomi is still not convinced by the gains. Prioritization of SR was disucssed in R18 already and nothing changed. Agrees that fallback to original priority may be complex for SR.
* Samsung thinks that main concerns were about complexity but the TPs are as simple as they can get.
* MTK sees this a corner case optimization. If you need to send SR, it means you are already delayed.
* Nokia thinks we can skip this optimization.\
* Samsung and ZTE agrees this is an optimization, but the whole WI is about optimizations for XR traffic. TP is very simple.
* IDT indicates that for BSR we did not do anything so for SR we should follow this principle.
* [MAC-01] The additional LCP priority is NOT used for SR priority determination in intra-UE prioritization.

**Impact of congestion on priority adjustment (MAC-02)**

[R2-2503698](file:///D:\3GPP\Extracts\R2-2503698%20Discussions%20on%20Delay-based%20LCP%20Enhancements.docx) Discussions on Delay-based LCP Enhancements Apple discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2: For the potential impacts of PSI-based discarding, RAN2 can discuss the following options:

• Option 1: When PSI-based discarding is activated a DRB, priority adjustment for the corresponding LCH is disabled.

• Option 2: When PSI-based discarding is activated a DRB, priority adjustment is applied only if there is at least one more important packet in the buffer has a remaining time smaller than the threshold.

[R2-2503365](file:///D:\3GPP\Extracts\R2-2503365%20Discussion%20on%20LCP%20enhancements.docx) Discussion on LCP enhancements Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2. [MAC-02] If an LCH with priority p is in congestion (i.e. PSI based discard has been activated), then no other LCHs are allowed to adjust their priorities to priority p, even if they meet the priority adjustment criteria.

Proposal 3. [MAC-02] If an LCH is in congestion (i.e. PSI based discard has been activated), PDUs with low importance are not considered for priority adjustment.

DISCUSSION on Apple’s P2:

* LGE think option 2 is sufficient.
* OPPO agrees with option 2, i.e. we only consider high importance packets.
* Ofinno also agrees with O2, O1 has some issues.
* Xiaomi also supports that and thinks draft CR already captures it porperly.

Disucssion on QCM P2:

* Ofinno this proposal can create additional issues, e.g. if more LCHs are in congestion.
* Xiaomi thinks this harms other LCHs and in other LCHs we can also discard low importance data.
* LGE also does not want to optimize.
* When PSI-based discarding is activated for a DRB, priority adjustment is applied only if there is at least one high importance packet in the buffer has a remaining time smaller than the threshold. (MAC spec is already aligned with this agreement).

**Priority fallback with consideration of PDU Set integrated handling (MAC-13)**

[R2-2504373](file:///D:\3GPP\Extracts\R2-2504373%20Further%20consideration%20on%20LCP%20enhancement%20for%20XR.docx) Further consideration on LCP enhancement for XR CMCC discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 5a: In the 1st round of LCP, PSIHI has no specification impact on LCH priority determination as PDU set and PDCP SDU use the same remaining time threshold.

Proposal 5b: In the 2nd round of LCP, if pdu-SetDiscard is configured, the priority of LCH should fall back to the original priority if there is neither PDCP SDU nor PDCP SDU within a PDU set whose remaining is less than the threshold.

[R2-2503426](file:///D:\3GPP\Extracts\R2-2503426%20Consideration%20on%20LCP%20Enhancement.docx) Consideration on LCP Enhancement CATT discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 5: (MAC-13) Do not consider priority adjustment on PDU set level in enhanced LCP procedure.

DISCUSSION:

* OPPO agrees with CATT proposal not to consider PSIHI. It can be handled by proper network scheduling.
* LGE thinks that in case we consider PSIHI it should also be considered in triggering etc.
* Apple thinks we should align with what we have and for DSR we already consider PDU sets, e.g. in case of DSR cancellation. Apple thinks we should continue using enhanced priority if there are PDUs of the PDU set with remaining time below threshold.
* Ofinno thinks that we should not consider PDU sets as then the whole LCH will be prioritized which is unfair.
* Ericsson agrees with Apple, PDU sets should be treated as a whole and we should align with DSR.
* Lenovo think we should follow the definition of delay critical data which is per PDU set. Lenovo thinks we should have the same principle for the first round as well. Nokia agrees.
* Nokia thinks we can simply use similar way of defining priority adjustable data as we did for delay critical data.
* Sharp would also like to have consistent behaviour.
* QCM think how we treat this depends on how we define the remaining time handling (based on PDU or PDU set).
* Xiaomi thinks for autonomous transmission PDU set based treatment was not agreed. Even if it is not transmitted in 2nd round, then it will get promoted in the next LCP. Apple thinks we should use an available grant as soon as possible, it may be too late otherwise.
* CMCC underlines that PSIHI means that we should treat PDU sets as a whole.
* LGE indicates that perhaps we should revisit the decision we made for auto reTx and polling, i.e. also consider them based on PDU sets. It will be cleaner and simpler for PDCP specs.
* Nokia indicates that this agreement does not impact PDCP specs as the definition for this feature is in MAC.
* (MAC-13) When pdu-SetDiscard is configured, PDU sets should be treated as a whole in the LCP procedure with adjusted priority.

**Bj enhancement**

[R2-2504596](file:///D:\3GPP\Extracts\R2-2504596%20-%20Discussion%20on%20Bj%20enhancement.docx) Discussion on Bj enhancement Ericsson, InterDigital, LG Electronics, Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1 Bj enhancement shall be incorporated in the Rel19 LCP enhancements to achieve the most flexible and high performing LCP solution.

Proposal 2 Implement the TP provided in Appendix 1.

[R2-2503522](file:///D:\3GPP\Extracts\R2-2503522%20LCP%20Enhancements%20for%20XR.docx) LCP Enhancements for XR Ofinno discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1 Confirm the working assumption “No Bj enhancement is introduced” as an agreement.

DISCUSSION:

* Nokia thinks E///’s TP does not solve the issue. There are more complex proposals, but Nokia would not like to pursue them.
* Lenovo supports Ericsson approach.
* Nokia indicates that with current TP it will be applied to all LCHs, even without adjusted priority.
* Apple thinks the purpose of LCP is to ensure QoS and fairness. From fairness point of view, the proposed approach is not appropriate.
* CATT thinks there are some benefits shown in simulation results and the TP is simple.
* Fujitsu also support the proposal from Ericsson, fairness is slightly impacted but this is to ensure high priority data gets transmitted.
* Huawei agrees that this will go against fairness with the current design. We probably need more elaborate solution to control when negative Bj can be considered.
* Xiaomi thinks what we have already is sufficient, no need to pursue this. Samsung agrees.
* Ericsson thinks it can be configurable only for some LCHs.
* Confirm the working assumption “No Bj enhancement is introduced” as an agreement.

[R2-2503475](file:///D:\3GPP\Extracts\R2-2503475%20Remaining%20issues%20on%20LCP%20enhancement%20for%20XR.docx) Remaining issues on LCP enhancement for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503509](file:///D:\3GPP\Extracts\R2-2503509%20XR%20LCP.docx) Open Issues on LCP Enhancements Sharp discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503622](file:///D:\3GPP\Extracts\R2-2503622_On%20Bj%20adjustments%20for%20LCH%20priority-adjusted%20data%20transmission.docx) Discussion on Bj adjustments for LCH priority-adjusted data transmission vivo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503654](file:///D:\3GPP\Extracts\R2-2503654%20%20Discussion%20on%20LCP%20enhancements%20of%20XR%20traffic.doc) Discussion on LCP enhancements of XR traffic Xiaomi Communications discussion

[R2-2503793](file:///D:\3GPP\Extracts\R2-2503793%20Discussion%20on%20Remaining%20Issues%20of%20LCP%20Enhancements.docx) Discussion on Remaining Issues of LCP Enhancements China Telecom discussion Rel-19

[R2-2503883](file:///D:\3GPP\Extracts\R2-2503883_Remaining%20issues%20on%20LCP%20enhancements.docx) Remaining issues on LCP enhancements NEC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503891](file:///D:\3GPP\Extracts\R2-2503891.docx) Open issues on Intra-UE prioritization/LCP enhancements Lenovo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503957](file:///D:\3GPP\Extracts\R2-2503957%20Discussion%20on%20enhanced%20LCP%20for%20XR.docx) Discussion on enhanced LCP for XR ITRI discussion NR\_XR\_Ph3-Core

[R2-2503972](file:///D:\3GPP\Extracts\R2-2503972_xrLcpEnh.docx) LCP enhancements for XR ZTE Corporation, Sanechips discussion Rel-19

[R2-2504308](file:///D:\3GPP\Extracts\R2-2504308%20Discussion%20on%20remaining%20issues%20of%20LCP%20enhancements.docx) Remaining open issues on LCP in XR Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504410](file:///D:\3GPP\Extracts\R2-2504410%20LCP%20enhancements.docx) LCP Enhancements for XR Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504537](file:///D:\3GPP\Extracts\R2-2504537_Discussion%20on%20LCP%20enhancements%20for%20XR.docx) discussion on LCP enhancements for XR ETRI discussion Rel-19

[R2-2504608](file:///D:\3GPP\Extracts\R2-2504608%20-%20Discussion%20on%20LCP%20enhancement.docx) Discussion on LCP enhancement Ericsson discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504619](file:///D:\3GPP\Extracts\R2-2504619%20Finalising%20LCP%20design%20for%20XR%20Ph3.docx) Finalising LCP design for XR Ph3 Samsung R&D Institute UK discussion

#### 8.7.4.2 DSR enhancements

Further details of enhanced DSR configuration/procedure, data volume calculation etc.

**Handling of Control PDUs and retransmission PDUs (PDCP-1, RLC-5)**

[R2-2503556](file:///D:\3GPP\Extracts\R2-2503556%20Discussions%20on%20DSR%20enhancements.docx) Discussions on DSR enhancements Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2: Both PDCP and RLC consider Control PDU and/or retransmitted data into the shortest configured reporting threshold.

Proposal 3: The value of the remaining time field in the enhanced DSR MAC CE is set to 0, if there are only control PDUs and/or retransmitted data to be reported for the shortest configured reporting threshold of the LCG.

[R2-2503834](file:///D:\3GPP\Extracts\R2-2503834%20(R19%20NR%20XR%20AI8742)%20DSR%20enhancements%20for%20UL%20scheduling.docx) DSR enhancements for UL scheduling InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3: The additional delay critical data amount from control PDUs and re-transmission data is included into the smallest reported threshold in the new DSR MAC CE.

DISCUSSION:

* LGE thinks that Fujitsu’s approach is simpler. OPPO agrees.
* OPPO thinks we also need to discuss whether this is per LCH or per LCG in case of following IDT’s proposal.
* Apple would like not to complicate data volume calculation any further. Would like to avoid having to update the volume for thresholds depending on when the grant arrives. It is better to just use smallest configured threshold.
* Huawei does not see additional complexity as UE anyway needs to determine smallest reporting threshold, because there is always some data. Would also like to avoid C-PDU only case which can happen with Fujitsu proposal.
* Ofinno thinks that in case of Fujitsu’s approach we need to send unnecessary DSR at times.
* Samsung supports Fujitsu’s approach as it allows to avoid inter-layer interactions.
* Xiaomi shares view with Huawei. With IDT approach we can guarantee to only send DSR when there is data available. Does not see additional complexity as PDCP needs to just send indication to MAC about C-PDUs and data.
* QCM echoes Apple’s comments, would not like to optimize.
* Nokia also would like to avoid additional entry in the DSR. Nokia hopes that we do not send DSR for LCG when there is no data in this LCG.
* Sharp does not see additional complexity as data volume calculation needs to take place anyway and IDT’s proposal saves overhead.
* CMCC agrees with IDT and sees no additional complexity. Lenovo also agrees.
* CATT thinks this is matter of taste.
* LGE thinks both options work and there is complexity vs overhead trade-off between them.
* Ericsson is fine with both options. Ericsson think overhead is a corner case.
* Both PDCP and RLC consider Control PDU and/or retransmitted data into the shortest configured reporting threshold.
* The value of the remaining time field in the enhanced DSR MAC CE is set to 0, if there are only control PDUs and/or retransmitted data to be reported for the shortest configured reporting threshold of the LCG.
* An understanding is that there will be no DSR with no data indication (i.e. indicating only volume of C-PDU and/or retransmissions for any LCG)

**Threshold configuration for R19 DSR (RRC-7)**

[R2-2503973](file:///D:\3GPP\Extracts\R2-2503973_xrDsrEnh.docx) DSR enhancements for XR ZTE Corporation, Sanechips discussion Rel-19

Proposal 4(RRC-7): New DSR MAC CE will (always) be used when at least one LCG is configured with multiple thresholds, and not define new LC-ID for the new DSR MAC CE.

[R2-2503510](file:///D:\3GPP\Extracts\R2-2503510%20XR%20DSR.docx) Open issues on DSR Enhancements Sharp discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 9 If at least one LCG is configured with dsr-ReportingThresList, any LCG configured with a triggering threshold shall be configured with at least one reporting threshold.

DISCUSSION:

* Huawei thinks that we do not have to configure all LCGs with reporting thresholds which is aligned with ZTE’s proposal.
* Ofinno thinks we need to configure all LCGs with the thresholds as otherwise we need to fall back to legacy DSR.
* IDT agrees we do not have to configure multiple thresholds for all LCGs, we can use triggering threshold as reporting threshold. IDT thinks we can use a new LCID, no need to optimize.
* Nokia also thinks we do not have to configure reporting thresholds for all LCGs. This means we will use R18 way of data calculation for these LCGs but still use new DSR format.
* LGE thinks we should not consider triggering threshold as reporting threshold. What Nokia suggest is possible but may complicate MAC specs.
* Nokia thinks there is no impact to MAC or PDCP.
* QCM thinks it’s cleaner if we separate triggering and reporting thresholds.
* Samsung think from signalling point of view it makes no sense to configure multiple thresholds with the same value. No need to reuse LCID as proposed by ZTE.
* Sharp thinks that this is just RRC signalling.
* Ofinno think it is simpler to configure them separately.
* Fujitsu also prefers to have a principle that we always have reporting thresholds for all LCGs when we use R19 DSR.
* Nokia thinks that intention was always to only configure reporting thresholds when they are different from triggering thresholds, otherwise we could agree that we always configure multiple.
* (RRC-7) If at least one LCG is configured with dsr-ReportingThresList, any LCG configured with a triggering threshold shall be configured with at least one reporting threshold.
* New LCID is used for R19 DSR

**DSR cancellation in DC configuration (MAC-03)**

[R2-2503366](file:///D:\3GPP\Extracts\R2-2503366%20Discussion%20on%20DSR%20enhancements.docx) Discussion on DSR enhancements Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

Observation 1. In DC, no enhancements are needed when a pending DSR is canceled because all its associated PDCP SDUs have been discarded or included in a MAC PDU.

Proposal 2. [MAC-03] For Rel-19, define an optional UE capability, which is per band combination, for the support of canceling pending DSRs in both MAC entities when an associated DSR MAC CE is sent in one of the MAC entities.

Proposal 3. [MAC-03] For UEs that support the capability defined in Proposal 1, network configures UE whether it shall cancel pending DSRs in both MAC entities when an associated DSR MAC CE is sent in one of the MAC entities.

[R2-2503476](file:///D:\3GPP\Extracts\R2-2503476%20Remaining%20issues%20on%20DSR%20enhancement%20for%20XR.docx) Remaining issues on DSR enhancement for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 5. For DC case, no further enhancements on DSR due to transmission of DSR MAC CE in the other MAC entity and this DSR MAC CE with the delay information of all the PDCP SDUs associated with the DSR.

Proposal 6. For Rel-19, cancel the DSR when a MAC PDU is transmitted in any MAC entity and this MAC PDU includes all the PDCP SDUs associated with the DSR.

DISCUSSION:

* Xiaomi thinks that P6 from LG is not needed, i.e. for case of MAC PDU being transmitted does not have to be addressed. Also does not see big issue for the case mentioned by QCM.
* Nokia supports LG’s proposals. For case in P5, this can be controlled by data split threshold. Nokia thinks clarification is needed for the other case, as mentioned by LG in P6.
* Huawei thinks that MAC entities handle their own procedures.
* Samsung prefers not to optimize, LG’s approach makes more sense.
* LGE thinks there were different views on whether P6 is already in current specs, hence they propose to clarify.
* QCM thinks that coordination between MAC entities is not possible. But MAC entity can see that the data volume is zero and it can cancel. Xiaomi, Ericsson agrees.
* (MAC-03) For DC case, no further enhancements on DSR due to transmission of DSR MAC CE in the other MAC entity and this DSR MAC CE with the delay information of all the PDCP SDUs associated with the DSR.
* (MAC-03) In DC, no enhancements are needed when a pending DSR is cancelled because all its associated PDCP SDUs have been discarded or included in a MAC PDU.
* (MAC-03) An understanding is that if MAC PDU is sent in one MAC entity, then the other MAC entity will see that there is no PDCP SDU associated with DSR and will cancel the DSR.

**Capability dependency (Capability-1)**

[R2-2503453](file:///D:\3GPP\Extracts\R2-2503453%20-%20Discussion%20on%20DSR%20enhancements%20for%20XR.docx) Discussion on DSR enhancements for XR OPPO discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1 [UE Cap-1] From UE capability signalling perspective, no need to have the pre-requisite for the capability of Rel-19 DSR.

[R2-2503655](file:///D:\3GPP\Extracts\R2-2503655%20Discussion%20on%20DSR%20enhancements%20of%20XR%20traffic.doc) Discussion on DSR enhancements of XR traffic Xiaomi Communications discussion

Proposal 6 A UE supporting Rel-19 enhance DRS shall also indicate support of delayStatusReport-r18.

[R2-2503427](file:///D:\3GPP\Extracts\R2-2503427%20Consideration%20on%20DSR%20Enhancement.docx) Consideration on DSR Enhancement CATT discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503623](file:///D:\3GPP\Extracts\R2-2503623_Remaining%20issues%20on%20DSR%20enhancements%20for%20XR.docx) Remaining issues on DSR enhancements for XR vivo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503699](file:///D:\3GPP\Extracts\R2-2503699%20On%20Data%20Volume%20Calculations%20for%20Rel-19%20DSR.docx) On Data Volume Calculations for Rel-19 DSR Apple discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503794](file:///D:\3GPP\Extracts\R2-2503794%20Discussion%20on%20Remaining%20Issues%20of%20DSR%20Enhancements.docx) Discussion on Remaining Issues of DSR Enhancements China Telecom discussion Rel-19

[R2-2503885](file:///D:\3GPP\Extracts\R2-2503885_Remaining%20issues%20on%20DSR%20enhancements.docx) Remaining issues on DSR enhancements NEC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503912](file:///D:\3GPP\Extracts\R2-2503912%20DSR%20v1.docx) Enhanced delay status reporting for XR Lenovo discussion Rel-19

[R2-2504113](file:///D:\3GPP\Extracts\R2-2504113%20Discussion%20on%20DSR%20enhancements%20in%20XR_final.docx) Remaining open issues on DSR enhancements in XR Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504374](file:///D:\3GPP\Extracts\R2-2504374%20Further%20consideration%20on%20DSR%20enhancement%20for%20XR.docx) Further consideration on DSR enhancement for XR CMCC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504411](file:///D:\3GPP\Extracts\R2-2504411%20DSR%20enhancements.docx) DSR Enhancements for XR Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504435](file:///D:\3GPP\Extracts\R2-2504435%20DSR%20Enhancements.docx) Remaining Issues on DSR enhancements in Rel-19 XR Samsung discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504474](file:///D:\3GPP\Extracts\R2-2504474%20Discussion%20on%20DSR%20enhancements.docx) Discussion on DSR enhancements HONOR discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504518](file:///D:\3GPP\Extracts\R2-2504518.docx) Discussion on DSR enhancements for XR DENSO CORPORATION discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504574](file:///D:\3GPP\Extracts\R2-2504574%20Discussion%20on%20XR%20DSR%20enhancements.docx) Discussion on XR DSR enhancements III discussion NR\_XR\_Ph3-Core

[R2-2504598](file:///D:\3GPP\Extracts\R2-2504598%20-%20Discussion%20on%20DSR%20enhancements.docx) Discussion on DSR enhancements Ericsson discussion Rel-19 NR\_XR\_Ph3-Core

### 8.7.5 RLC enhancements

Further details of autonmous retransmission and enhanced polling mechanisms and unnecessary retransmission avoidance.

**Timely retransmissions**

**Excessive polling and retransmissions due to polling (RLC-8, RLC-9)**

[R2-2503624](file:///D:\3GPP\Extracts\R2-2503624_Discussion%20on%20RLC%20remaining%20issues%20for%20XR.docx) Discussion on RLC remaining issues for XR vivo discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3: (RLC-8) Similar to autonomous retransmission, polling shall only be triggered once per RLC SDU when its remaining time falls below a specified threshold.

Proposal 4: (RLC-9) No additional conditions are needed for the polling enhancement.

DISCUSSION on P3:

* LGE thinks P3 is not needed. It does not matter if multiple polls are triggered and sent. One SR will be sent anyway. Supports P4.
* Vivo clarifies that after reviewing specification, they share understanding from LGE.
* LGE also thinks P3 causes issues in case of RLC segmentation.
* Xiaomi supported original P3 to limit the polling. IDT has similar concerns.
* LGE clarifies that the second poll is due to remaining time condition while the first one was due to legacy conditions. Thinks we do not have to do anything about this.
* Huawei agrees with LGE and prefers not to agree P3.
* Lenovo wonders whether we need to specify that enhanced polling will normally be triggered before autonomous retransmission.
* (RLC-8) We just keep the current specifications for polling triggering, i.e. no need to specify that polling shall only be triggered once per RLC SDU when its remaining time falls below a specified threshold, unless an issue is identified with this
* (RLC-9) No additional conditions are needed for the polling enhancement.

**Autonomous Retransmission coexistence with ARQ (RLC-7)**

[R2-2503830](file:///D:\3GPP\Extracts\R2-2503830%20Remaining%20open%20issues%20on%20RLC%20enhancements%20for%20XR.docx) Remaining open issues on RLC enhancements for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 4. Remaining-time based RLC retransmission does not increment RETX\_COUNT, but a simple text is added in the RLC specification as in the following TP.

[R2-2503600](file:///D:\3GPP\Extracts\R2-2503600_disc_XR_RLC_KDDI.docx) Considerations on open issues for RLC enhancements KDDI Corporation (TTC) discussion

Proposal 4: RAN2 agrees that autonomous retransmissions should trigger an increment of the RETX\_COUNT.

DISCUSSION:

* Ofinno, Huawei supports KDDI proposal, it is easier to implement in the current specs.
* Samsung supports LGE because the retransmission is due to latency, not channel conditions.
* Huawei indicates it does not matter so much as there is only one auto reTx.
* QCM also supports LGE.
* Nokia agrees with Huawei, i.e. we can just follow current specifications.
* LGE emphasizes that this reTx is without SR, so it makes more technical sense not to increment. But is OK to go with KDDI proposal.
* RAN2 agrees that autonomous retransmissions should trigger an increment of the RETX\_COUNT.

**PDU set impact on timely retransmissions (PDCP-2)**

[R2-2503830](file:///D:\3GPP\Extracts\R2-2503830%20Remaining%20open%20issues%20on%20RLC%20enhancements%20for%20XR.docx) Remaining open issues on RLC enhancements for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 6. If pdu-SetDiscard is configured, remaining-time based RLC retransmission and polling are triggered for all SDUs in the PDU set.

Proposal 7. If PSI based SDU discard is activated, remaining-time based RLC retransmission is not triggered.

[R2-2503439](file:///D:\3GPP\Extracts\R2-2503439.docx) RLC AM retransmission enhancements Xiaomi discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 6: (PDCP-2) The UE shall trigger remaining-time-based RLC retransmission and polling in PDCP PDU level, no matter pdu-SetDiscard is configured or not. No specification change is needed.

DISCUSSION on PDCP-2:

* Ericsson share understanding with Xiaomi.
* Ofinno also agrees with Xiaomi, because each PDU can trigger this separately, we do not have to rely on other PDUs from PDU set.
* QCM suggests an alternative way of capturing LGE’s proposal by keeping the remaining timer per SDU, but redefining the remaining time to per PDU set.
* CMCC thinks auto reTX should only refer to high importance PDUs.
* Lenovo has sympathy for Xiaomi’s proposal as there should be no long intervals between PDUs. Nokia agrees.
* LGE thinks that with Xiaomi’s proposal we are more likely to fail to meet PSDB requirement.

DISCUSSION on P7 from LGE paper:

* Futurewei tends to support LGE’s proposal but it may be too restrictive. FTW thinks that for high importance packets it can still be used. We can add the condition that low importance discard timer is non-zero.
* (PDCP-2) The UE shall trigger remaining-time-based RLC retransmission and polling in PDCP SDU level, no matter pdu-SetDiscard is configured or not. No specification change is needed.
* Autonomous retransmission and polling is triggered only based on discardTimer, i.e. not based on discardTimerForLowImprotance

**Configuration clarifications (RRC-8)**

[R2-2504666](file:///D:\3GPP\Extracts\R2-2504666%20RLC%20enhancements.docx) RLC enhancements Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core [R2-2503566](file:///D:\3GPP\Extracts\R2-2503566%20RLC%20enhancements.docx)

Proposal 2 (RRC-8): the remaining time thresholds (for both autonomous retransmission and polling) are configured per PDCP entity.

* QCM thinks the granularity can be similar to DSR. Different paths can have different RTT so it makes sense to keep this per RLC.
* Lenovo also prefers to have per RLC entity, also DSR is per LCG so we can align this.
* Ericsson has sympathy for Nokia view as PDCP uses this timer, so not sure how we can have different timers for different RLC entities.
* LGE agrees with Nokia’s proposal.
* Apple indicates that several meetings ago Apple raise the same issue for LCP enhancements and we sticked to per RLC, so we can also do this per RLC.
* LGE thinks that LCP and DSR are different as these are MAC features, but here we speak of RLC features.
* Samsung also prefers PDCP, this will simplify the mechanism.
* QCM indicates all parameters are anyway in RRC. Different RLC entities can correspond to different carriers (e.g. in FR1 and FR2), so there is different RTT.
* KDDI prefers simpler configuration.
* Nokia thinks that it will be simpler as having it at PDCP allows us to avoid impact on DC.
* The remaining time thresholds (for both autonomous retransmission and polling) are configured per PDCP entity.

**Auto reTx and polling applicability for low importance SDUs (RRC-3, RRC-4)**

[R2-2503913](file:///D:\3GPP\Extracts\R2-2503913%20%20AM%20RLC%20enhancement%20v1.docx) AM RLC enhancement Lenovo discussion Rel-19

Proposal 4. (RLC-9) If PSI based-discard is activated, the discardTimerforLowImportance is not considered for autonomous retransmission and/or enhanced polling.

**Unnecessary retransmission avoidance**

**Impact on RLF (RLC-6)**

[R2-2503493](file:///D:\3GPP\Extracts\R2-2503493%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 1 (RLC-6) RAN2 to discuss whether/how to solve RLC-based RLF miss-detection issue (i.e., maxRetxThreshold cannot be reached) caused by in-flight PDU discard enhancement.

[R2-2503624](file:///D:\3GPP\Extracts\R2-2503624_Discussion%20on%20RLC%20remaining%20issues%20for%20XR.docx) Discussion on RLC remaining issues for XR vivo discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 8: (RLC-6) RAN2 should discuss the following approaches for triggering RLF when avoiding unnecessary retransmission is enabled:

- Approach 1: Triggering RLF when the RLC entity receives consecutive N SDU discard indications from the PDCP entity.

- Approach 2: Triggering RLF when the RLC entity receives a total of N SDU discard indications from the PDCP entity within the configured time window.

[R2-2503428](file:///D:\3GPP\Extracts\R2-2503428%20Further%20Consideration%20on%20XR-specific%20RLC%20Enhancement.docx) Further consideration on XR-specific RLC Enhancement CATT discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 5: (RLC-6) There is no specification impact foreseen for RLF.

DISCUSSION:

* Ofinno indicates that in this case increment would not be due to bad channel conditions, so no enhancement is needed.
* Huawei supports proposal from CATT, it is not critical to address it.
* Lenovo also ado not think any special handling is needed. The packets might not have been even transmitted, so makes no sense to trigger RLF.
* LGE also support CATT proposal, there are other ways to detect bad channel conditions. We should not increment if there was no transmission.
* Apple thinks we should not trigger RLF due to discarded packets. No enhancement is needed.
* MTK, Sharp agrees and also thinks other RLF triggers will kick in.
* (RLC-6) There is no specification impact foreseen for RLF triggering due to RLC maximum retransmission.

**No SDU to retransmit the poll with (RLC-11)**

[R2-2503507](file:///D:\3GPP\Extracts\R2-2503507%20Discussion%20on%20RLC%20Enhancements%20for%20XR.docx) Discussion on RLC Enhancements for XR Samsung discussion Rel-19

Proposal 1: When the indicated RLC SDU for discard has a sequence number equal to POLL\_SN and all other RLC SDU(s) with sequence number < POLL\_SN is already acknowledged or discarded, stop and reset t-PollRetransmit, if running. (Adopt TP 1)

[R2-2504666](file:///D:\3GPP\Extracts\R2-2504666%20RLC%20enhancements.docx) RLC enhancements Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core [R2-2503566](file:///D:\3GPP\Extracts\R2-2503566%20RLC%20enhancements.docx)

Proposal 7 (RLC-11): If the transmitting window is stalled when t-PollRetransmit expires, the poll is re-sent in a retransmitted SDU, even if only SDUs discarded by PDCP are buffered.

Proposal 8 (RLC-11): When an RLC ACK or a PDCP-discard indication for an SDU is received, if the transmitting window is not stalled, t-PollRetransmit is stopped if, after the reception, all SDUs previously submitted to lower layer have been either ACKed or their transmissions have been stopped due to discard indication from PDCP.

DISCUSSION:

* Huawei supports Nokia’s proposal, it is important to avoid window stalling.
* Ericsson asks whether this is actually current behavior that when window is stalled then we choose any PDU.
* Sharp agrees window stalling should be addressed and support Nokia’s proposal.
* OPPO thinks in case all PDUs are discarded then poll is useless. OPPO understand companies thought there was no window stalling issue.
* LGE indicates that in case the buffer is empty there is no issue. But in case some PDUs are stuck in the buffer there can be problem. But this is corner case.
* Samsung indicates there is a timer at Rx, so an SR will be sent anyway. Ericsson agrees with LGE.
* Sharp think that even if this is corner case, it has critical consequences, that is why we handle it specifically in legacy case.
* Ericsson thinks it is different than legacy because SR will be sent anyway.
* LGE think even Samsung’s proposal is not needed, we can keep current running CR.
* Vivo agrees with LGE.
* Working assumption: (RLC-11) No need to address window stalling issue with polling retransmission (TBC next meeting)
* Assumption from companies is that this should not happen due to SR triggering from Rx side, but it needs to be checked whether this will always work

**Capability or capabilities (Capability-2)**

[R2-2504342](file:///D:\3GPP\Extracts\R2-2504342_Discussion%20on%20UE%20Capabilities%20for%20Unnecessary%20Retransmission%20Avoidance.docx) Discussion on UE Capabilities for Unnecessary Retransmission Avoidance Ericsson, Qualcomm Incorporated, ZTE Corporation, MediaTek Inc., Xiaomi discussion Rel-19

Proposal 1 Define an (optional) per-UE capability with signalling for the Rx-side aspect, where an outdated SDU is abandoned based on a new RLC timer and the abandoned SDUs are positively acknowledged in an RLC status report.

Proposal 2 Define an (optional) per-UE capability with signalling for the Tx-side aspect, where the Tx side stops transmissions for an outdated SDU based on an indication from the PDCP. A UE supporting this feature shall also indicate the support of Rx-side aspect.

* OPPO thinks we do not have mandate UE supporting Tx side to also support Rx side. Vivo agrees.
* LGE thinks Tx side requires Rx side, otherwise we can have window stalling issue we just discussed. LGE supports the proposals.
* OPPO indicates that this is for UL so SR is triggered by the network.
* Define an (optional) per-UE capability with signalling for the Rx-side aspect, where an outdated SDU is abandoned based on a new RLC timer and the abandoned SDUs are positively acknowledged in an RLC status report.
* Define an (optional) per-UE capability with signalling for the Tx-side aspect, where the Tx side stops transmissions for an outdated SDU based on an indication from the PDCP. FFS A UE supporting this feature shall also indicate the support of Rx-side aspect.

**Impact of discard on PDCP SN gap report (RLC-12)**

R2-2503507 Discussion on RLC Enhancements for XR Samsung discussion Rel-19

Proposal 3: RAN2 agree to the following approach in order to address PDCP SN gap reporting for AM DRBs during mobility (Adopt TP 3):

- For AM DRBs configured by upper layers to send a PDCP SN gap report in the uplink, when a PDCP SN gap report was previously transmitted during mobility but its successful delivery has not been confirmed by lower layers, the transmitting PDCP entity triggers a PDCP SN gap report that includes the same set of previously discarded PDCP SDUs, apart from newly discarded PDCP SDUs, if any.

- A separate configuration “sn-GapReportMobility” is used for R19 AM DRBs for this purpose to distinguish from the legacy configuration.

[R2-2503830](file:///D:\3GPP\Extracts\R2-2503830%20Remaining%20open%20issues%20on%20RLC%20enhancements%20for%20XR.docx) Remaining open issues on RLC enhancements for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 8. No enhancement is needed for PDCP SN gap report handling during UE mobility.

Proposal 9. If the proposal 8 is not agreeable, the UE retransmits a PDCP SN gap report when an SDU indicated in a previous SN gap report is negatively acknowledged in a PDCP status report.

**Configuration clarifications (RLC-10)**

[R2-2503830](file:///D:\3GPP\Extracts\R2-2503830%20Remaining%20open%20issues%20on%20RLC%20enhancements%20for%20XR.docx) Remaining open issues on RLC enhancements for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2. Add RRC configuration guidance for the stopReTxObsoleteSDU and t-RxDiscard, i.e., if stopReTxObsoleteSDU is configured, the t-RxDiscard is configured at the peer receiving entity.

[R2-2503439](file:///D:\3GPP\Extracts\R2-2503439.docx) RLC AM retransmission enhancements Xiaomi discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2: (RLC-10) It is up to network implementation on whether to configure stopReTxDiscardedSDU / t-RxDiscard and related network behavior.

[R2-2503367](file:///D:\3GPP\Extracts\R2-2503367%20Discussion%20on%20RLC%20enhancements.docx) Discussion on RLC enhancements Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503511](file:///D:\3GPP\Extracts\R2-2503511%20XR%20RLC.docx) Open Issues on RLC Enhancements Sharp discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503557](file:///D:\3GPP\Extracts\R2-2503557_xr_rlc.doc) Discussions on RLC enhancements Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503566](file:///D:\3GPP\Extracts\R2-2503566%20RLC%20enhancements.docx) RLC enhancements Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

=> Revised to [R2-2504666](file:///D:\3GPP\Extracts\R2-2504666%20RLC%20enhancements.docx)

[R2-2503635](file:///D:\3GPP\Extracts\R2-2503635%20%20Discussion%20on%20RLC%20AM%20Enhancements.docx) Discussion on RLC AM Enhancements CANON Research Centre France discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503700](file:///D:\3GPP\Extracts\R2-2503700%20Views%20on%20Avoidance%20of%20Unnecessary%20RLC%20Retransmissions.docx) Views on Avoidance of Unnecessary RLC Retransmissions Apple discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503701](file:///D:\3GPP\Extracts\R2-2503701%20Discussions%20on%20Fast%20RLC%20Retransmission.docx) Discussions on Fast RLC Retransmission Apple discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503795](file:///D:\3GPP\Extracts\R2-2503795%20Discussion%20on%20Remaining%20Issues%20of%20RLC%20AM%20Enhancements.docx) Discussion on Remaining Issues of RLC AM Enhancements China Telecom discussion Rel-19

[R2-2503818](file:///D:\3GPP\Extracts\R2-2503818%20Details%20on%20XR%20RLC%20autonomous%20retransmission.docx) Details on XR RLC autonomous retransmission Quectel discussion

[R2-2503835](file:///D:\3GPP\Extracts\R2-2503835%20(R19%20NR%20XR%20AI875)%20RLC%20enhancement.docx) Discussion on RLC enhancements InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503974](file:///D:\3GPP\Extracts\R2-2503974_xrRlcEnh.docx) RLC enhancements for XR ZTE Corporation, Sanechips discussion Rel-19

[R2-2504032](file:///D:\3GPP\Extracts\R2-2504032.docx) Remaining issues on RLC AM enhancement NEC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504056](file:///D:\3GPP\Extracts\R2-2504056_8.7.5%20XR_RLC_v3.docx) Timely retransmissions for RLC AM Sony, Canon discussion Rel-19 NR\_XR\_Ph3

[R2-2504118](file:///D:\3GPP\Extracts\R2-2504118%20Discussion%20on%20RLC%20AM%20enhancements_final.docx) Discussion on RLC AM enhancements Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504401](file:///D:\3GPP\Extracts\R2-2504401.docx) Discussion on the left issue of RLC enhancements CMCC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504475](file:///D:\3GPP\Extracts\R2-2504475%20Discussion%20on%20RLC%20enhancements.docx) Discussion on RLC enhancements HONOR discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504519](file:///D:\3GPP\Extracts\R2-2504519.docx) Discussion on RLC enhancements DENSO CORPORATION discussion Rel-19 NR\_XR\_Ph3-Core

### 8.7.6 XR rate control

Further details of XR rate control, e.g. configuration, MAC CE design, table design etc.

**Single or multiple QoS flows (MAC-05)**

[R2-2503429](file:///D:\3GPP\Extracts\R2-2503429_Discussion%20on%20XR%20Rate%20Control.docx) Discussion on XR Rate Control CATT discussion Rel-19 NR\_XR\_Ph3-Core

Proposal : (MAC-05) RAN2 follows the legacy design not to introduce the flexibility MAC CE format in Rel-19 XR.

[R2-2504476](file:///D:\3GPP\Extracts\R2-2504476%20Discussion%20on%20XR%20rate%20control.docx) Discussion on XR rate control HONOR discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2: (MAC-05) XR rate control MAC CE can comprise multiple QoS flows.

DISCUSSION:

* Ofinno supports having multiple QoS flows.
* Xiaomi thinks multiple QoS flows complicates the design.
* Ericsson also has concerns with multiple QoS flows.
* ZTE thinks single QoS flow is sufficient.
* Nokia thinks we need to clarify if these multiple QoS flows belong to the same LCH/LCG.
* Lenovo thinks QoS flows may belong to different services and we can further discuss how they are indicated.
* Ericsson thinks the point was to indicate for a particular QoS flow.
* LGE thinks one characteristic of XR service is multiple QoS flows with different QoS requirements. With single QoS flow MAC CE, NW needs to send multiple MAC CEs.
* The main question is how often we will use multiple QoS and for XR service it is common.
* Nokia thinks we need to consider overhead and multiple QoS flow MAC CE allows to achieve this.
* (MAC-05) XR rate control MAC CE can comprise multiple QoS flows (which may belong e.g. to different LCHs) unless it becomes very complicated to specify.

**ID for flow identification (MAC-04)**

[R2-2503889](file:///D:\3GPP\Extracts\R2-2503889_Uplink%20rate%20control%20for%20XR.docx) Uplink rate control for XR NEC discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3: [MAC-04] RAN2 agrees to indicate “QFI + DRB ID” in the new recommended bit rate MAC CE.

[R2-2503429](file:///D:\\3GPP\\Extracts\\R2-2503429_Discussion%20on%20XR%20Rate%20Control.docx" \o "D:3GPPExtractsR2-2503429_Discussion on XR Rate Control.docx) Discussion on XR Rate Control CATT discussion Rel-19 NR\_XR\_Ph3-Core

Proposal : (MAC-04) RAN2 uses the PDU session ID and QoS Flow ID to indicate per QoS flow level recommended bit rate in Rel-19 as baseline.

Proposal : (MAC-04) RAN2 further discusses whether any optimize for the overhead is needed.

[R2-2503558](file:///D:\3GPP\Extracts\R2-2503558%20Discussions%20on%20XR%20rate%20control.docx) Discussions on XR rate control Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 4: In the rate control MAC CE, the index (indices) of the QoS flows is included, e.g., via a bitmap.

Proposal 5: The index in the rate control MAC CE can be configured by network based on the QoS flow ID and the PDU session ID, or the mapping between the index in the rate control MAC CE and the QoS flow ID and the PDU session ID can be pre-defined.

**DL rate control (MAC-11)**

[R2-2503512](file:///D:\3GPP\Extracts\R2-2503512%20XR%20Rate%20Control.docx) Open Issues on Rate Control Sharp discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1 Rel-19 Rate Control MAC CE can be used for DL as well as UL.

[R2-2504375](file:///D:\3GPP\Extracts\R2-2504375%20Further%20consideration%20on%20XR%20rate%20control%20and%20query.docx) Further consideration on XR rate control and query CMCC discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2: RAN2 will not specify DL rate control and DL rate control query.

**Procedure details and prohibit timer configuration (RRC-1, MAC-08, MAC-10)**

[R2-2503440](file:///D:\3GPP\Extracts\R2-2503440.docx) XR rate control Xiaomi discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 6: (RRC-1) The granularity of bit rate query prohibit timer is QoS flow.

Proposal 7: (MAC-08, MAC-10) Legacy Recommended bit rate query procedure (i.e. triggering, multiplexing, cancellation, prohibit timer) is used as baseline for bit rate query, with the change of logical channel to QoS flow.

**Available bit rate query (MAC-12)**

[R2-2503523](file:///D:\3GPP\Extracts\R2-2503523%20XR%20Rate%20Control.docx) XR Rate Control Ofinno discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1[MAC-12] RAN2 to discuss and down-select one of the following options to indicate that the bit rate query is for an available bit rate with no desired bit rate:

Option 1: Use a specific index (e.g., index 0 or a reserved index) in the bit rate table:

The specific index (e.g., index 0 or reserved index) in the bit rate table specifically to indicate a query for an available bit rate with no desired bit rate.

Option 2: Introduce a single-bit field/flag in the Rate Control MAC CE:

The single-bit field/flag can indicate whether the UE queries an available bit rate with no desired bit rate or queries an available bit rate by indicating a desired bit rate.

Option 3: Introduce an additional Rate Control MAC CE format which does not include bit rate field.

[R2-2503831](file:///D:\3GPP\Extracts\R2-2503831%20Remaining%20open%20issues%20on%20rate%20control%20signaling%20for%20XR.docx) Remaining open issues on rate control signaling for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 6. The index 0 in the new bit rate table does not have a special meaning, i.e., indicate 0 bit rate or make it reserved bit.

Proposal 7. The available bit rate query is not supported and the bit rate query from the UE always includes a desired bit rate.

**Impact of Dual-Connectivity (MAC-9)**

[R2-2503889](file:///D:\3GPP\Extracts\R2-2503889_Uplink%20rate%20control%20for%20XR.docx) Uplink rate control for XR NEC discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 5: [MAC-09] RAN2 considers the following solutions to apply the indicated recommended bit rate for a QoS flow in DC:

- For PDCP duplication, the UE may not be expected to go beyond the recommended bit rate of min (recommended bit rate 1, recommended bit rate 2) for the QoS flow.

- For split transmission, the recommended bit rate for a QoS flow may be applied to the cells or cell groups where the MAC CE is received.

[R2-2504119](file:///D:\3GPP\Extracts\R2-2504119%20Discussion%20on%20XR%20rate%20control_final.docx) Discussion on XR rate control Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 8: (MAC-09) RAN2 to capture a NOTE that each Rate Control MAC CE indicates the recommended bit rate for the service corresponding to the QoS flow.

Proposal 9: (MAC-09) RAN2 to leave the issue of Rate Control in DC to NW implementation or RAN3 discussion.

[R2-2503368](file:///D:\3GPP\Extracts\R2-2503368%20Discussion%20on%20XR%20rate%20control.docx) Discussion on XR rate control Qualcomm Incorporated, MediaTek Inc. discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503558](file:///D:\3GPP\Extracts\R2-2503558%20Discussions%20on%20XR%20rate%20control.docx) Discussions on XR rate control Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503625](file:///D:\3GPP\Extracts\R2-2503625_Discussion%20on%20remaining%20issues%20of%20XR%20rate%20control.doc) Discussion on remaining issues of XR rate control vivo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503702](file:///D:\3GPP\Extracts\R2-2503702%20Views%20on%20Remaining%20Issues%20of%20XR%20Uplink%20Rate%20Control.docx) Views on Remaining Issues of XR Uplink Rate Control Apple discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503796](file:///D:\3GPP\Extracts\R2-2503796%20Discussion%20on%20Remaining%20Issues%20of%20XR%20Rate%20Control.docx) Discussion on Remaining Issues of XR Rate Control China Telecom discussion Rel-19

[R2-2503836](file:///D:\3GPP\Extracts\R2-2503836%20(R19%20NR%20XR%20AI876)%20Discussion%20on%20UL%20congestion%20signaling.docx) Discussion on UL congestion signaling InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2503975](file:///D:\3GPP\Extracts\R2-2503975_XR%20rate%20control.docx) XR Rate control details ZTE Corporation, Sanechips discussion Rel-19

[R2-2504000](file:///D:\3GPP\Extracts\R2-2504000%20-%20Discussion%20on%20XR%20Rate%20Control.docx) Discussion on XR Rate Control OPPO discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504343](file:///D:\3GPP\Extracts\R2-2504343_More%20Views%20on%20XR%20Rate%20Control.docx) More Views on XR Rate Control Ericsson discussion Rel-19

[R2-2504434](file:///D:\3GPP\Extracts\R2-2504434%20UL%20rate%20control.docx) Discussion on UL rate control for Rel-19 XR Samsung discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2504457](file:///D:\3GPP\Extracts\R2-2504457%20Closing%20the%20loop%20on%20XR%20rate%20control.docx) Closing the Loop on XR Rate Control Nokia, Nokia Shanghai Bell discussion NR\_XR\_Ph3-Core

[R2-2504599](file:///D:\3GPP\Extracts\R2-2504599.docx) XR Rate Control Lenovo discussion NR\_XR\_Ph3-Core

## 8.18 LTE-based 5G Broadcast

(LTE\_terr\_bcast\_Ph2; leading WG: RAN1; REL-19; WID RP-250794)

Time budget: 0.25 TU

Tdoc Limitation: 1 tdoc

### 8.18.1 Organizational

Incoming LS, rapporteur input, running CRs, etc.

### 8.18.2 Other

RAN2 signalling impacts to support time-frequency interleavers.

**Baseline signalling design**

[R2-2504260](file:///D:\3GPP\Extracts\R2-2504260%20LTE-based-5GB.docx) RAN2 impacts to support time-frequency interleavers for LTE-based 5G Broadcast Phase 2 Qualcomm Incorporated, EBU discussion Rel-19 LTE\_terr\_bcast\_Ph2-Core

Proposal 1: Wait for RAN1 for the down-selection regarding the configuration for time interleaving transmission.

Proposal 2: Wait for RAN1 for the candidate values of the new MCH scheduling period(s).

Proposal 3: Introduce a field to indicate TBS scaling factor (i.e. N) with candidate values {2,4,8,16,ffs}.

Proposal 4: Introduce a field to indicate the separation between two transmissions of the same TB (i.e. M) with candidate values {4,8,16,32,ffs}.

Proposal 5: Presence of the parent IE containing fields for N and M indicates time interleaving is enabled.

Proposal 6: Introduce a flag to indicate whether frequency interleaving for MTCH is enabled.

* QCM indicates RAN already agreed per PMCH configuration.
* ZTE thinks there may be some MAC impacts.
* Huawei asks whether we need to agree those or we just wait for L1 parameter list.
* Samsung thinks we need to align terminology with RAN1.
* Huawei thinks that for P6 RAN1 is still discussing whether flag is needed. For P6 we can wait for RAN1.
* RAN2 assumes the following needs to be specified in RRC, but the final parameters/values/structure/terminology needs to be confirmed based on L1 parameters list from RAN1:
  + - Follow RAN1 agreement (i.e. per PMCH configuration) on the configuration for time interleaving transmission.
    - Wait for RAN1 for the candidate values of the new MCH scheduling period(s).
    - Introduce a field to indicate TBS scaling factor (i.e. N) with candidate values {2,4,8,16,ffs}.
    - Introduce a field to indicate the separation between two transmissions of the same TB (i.e. M) with candidate values {4,8,16,32,ffs}.
    - Presence of the parent IE containing fields for N and M indicates time interleaving is enabled.
    - FFS (pending RAN1 decision): Introduce a flag to indicate whether frequency interleaving for MTCH is enabled.

**Co-existence with legacy MBMS and MAC impacts**

[R2-2503506](file:///D:\3GPP\Extracts\R2-2503506%20Configuration%20and%20scheduling%20aspects%20for%20LTE-based%205G%20Broadcast%20Phase%202.docx) Configuration and scheduling aspects for LTE-based 5G Broadcast Phase 2 Samsung discussion Rel-19

Proposal 1: Co-existence for legacy and R19 transmission and UEs is achieved with defining R19 PMCHs to cater to Time Interleaving based configurations, scheduling and transmissions in addition to legacy PMCHs.

Proposal 5: RAN2 to adopt and specify minimal multiplexing enhancements for MCH reception that are applied only for scheduling of R19 PMCHs based MTCHs and include:

a) Not allowing multiplexing of two MTCHs in same subframe

b) Not applying Time interleaving to subframe carrying MSI/eMSI/MCCH

c) Not allowing multiplexing of MTCH with MSI/eMSI/MCCH in a sub-frame due to Time interleaving difference

d) Inserting and/ interpreting padding to account for remaining portion of the subframe in above scenarios

Proposal 6: RAN2 to specify the HARQ handling for Rel-19 5G Broadcast with regard to differentiating new transmission and retransmission/repetition, allowing for soft combining and addressing HARQ feedback generation aspects.

DISCUSSION on P1:

* Huawei thinks that this may also depend on L1 parameters list, but is generally OK with the proposal.
* QCM asks if the intention is to support UEs supporting TFI and not supporting TFIs in the same cell. Samsung confirms.

DISCUSSION on P5:

* QCM support the intention but the details may depend on exact configuration of TFI.
* ZTE thinks Samsung proposal is OK as MTCHs are scheduled one after another. Even with the same TFI, they should not be multiplexed together.
* Huawei agrees with ZTE. Two MTCHs are not multiplexed in the same subframe, but they can be multiplexed in one MAC PDU.
* Huawei thinks for bullet d) we need to wait for RAN1, e.g. whether we use padding or skip etc.

DISCUSSION on P6:

* ZTE thinks this is not HARQ and this seems a new enhancement.
* Huawei understands there is no such discussion in RAN1, so it is unclear why there is any impact to HARQ operation.
* Samsung clarifies that HARQ is specified in MAC, so RAN2 can handle this.
* QCM thinks RAN1 did not discuss HARQ.
* EBU thinks that HARQ enhancements do not make sense in the current MBMS design.
* We aim to support co-existence of legacy (pre-Rel19) and R19 transmission and UEs by defining R19 PMCHs to cater to Time Interleaving based configurations, scheduling and transmissions in addition to legacy PMCHs. FFS exact signalling
* RAN2 to adopt and specify minimal multiplexing enhancements for MCH reception that are applied only for scheduling of R19 PMCHs based MTCHs and may include, e.g.:

a) Not allowing multiplexing of two MTCHs in same subframe

b) Not applying Time interleaving to subframe carrying MSI/eMSI/MCCH

c) Not allowing multiplexing of MTCH with MSI/eMSI/MCCH in a sub-frame due to Time interleaving difference

d) FFS (pending RAN1 discussion): Inserting and/ interpreting padding to account for remaining portion of the subframe in above scenarios

**Impact on cell reselection**

[R2-2504075](file:///D:\3GPP\Extracts\R2-2504075%20Discussion%20on%20timefrequency%20interleavers%20for%20MBMS.docx) Discussion on time-frequency interleavers for MBMS Huawei, HiSilicon discussion Rel-19 LTE\_terr\_bcast\_Ph2

Proposal 3: UE supporting time-frequency interleaving should prioritize the cells enabling time-frequency interleaving while legacy UE shouldn’t.

DISCUSSION:

* QCM tends to agree, but is there any spec impact due to this?
* Huawei thinks we may need a new list of frequencies for the UE to prioritize (e.g. frequencies with TFI enabled).
* Samsung thinks that services will be separated, so no need to change frequency prioritization.
* ZTE thinks the proposal is assuming that the same service will be provided using both TFI and non-TFI which is not a practical scenario.
* QCM thinks this is related to co-existence issue.
* Huawei think not all deployments will always support both legacy and non-legacy services.
* FFS cell reselection impact (e.g. need to understand whether there is a practical scenario where some changes would be needed)

**UE capabilities**

[R2-2504620](file:///D:\3GPP\Extracts\R2-2504620%20Discussion%20on%20TFI%20for%205G%20Broadcast.doc) Discussion on TFI for 5G Broadcast ZTE Corporation, Sanechips discussion Rel-19 LTE\_terr\_bcast\_Ph2

Proposal 5 LS RAN3 and cc RAN1 on inquiring the feasibility to indicate the intended UE category for one specific eMBMS service from core network.

[R2-2504260](file:///D:\3GPP\Extracts\R2-2504260%20LTE-based-5GB.docx) RAN2 impacts to support time-frequency interleavers for LTE-based 5G Broadcast Phase 2 Qualcomm Incorporated, EBU discussion Rel-19 LTE\_terr\_bcast\_Ph2-Core

Proposal 7: Postpone the discussion about UE capabilities to next meeting.

[R2-2503390](file:///D:\3GPP\Extracts\R2-2503390%20Configuration%20to%20support%20LTE-based%205G%20Broadcast.docx) Configuration to support LTE-based 5G Broadcast NEC discussion Rel-19 LTE\_terr\_bcast\_Ph2

## 8.20 NR Others

Tdoc limit: 2

Specific items may be allocated to a breakout session for treatment.

Impacts from Other RAN WGs and TSGs that has no separate TU budget in RAN2. LS ins for Rel-19 specific WIs/SIs that has no RAN WI.

Additional tdocs on top of limit can be allowed for co-sourced contribution with 3 or more companies

### 8.20.2 Other WGs

*Including input for LS from S4-250739*

[R2-2503341](file:///D:\3GPP\Extracts\R2-2503341_S4-250739.docx) LS on RTP retransmission (S4-250739; contact: Nokia) SA4 LS in Rel-19 5G\_RTP\_Ph2 To:SA2, RAN2

[R2-2503567](file:///D:\3GPP\Extracts\R2-2503567%20XR%20RTP%20Retransmissions.docx) RTP Retransmissions for XR Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

Conclusion

This contribution has discussed the SA4 LS on RTP Retransmissions for XR and has observed that identifying RTX PDUs would be beneficial to the RAN and can easily be done if two QoS flows are setup (one for the source stream and another one for the retransmissions streams).

[R2-2503578](file:///D:\3GPP\Extracts\R2-2503578%20Views%20on%20LS%20on%20RTP%20retransmission%20(S4-250739).docx) Views on LS on RTP retransmission (S4-250739) CATT discussion Rel-19 5G\_RTP\_Ph2

Proposal 1: RAN2 to reply to SA4 with the following information:

1. Whether a separate QoS flow is necessary for RTP retransmission PDUs depends on how many and how often RTP PDUs need to be retransmitted, but this is not clear according to the SA4 LS.

2. It’s up to gNB implementation to map different QoS flows to same/different DRBs, and also up to gNB implementation to achieve the corresponding scheduling to fulfill the QoS requirement. No additional assistance information from application layer seems to be really necessary.

3. RAN2 work is postponed until SA2 determines what RAN enhancement is needed for mapping between QoS flow and DRB.

[R2-2504117](file:///D:\3GPP\Extracts\R2-2504117%20Discussion%20on%20LS%20S4-250739%20for%20RTP%20retransmission_final.docx) Discussion on LS S4-250739 for RTP retransmission Huawei, HiSilicon discussion Rel-19 5G\_RTP\_Ph2

Proposal 1: RAN2 to reply to SA4 that there is no additional benefit to RAN from receiving application layer retransmission information if the retransmission PDUs and the source PDUs are mapped to distinct QoS flows and no RAN impact is needed.

DISCUSSION:

* FTW thinks it is unclear what kind of packet will be retransmitted via RTP.
* Nokia thinks this is irrelevant to RAN2. Lenovo agrees and supports proposal from Huawei tdoc.
* CMCC thinks that from R2 point of view it is simplest to rely on separate QFIs.
* OPPO agrees with Huawei proposal.
* Nokia thinks maybe the proposal seems to suggest there is no benefit. ZTE has similar concern.
* ?? RAN2 thinks there is benefit for RAN to be able to distinguish initial PDUs and retransmissions (e.g. by mapping them to different QoS flows)
* ?? From RAN2 point of view this can be achieved if the retransmission PDUs and the source PDUs are mapped to distinct QoS flows as in this case no RAN impact is needed.
* [AT130][502][XR] Reply to SA4 LS on RTP retransmission (Nokia)

Scope: Discuss the reply LS considering the online discussion

Intended outcome: Agreeable reply LS in R2-2504813

Deadline: CB session on Thursday