3GPP TSG-RAN WG2 Meeting #125bis DRAFT\_R2-2403736

Changsha, China, April 15th – 19th, 2024

Source: Session chair (Huawei)

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

# AT-meeting offline discussions:

Started together with the meeting start:

* [AT125bis][600] Organizational – Session on R18 MBS, R18 QoE and R19 XR

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

Started after Tuesday online session:

* [AT125bis][601][eMBS] Updated RIL resolutions (Huawei)

Scope: Propose and review resolutions for the remaining ToDo RILs

Intended outcome: Updated RIL status

Deadline: Updated RIL list ready for endorsement on Thursday CB session

## 2.4 Instructions

Rel-17 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.

Rel-18 CR Handling

- CR editors / Rapporteurs continue to support maintenance related to their respective CR / WI and are required to follow drafting rules

- Single correction CR per spec coordinated by CR editor/rapporteurs will be agreed per feature for RAN#104

- A list of open issues is expected to be created per CR per WI and shared from CR editors/rapporteurs

- CR editors / Rapporteurs are to gather miscellaneous and non-controversial issues, if any, for their respective specification prior to submission deadline. Other companies are expected to give inputs to these CRs and not have contributions on such issues.

- Companies are should give inputs on editorials and clarifications to the CR editors/rapporteurs and not have individual CRs/contributions on such issues. Emails to CR editors/rapporteurs should follow the following naming convention when sending emails to rapporteurs:

[Pre\_RAN2#125][CR xx.yyy] Clarification CRs

- The organizational AIs for each WIs are reserved for rapporteurs only. CR rapporteurs are expected to submit only 1 CR per spec.

- For RRC corrections, only selected RIL can be submitted in the agenda (i.e. only if RRC editor suggests to discuss the RIL under this agenda)

- Companies are expected to submit Tdocs with TP (not CRs). More specifically, the Tdoc should contain description of open issues/proposal and the proposed corrections/TP in the contribution itself.. Small issues can be included in the tdoc with just short justification same level of detail as in cover sheet.

- RRC ASN.1 changes can be drafted in a NBC way until ASN.1 is frozen, to avoid unnecessary RRC overhead. The focus should be on drafting the changes in the best possible way.

- Inter-op analysis on Rel-18 CR coverpages in NOT needed

Remaining/updated Rel-18 RRC parameters and MAC CEs

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

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

Rel-18 UE capabilities

- EUTRA UE capabilities corrections are covered by separate CRs

- 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 only a draft CR per WI is expected and will be merged with the running mega CR

**ASN.1 Review**

- Please follow the instructions provided in ASN.1 review rapporteur and read section “Review execution” on what to expect for paper submission.

<https://www.3gpp.org/ftp/Email_Discussions/RAN2/%5BMisc%5D/ASN1%20review/Rel-18%202024-03>

* Contributions on WI specific RILs should be submitted under the corresponding WI specific AI and NOT in the general ASN.1 review AI (7.0.3). That AI is reserved for common/cross-WI specific identified RILs
* Title of contribution should start with [RIL number] Title, or "[RIL number1][RIL number N] Title” if there are more than one RIL in a Tdoc.
* Proposals related to RIL resolution should include RIL number in the proposal

Tdoc limitations

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

- Assigned summary rapporteur input of the summary.

- Email / offline discussions outcomes by discussion rapporteur,

- WI rapporteurs input for WI planning etc,

- TS rapporteur input for TS maintenance.

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

- Spec rapporteur list of open issues for Rel-18 items

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 doesn’t apply to Tdocs related to RILs which has been assigned during ASN.1 review. **Single Tdoc containing 1 or more RIL resolutions per WI is expected**.

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

Tdoc request/submission for RAN2#125bis deadlines:

* Tdoc Submission deadline: April 5th, 2024 1000 UTC NOTE: NO changes to titles, sourcing companies, or new additional requests are allowed past this date. This should be treated as final deadline similar to all meetings where Tdoc requests/submission deadlines are aligned.

# 7 Rel-18

## 7.11 Enhancements of NR Multicast and Broadcast Services

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

Time budget: 0 TU

Tdoc Limitation: 1 tdoc

### 7.11.1 Organizational

LS in, rapporteur input (e.g. rapporteur CR, open issues list)

[R2-2402766](D:\\3GPP\\TSGR2\\TSGR2_125bis\\docs\\R2-2402766.zip" \o "D:\3GPP\TSGR2\TSGR2_125bis\docs\R2-2402766.zip) RIL list for MBS Huawei, HiSilicon report Rel-18 NR\_MBS\_enh-Core Late

PropAgree: C151, S735, C152, L011, L010, S736, S737

PropReject: S734

* PropAgree and PropReject RIL resolutions are agreed
* For S737: RAN2 acknowledges there is mis-alignment, but thinks this should be corrected in RAN1 specifications (no need for LS)
* Companies should not resubmit rejected RILs

[R2-2402767](file:///D:\3GPP\Extracts\R2-2402767%20MBS%20Rapporteur%20CR%20for%20RRC.docx) MBS Rapporteur CR for RRC Huawei, HiSilicon CR Rel-18 38.331 18.1.0 4688 - F NR\_MBS\_enh-Core Late

* One week review after the meeting

### 7.11.2 RRC corrections

Corrections related to RILs from ASN.1 review.

**ToDo RILs (high priority)**

[R2-2402282](file:///D:\3GPP\Extracts\R2-2402282%20%5bC148%5d%5bC149%5d%5bC150%5d%20RRC%20Corrections%20for%20eMBS.docx) [C148][C149][C150] RRC Corrections for eMBS CATT, CBN, China Broadnet discussion Rel-18 NR\_MBS\_enh-Core

Proposal 1: To address RIL [C148], it is clarified that UE can only know the serving cell where the multicast service was received in RRC\_CONNECTED for active session. TP in Annex 1 is adopted.

Proposal 3: To address RIL [C150], UE triggers RRC resume if multicast MCCH is not present upon receiving group paging that indicates the multicast session activation. TP in Annex 3 is adopted.

DISCUSSION on P1 (RIL C148):

* vivo thinks TP can be simplified.
* Ericsson is OK with the clarification. The UE may not receive in CONNECTED, but it may have joined the session while in CONNECTED.
* Nokia agrees with the intention, but TP can be improved.
* RIL 148: The intention of P1 is agreeable. TP to be discussed offline

Offline to discuss exact changes to be included in the RRC CR by the rapporteur (CATT), no CB

DISCUSSION on P3 (RIL C150):

* Nokia agrees with the intention.
* Samsung thinks this only happens for MCCH-less cell, so the UE should continue in RRC INACTIVE.
* CATT thinks there are two cases, i.e. same cell as before of when the UE changed the cell. This TP is for different cell case, N104 will solve the issue for the other case.
* LGE agree with the intention, but no new solution is needed. We can rely on group paging indication.
* CATT clarifies that the TP is needed to clarify the UE behaviour.
* Vivo thinks this should be limited to UEs having all sessions stopped.
* Xiaomi thinks it is already clear from the specifications
* RIL C150: For the case where UE was previously indicated to stop monitoring all its MBS sessions: If the UE has no valid PTM configuration and receives group paging that indicates the multicast session activation, the UE triggers RRC resume if multicast MCCH is not present.

[R2-2403597](file:///D:\3GPP\Extracts\R2-2403597%20%5bN101%5d%20%5bN102%5d%20%5bN103%5d%20%5bN104%5d%20%5bN105%5d%20%5bN106%5d%20%5bN107%5d%20%5bN108%5d%5bN109%5d%20Control%20plane%20aspects%20of%20multicast%20reception%20in%20RRC_INACTIVE%20state.docx) [N101] [N102] [N103] [N104] [N105] [N106] [N107] [N108][N109] Control plane aspects of multicast reception in RRC\_INACTIVE state Nokia discussion Rel-18 NR\_MBS\_enh-Core

Proposal 3 [N102]: RAN2 discusses the following options:

1- Default values are introduced to DMRS type, DMRS additional position and max length for multicast reception in RRC\_INACTIVE state (no changes in RRC specification required, possible RAN1 change required),

a. UEs in RRC\_CONNECTED state can be provided with an indication to switch using default values via broadcast signalling.

2- RRC release/MCCH indicate DMRS type, DMRS additional position and max length for multicast reception in RRC\_INACTIVE state.

Proposal 5 [N104]: If the following conditions are satisfied, UE assumes that the network operates MCCH-less for multicast reception in RRC\_INACTIVE state:

- UE is configured to receive a multicast service in RRC\_INACTIVE state in RRC release, along with the configuration to be able to receive the multicast service in RRC\_INACTIVE state, and

- UE camps in the same cell that the UE was sent to RRC\_INACTIVE state, and

- UE cannot find SIB24 scheduled.

Proposal 6: Upon UE detecting that the network operates MCCH-less for multicast reception in RRC\_INACTIVE state in a cell, UE does not reconnect to the same cell although it cannot find SIB24 scheduled in the cell that sent UE to RRC\_INACTIVE.

DISCUSISON on P5 and P6 (RIL N104):

* Huawei thinks it is fine to clarify RAN2 understanding, but no changes in specs are needed. QCM agrees.

Offline (Nokia): discuss whether we need to define what MCCH-less cell is in specifications (RIL N104, including P5 and P6)

CB Thursday

DISCUSSION on P3:

* Vivo indicates according to 38.214 is clear.
* QCM thinks it is not RAN2 issue, it should be raised in RAN1.
* [N102] Companies can check if something is missing and it can be brought directly to RAN1, if needed
* We will keep N102 open until the next meeting

[R2-2403508](file:///D:\3GPP\Extracts\R2-2403508%20%5bS731%5d%5bS732%5d%5bS733%5d%20Issues%20for%20Multicast%20Reception.docx) [S731][S732][S733] Issues for Multicast Reception Samsung discussion Rel-18

Proposal 1: Upon unsuccessful completion of the SDT procedure:

(a) UE which is configured for multicast reception in RRC\_INACTIVE, transits to RRC\_IDLE (same as legacy spec).

(b) UE forwards TMGI(s) to upper layers for multicast session(s) that UE is configured for multicast reception and receiving in RRC\_INACTIVE. Adopt the text proposal TP1.

DISCUSSION:

* Vivo thinks UE will to RRC IDLE and all multicast MRBs will be released and UE will indicate this to upper layers. No spec change is needed.
* Ericsson thinks this case is missing from specs and support having a change
* ZTE agrees with vivo.

Offline (Samsung) to check whether the spec change is needed, CB Thursday

**ToDo RILs (low priority)**

[R2-2402246](file:///D:\3GPP\Extracts\R2-2402246%20%5bV523%5d%5bV531%5d%20Remaining%20Issues%20on%20Multicast%20Reception%20in%20INACTIVE.docx) [V523][V531] Remaining Issues on Multicast Reception in INACTIVE vivo discussion Rel-18 NR\_MBS\_enh-Core Late

Proposal 1: For clause 5.3.13.1d, change “a multicast session that the UE has joined” to “at least one of the multicast session(s) that the UE has joined”.

Observation: In Rel-15 NR, decoding prioritization is up to UE implementation when more than two PDSCHs are received (e.g. the UE can choose to receive either PDSCH for SI or PDSCh for paging when the PDSCHs are scheduled simultaneously in the same slot).

Proposal 2: RAN2 to clarify that decoding prioritization is up to INACTIVE UE implementation when PDSCH for multicast MTCH and other PDSCH(s) for SI/paging/Msg2/MsgB are simultaneously received.

Proposal 3: RAN2 to adopt the text proposal in the Annex.

[R2-2402282](file:///D:\3GPP\Extracts\R2-2402282%20%5bC148%5d%5bC149%5d%5bC150%5d%20RRC%20Corrections%20for%20eMBS.docx) [C148][C149][C150] RRC Corrections for eMBS CATT, CBN, China Broadnet discussion Rel-18 NR\_MBS\_enh-Core

Proposal 2: To address RIL [C149], the description of MII reporting triggered upon handover or RRC re-establishment scenarios is modified. TP in Annex 2 is adopted.

[R2-2402634](file:///D:\3GPP\Extracts\R2-2402634%20%5bZ695,%20Z696%5d%20Misc%20issues%20for%20multicast%20reception%20in%20RRC_INACTIVE%20with%20draft%20CR.doc) [Z695, Z696] Misc issues for multicast reception in RRC\_INACTIVE with draft CR ZTE, Sanechips discussion Rel-18 NR\_MBS\_enh-Core

Proposal 1 RAN2 to agree the draft CR in section 5 for UE handling in multicast reception in RRC\_INACTIVE state.

Proposal 2 The presence of thresholdIndex IE is used as the indication whether the RRC resumption due to reception quality is enabled for one session.

[R2-2403508](file:///D:\3GPP\Extracts\R2-2403508%20%5bS731%5d%5bS732%5d%5bS733%5d%20Issues%20for%20Multicast%20Reception.docx) [S731][S732][S733] Issues for Multicast Reception Samsung discussion Rel-18

Proposal 2: RAN2 to agree and capture that PDCP synchronization does not imply the multicast session availability within all the cells in RNA. Adopt the text proposal TP2.

Proposal 3: It is left up to UE implementation as to how it tracks multicast session inactivity in a MCCH-less cell. Capture in a Note.

[R2-2403597](file:///D:\3GPP\Extracts\R2-2403597%20%5bN101%5d%20%5bN102%5d%20%5bN103%5d%20%5bN104%5d%20%5bN105%5d%20%5bN106%5d%20%5bN107%5d%20%5bN108%5d%5bN109%5d%20Control%20plane%20aspects%20of%20multicast%20reception%20in%20RRC_INACTIVE%20state.docx) [N101] [N102] [N103] [N104] [N105] [N106] [N107] [N108][N109] Control plane aspects of multicast reception in RRC\_INACTIVE state Nokia discussion Rel-18 NR\_MBS\_enh-Core

Proposal 1 [N101]: UE will consider to be allowed to receive a multicast service in RRC\_INACTIVE state in the RRC release message with suspendConfig if the TMGI is present within MulticastConfigInactive-r18 IE is the configuration.

Proposal 2: To reflect above proposals in the specification, the changes in the Annex are adopted.

Proposal 4: Operating RRC\_INACTIVE multicast with/without MCCH is a per PLMN configuration.

Proposal 7: MCCH-less operation is either made feasible without additional signalling in the air interface, as proposed within this paper, or removed from the specifications.

Proposal 8: [N103}[N105]When the UE receives stop monitoring G-RNTI indication in RRC release, it stops monitoring for data in the current cell and stop monitoring G-RNTI even after cell reselection to a cell that does not contain SIB24/MCCH (or PTM configuration).

Proposal 9: [N103}[N105] When the UE does not receive stop monitoring G-RNTI in RRC release, but only in MCCH, it stops monitoring data only in the cell where such indication is provided; and goes back to RRC\_CONNECTED even after cell reselection to a cell that does not contain SIB24/MCCH (or PTM configuration).

Proposal 10: To reflect above proposals in the specification, the changes in the Annex are adopted.

Proposal 11 [N106]: PTM configuration in RRC release with suspendConfig belongs to the serving PCell of the UE in RRC\_CONNECTED state.

Proposal 12: To reflect above proposals in the specification, the changes in the Annex are adopted.

Proposal 13: An LS is sent to RAN3 to define the signalling for information exchange on multicast delivery to UEs in RRC\_INACTIVE state between neighbor gNBs.

Proposal 14: Remove the UE behaviour from Stage-3 regarding mbs-NeighbourCellList. as the UE behaviour is already captured in Stage-2.

Proposal 15 [N108]: If MBS multicast session continues in INACTIVE but with a different MRB (different LCID), the connected mode MRB is suspended (not released).

Proposal 16 [N107]: When PTM configuration is updated via MCCH, the UE shall perform multicast MRB modification if the LCID associated with the MRB is the same as in the previous PTM configuration; otherwise, the UE shall perform multicast MRB release/establishment.

Proposal 17 [N109]: A connected mode MRB continued in inactive mode is suspended (not released) when the MRB cannot be continued in cell reselection (pdcpSync not configured) and a new MRB is established in the reselected cell.

[R2-2403604](file:///D:\3GPP\Extracts\R2-2403604.doc) RIL\_J009/J010/J011 MBS CP Sharp discussion

Proposal 1: update the current text related to receive the RRCRelease message to align with the agreement.

Proposal 2: The acquired multicast MCCH information overwrites any stored multicast MCCH information and the PTM configuration configured in dedicated RRC message.

Proposal 3: To have a clarification on what is PTM configuration.

* For low priority ToDo RILs, RRC rapp to propose resolutions and companies should review offline (offline Huawei)

**Non-RIL related**

[R2-2402849](file:///D:\3GPP\Extracts\R2-2402849%20Discussion%20on%20frequency%20information%20reported%20for%20shared%20processing.docx) Discussion on frequency information reported for shared processing Xiaomi, Huawei, HiSilicon discussion Rel-18 NR\_MBS\_enh-Core

Proposal: RAN2 is kindly requested to clarify that the frequency band information reported is based on the UE capability supporting MBS.

* Postponed to the next meeting

**Discussion on RILs from other companies**

[R2-2403547](file:///D:\3GPP\Extracts\R2-2403547%20MBS%20RILs.docx) MBS RILs Ericsson discussion Rel-18 NR\_MBS\_enh-Core Late

**Withdrawn**

R2-2402768 [H099] PTM configuration indication in the neighbour cell list for multicast Huawei, HiSilicon discussion Rel-18 NR\_MBS\_enh-Core Late

### 7.11.3 Other corrections

*Corrections related to other specs, e.g. 38.300, 38.321, 38.323, UE capabilities.*

[R2-2402868](D:\\3GPP\\Extracts\\R2-2402868_CR38321(Rel18)_CR1800_Clarification on MAC Reset for multicast reception in RRC_INACTIVE_v2.docx" \o "D:\3GPP\Extracts\R2-2402868_CR38321(Rel18)_CR1800_Clarification on MAC Reset for multicast reception in RRC_INACTIVE_v2.docx) Clarification on MAC reset for multicast reception in RRC\_INACTIVE Apple, Samsung, CATT, Nokia, Huawei, HiSilicon, LG Electronics Inc. CR Rel-18 38.321 18.1.0 1800 - F NR\_MBS\_enh-Core

DISCUSSION:

* Apple clarifies the intention is to have a separate MAC reset operation for MBS multicast not to impact other UEs.
* Ericsson thinks we need to clarify better this is only for MBS multicast. Ericsson agrees with the intention though.
* QCM thinks we may need to also clarify something in RRC specifications.
* The intention seems agreeable, but it is unclear whether the current changes are correct/complete.
* We come back next meeting

[R2-2403203](file:///D:\3GPP\Extracts\R2-2403203%20Error%20data%20handling%20for%20MBS.docx) Error data handling for MBS Langbo discussion Rel-18 38.321 NR\_MBS\_enh-Core

Proposal 1: The MAC entity shall discard the received subPDU containing an LCID or eLCID value associated with a suspended multicast MRB.

Proposal 2: Move the handling of MAC PDU received for MAC entity's G-RNTI or G-CS-RNTI, or by the configured downlink assignment for MBS multicast containing an LCID or eLCID which is not configured from clause 5.3.3 to clause 5.13.

Proposal 3: Adopt the TP in the Annex.

DISCUSSION:

* Huawei think P1 is already covered in specs. Location of the text was also discussed and we decided to have it in the current clause, because it is not an error case for MBS multicast in INACTIVE. Samsung agrees. Vivo agrees.
* LGE supports P2.
* Not agreed, noted.

[R2-2403546](file:///D:\3GPP\Extracts\R2-2403546%20Clarification%20for%20(e)RedCap%20UE%20supporting%20MBS%20in%20RRC_INACTIVE.docx) Clarification for (e)RedCap UE supporting MBS in RRC\_INACTIVE Ericsson discussion Rel-18 NR\_MBS\_enh-Core

Observation 1 When a RedCap UE indicates to support 16 DRBs and MBS multicast reception in RRC\_INACTIVE it is unclear whether the RedCap UE supports 8 or 16 DRBs in RRC\_INACTIVE.

Proposal 1 Clarify that supportOf16DRB-RedCap-r17 is applicable in RRC\_CONNECTED and when the UE supports MBS multicast in RRC\_INACTIVE it also is applicable in RRC\_INACTIVE.

Proposal 2 Clarify that supportOf16DRB-RedCap-r17 is also applicable in RRC\_INACTIVE when the UE supports SDT.

DISCUSSION:

* Mediatek thinks the original text is already clear, i.e. it applies to both CONNECTED and INACTIVE. If we do this change, we might need to change for many other cases.
* QCM thinks TP is OK, but perhaps RA SDT and RA SDT NTN is missing. We have already made some clarifications like this so this change would be OK.
* Nokia agrees with Mediatek.
* CATT thinks this makes specs clearer and supports the proposal.
* Intel does not think changes are needed, agrees with Mediatek.
* RAN2 understanding is that *supportOf16DRB-RedCap-r17* is applicable in RRC\_CONNECTED and when the UE supports MBS multicast in RRC\_INACTIVE it also is applicable in RRC\_INACTIVE (FFS if spec changes are needed)

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

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

Time budget: 0 TU

Tdoc Limitation: 1 tdoc

### 7.14.1 Organizational

LSs and rapporteur inputs (e.g. rapporteur CR, open issues list)

[R2-2402103](D:\\3GPP\\TSGR2\\TSGR2_125bis\\docs\\R2-2402103.zip" \o "D:\3GPP\TSGR2\TSGR2_125bis\docs\R2-2402103.zip) LS on area scope handling for QoE measurement collection (C1-241717; contact: Ericsson) CT1 LS in Rel-18 NR\_QoE\_enh-Core To:RAN2 Cc:SA4, SA5, RAN3

* Noted

[R2-2403247](file:///D:\3GPP\TSGR2\TSGR2_125bis\docs\R2-2403247.zip) RIL issue list for QoE Ericsson discussion Rel-18 NR\_QoE\_enh-Core Late

DISCUSSION:

* ZTE would like to discuss E215 more.
* The following PropAgree and PropReject RIL resolutions are agreed:

PropAgree: G121

PropReject: G118, G119, G120, G122, G123, H082

[R2-2403246](file:///D:\3GPP\Extracts\R2-2403246%20-%20Correction%20CR%20for%20QoE%20measurements.docx) Correction of Enhancement on NR QoE management and optimizations for diverse services Ericsson CR Rel-18 38.331 18.1.0 4711 - F NR\_QoE\_enh-Core Late

* One week review after the meeting

### 7.14.2 QoE measurements in RRC\_IDLE INACTIVE

*Corrections related to RILs from ASN.1 review.*

[R2-2403159](D:\\3GPP\\Extracts\\R2-2403159 Discussion on serving cell for MBS QoE collection H079H082.docx" \o "D:\3GPP\Extracts\R2-2403159 Discussion on serving cell for MBS QoE collection H079H082.docx) Discussion on serving cell for MBS QoE collection H079H082 Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core

Proposal 1: For QoE area scope checking, the UE should recheck the area scope only when the cell from which the UE receives the service changes.

DISCUSSION:

* Ericsson wonders about the definition of the area scope. Previously it was the area where the UE camps, now it would be where the UE receives the service.
* ZTE agrees with P1 as the broadcast may be received from another cell.
* Huawei clarifies that UE already checks the cell where service is received during state transitions.
* CATT agrees with P1 and we should correct the specs.
* Qualcomm supports the intention, but would like to re-check the are upon cell reselection only.
* Ericsson wonders if we need to check with SA5 what is the area scope, i.e. cells where UE receives the service or the cells where UE camps.
* [Offline – Huawei] Check whether there is a definition in SA5 specifications on what QoE area scope is, i.e. cells where the UE camps or cells where the UE receives the service.

CB Thursday

[R2-2403249](file:///D:\3GPP\Extracts\R2-2403249%20-%20RIL%20issues%20related%20to%20QoE%20measurements.docx) RIL issues related to QoE measurements Ericsson discussion Rel-18 NR\_QoE\_enh-Core

Proposal 1 Only include measConfigReportAppLayerAvailable in the first RRCReconfigurationComplete message at handover if the UE has stored QoE configuration with appLayerIdleInactiveConfig not successfully transmitted since the UE entered RRC\_CONNECTED.

Proposal 2 Add a note to clarify that once a value of a parameter included in an RVQoE configuration has been forwarded to the UE application layer, the value of the parameter will be maintained in the UE application layer unless explicitly released.

Proposal 3 The UE sends the session status indication to the node that configured the QoE configuration.

DISCUSSION on P1 (RIL E215):

* ZTE thinks P1 is an optimization. If it is re-reported, the NW can know there is sth to be fetched.
* Samsung agrees with ZTE, there is not much overhead with this signalling.
* CATT does not think we need to limit the indication to the first of RRC reconfig, it may be unclear what it means.
* RIL E215 is rejected

DISCUSSION on P2 (RIL E214):

* Nokia wonders why we need to specify app layer behaviour in RRC, it should be done by CT1.
* Qualcomm thinks such note will complicate the specifications. RRC just provide the indication and app handles it.
* Huawei agrees with Nokia.
* Samsung supports Ericsson proposal, but the note does not help.
* Ericsson thinks there is inconsistency and we need to solve it.
* Qualcomm thinks it is not a standard problem. If sth is NEED R, then it is released and RRC should inform upper layer about it.
* ?? RIL E214 is rejected

CB Thursday (Ericsson) to see if this needs to be solved

DISCUSSION on P3:

* ZTE thinks the UE sends this with together with QOE report so it should follow the same SRB. Huawei agrees, i.e. the UE follows reportingSRB.
* Samsung agrees with ZTE. Samsung thinks it should be done on the NW side.
* QCM thinks we should correct at the NW side.
* Ericsson thinks there is no solution in RAN3 at the moment.
* RIL E216 is rejected
* RAN2 thinks that, if needed, this can be solved by RAN3

### 7.14.3 Other corrections

Corrections related to other specs, e.g. 38.300, 37.340, UE capabilities.

[R2-2403075](D:\\3GPP\\Extracts\\R2-2403075 Consideration on QoE remaining issues.doc" \o "D:\3GPP\Extracts\R2-2403075 Consideration on QoE remaining issues.doc) Consideration on QoE remaining issues ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core

Proposal 1: RAN2 agrees to revise the field description of the flag idleInactiveReportAllowed based on the TP in the annex 1.

Proposal 2: UE includes RPLMN identity in QoE reports stored in AS layer when storing QoE reports in non-connected stat.

DISCUSSION on P1:

* Nokia agrees with the intention.
* Ericsson agrees with the intention but the TP does not seem to be correct.
* Huawei thinks the TP is misleading, e.g. it sounds as if the scope of QOE collection is extended.
* QCM shares the view from Huawei and the procedural text is already clear.
* CATT supports the proposal.
* The intention seems agreeable, but it is not clear whether the changes in the field description are needed
* Offline (ZTE) to check whether/how we need to change the field description.

CB Thursday

DISCUSSION on P2:

* Huawei thinks we have discussed this and there is no need to re-discuss (this is an optimization).
* QCM agrees with Huawei.
* P2 is rejected and not pursued

[R2-2403248](file:///D:\3GPP\Extracts\R2-2403248%20-%20Open%20issues%20for%20QoE%20measurements.docx) Open issues for QoE measurements Ericsson discussion Rel-18 NR\_QoE\_enh-Core

Proposal 1 Send an LS to SA4 to discuss the problem of “pollution” of the QoE reports and the lack of measurement results. (A draft LS is included in the Annex.1.)

DISCUSSION:

* CATT thinks this should be discussed by SA4. Nokia agrees, this is Rel-17 requirement and this can impact Rel-17 QoE as well.
* China Unicom thinks there is no pollution, this is a conscious principle.
* Samsung agrees with other companies.
* Noted

[R2-2403486](file:///D:\3GPP\Extracts\R2-2403486%20Correction%20for%20NR%20QoE%20configurations%20release%20in%20inter-RAT%20HO.docx) Correction for NR QoE configurations release in inter-RAT HO Nokia, Nokia Shanghai Bell CR Rel-18 38.331 18.1.0 4749 - F NR\_QoE\_enh-Core

DISCUSSION:

* Ericsson agrees with the change but wonders whether this should be corrected from Rel-17?
* CATT thinks UE AS layer does not know how many QoE configuration are still in app layer. Believes this is an optimization.
* Samsung agrees with Ericsson, this should be done from Rel-17. Text could be improved.
* Huawei thinks during HO to LTE, all QoE configs should be released.
* The intention is agreed, exact TP can be checked
* Check whether this needs to be introduced from R17 or R18

## 7.24 TEI18

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

Time budget: 1 TU

### 7.24.2 TEI proposals by RAN2

Items initiated in RAN2 for NR and LTE.

No contributions should be submitted under 7.24.2. They should be submitted under 7.24.x

Tdoc limitation: 1 tdoc, limitation applicable to new proposals. No new Cat. B proposals expected for this meeting

#### 7.24.2.2 Other RAN2 TEI-18

Contributions should focus only critical issues/corrections for already agreed TEI-18 topics. New TEI proposals should address critical issues that should be resolved by RAN2#125. Co-sourcing of such proposals is encouraged. Contributions on items that were explicitly downprioritized from Rel-18 WIs should not be brought as TEI18. No new Cat. B proposals expected for this meeting

Including outcome of [POST125][022][RedCap emergency calls] Review CRs (Apple) and [POST125][612][TEI18] CR for MBS operation with eDRX/MICO (Nokia)

**MBS with eDRX/MICO**

[R2-2403598](file:///D:\3GPP\Extracts\R2-2403598%20CR%20on%20MBS%20operation%20with%20eDRX%20MICO%20%5bTEI18%20NR_MBS_enh%5d.docx) MBS operation with eDRX MICO [TEI18 NR\_MBS\_enh] Nokia, Ericsson CR Rel-18 38.304 18.1.0 0399 - F TEI18

**MBS and (e)RedCap**

LSin

[R2-2402112](file:///D:\3GPP\Extracts\R2-2402112_R1-2401732.docx) LS on separate CFR introduced in Rel-18 TEI of MBS for RedCap UE applied for eRedCap UE (R1-2401732; contact: ZTE) RAN1 LS in Rel-18 NR\_redcap\_enh-Core To:RAN2

Search space clarifications

[R2-2402324](file:///D:\3GPP\Extracts\R2-2402324%20Remaining%20Issue%20on%20Broadcast%20CFR%20for%20Redcap.docx) Remaining Issue on Broadcast CFR for Redcap vivo discussion Rel-18 NR\_MBS-Core, NR\_redcap-Core, TEI18 R2-2400955 Late

[R2-2402631](file:///D:\3GPP\Extracts\R2-2402631%20MCCH%20Search%20space%20for%20(e)RedCap%20UE%20MBS%20broadcast%20reception.doc) MCCH Search space for (e)RedCap UE MBS broadcast reception ZTE, Sanechips discussion Rel-18 TEI18

[R2-2402769](file:///D:\3GPP\Extracts\R2-2402769%20Clarification%20on%20MBS%20search%20spaces%20configuration%20for%20(e)Redcap%20%5bRedCapMBS_Bcast%5d.docx) Clarification on MBS search spaces configuration for (e)Redcap [RedCapMBS\_Bcast] Huawei, CATT, Xiaomi, HiSilicon discussion Rel-18 TEI18, NR\_MBS\_enh-Core, NR\_redcap\_enh-Core

[R2-2402770](file:///D:\3GPP\Extracts\R2-2402770%20Correction%20on%20MBS%20search%20spaces%20configuration%20for%20(e)Redcap%20%5bRedCapMBS_Bcast%5d.docx) Correction on MBS search spaces configuration for (e)Redcap [RedCapMBS\_Bcast] Huawei, CATT, Xiaomi, HiSilicon CR Rel-18 38.331 18.1.0 4689 - F TEI18, NR\_MBS\_enh-Core, NR\_redcap\_enh-Core

Stage-2 clarifications

[R2-2402283](file:///D:\3GPP\Extracts\R2-2402283%20Correction%20to%2038.300%20for%20redcap%20CFR%20of%20MBS.docx) Correction to 38.300 for redcap CFR of MBS CATT, CBN, China Broadnet discussion Rel-18 NR\_MBS\_enh-Core

[R2-2403548](file:///D:\3GPP\Extracts\R2-2403548%20MBS%20RedCap%20CFR%20in%20Stage%202.docx) MBS RedCap CFR in Stage 2 Ericsson discussion Rel-18 TEI18

Proposal 1 Add a short description about MBS RedCap CFR to 38.300.

Proposal 2 Clarify in 38.306 that a RedCap UE supporting MBS broadcast also supports RedCap CFR.

Proposal 3 Capture in 38.300 that a UE only monitors one CFR at a time. A RedCap UE monitors the RedCap CFR, if configured, otherwise the default CFR if the bandwidth of the default CFR is within the UE capability.

Proposal 4 Clarify in 38.300 that the NR-RAN node ensures that the UE does not receive two DCIs for the same G-RNTI.

Other

[R2-2403549](file:///D:\3GPP\Extracts\R2-2403549%20MBS%20and%20eRedCap%20UE.docx) MBS and eRedCap UE Ericsson discussion Rel-18 TEI18

Proposal 1 Introduce NR RedCap UE information for eRedCap with or without reduced baseband bandwidth.

Proposal 2 RAN2 assumes that when NR RedCap UE information is absent NG-RAN cannot assume anything about the type of UE the MBS broadcast session is intended for.

# 8 Rel-19

## 8.7 XR Enhancements Ph3

(NR\_XR\_Ph3-Core; leading WG: RAN2; REL-19; WID: RP-240791)

Time budget: 1 TU

Tdoc Limitation: 3 tdocs

### 8.7.1 Organizational

LS, Rapporteur input, including workplan, etc.

[R2-2402836](file:///D:\3GPP\Extracts\R2-2402836%20XR%20Work%20Plan.docx) XR Workplan Nokia, Qualcomm (Rapporteurs) Work Plan Rel-19 NR\_XR\_Ph3-Core

“A couple of points worth noting for RAN2:

- For multi-modality and scheduling enhancements, the study phase should end in August to convey the outcome to RAN#105 in September;

- The ongoing SA2 study scheduled for completion in June will impact RAN2 work;

- The start of the work on measurement gaps in RAN2 needs to be discussed.”

Chair: Should we update TR 38.835 with current study findings on multi-modality and scheduling enhancements?

* Rapporteur explains WID update should be expected in August.
* Mediatek also points out that in September TU allocation update for RAN1 can be expected.
* Nokia prefers not to update the TR, perhaps we can rethink in case there is significant content to be included.
* Vivo asks about measurement gaps objective, when do we start in RAN2? Rapporteur thinks we can check after each meeting what the progress is.
* Intel thinks we need to prioritize SA2 related items, e.g. if we need to ask some questions. Vivo agrees, think we need to prioritize SI phase.
* ZTE also indicates that we need to identify impacts on other WGs, not included in WID currently, e.g. RAN3.
* RAN2 tries to identify impacts on other WGs as soon as possible, e.g. before SI phase end.
* Noted

[R2-2402837](file:///D:\3GPP\Extracts\R2-2402837%20XR%20SA2%20Overview.docx) SA2 Overview Nokia, Qualcomm (Rapporteurs) discussion Rel-19 NR\_XR\_Ph3-Core

“The Rel-19 SA2 Study on Extended Reality and Media service (XRM) Phase 2 contains several key issues whose solutions will impact RAN2. When completed (June 2024 at the earliest), RAN2 will need to take the SA2 agreements into account. “`

* Noted

[R2-2402838](file:///D:\3GPP\Extracts\R2-2402838%20XR%20Multi-Modal%20Overview.docx) Multi-Modal Communication Overview Nokia, Qualcomm (Rapporteurs) discussion Rel-19 NR\_XR\_Ph3-Core

* Noted

### 8.7.2 Multi-modality support

Objective: Study and if justified, specify aspects related to multi-modality (intra-UE) (with coordination with SA2/SA4 as needed by LS request). Aim to facilitate efficient and effective support for XR application with Multiple QoS flows with multi-modal inter-dependencies, meeting multi-modal QoS requirements, e.g. synchronization and/or coordination. Efficiency enhancements are expected to be visible in terms of capacity or power consumption.

Including aspects such as: intended use cases, target requirements, relation with SA2/SA4 work, solution directions.

**RAN awareness of multi-modality**

[R2-2403064](file:///D:\3GPP\Extracts\R2-2403064_XR.docx) XR multi modal flows Sony discussion Rel-19 NR\_XR\_Ph3

Proposal: RAN2 assumes that multi modal service ID is received in RAN from the core network i.e. there is no need for UE to provide this information to the gNB.

[R2-2402676](file:///D:\3GPP\Extracts\R2-2402676%20Discussion%20on%20Multi-modality%20support%20for%20XR%20traffic.doc) Discussion on Multi-modality support for XR traffic Xiaomi Communications discussion

Proposal 1 For DL, multi-modality awareness will be provided by CN in gNB while for UL, multi-modality awareness will be provided by UE in gNB.

Proposal 2 RAN2 should study the control plane procedure design for multi-modality coordination, e.g., coordinated access control.

Proposal 3 For DL, synchronization thresholds will be provided by CN in gNB while for UL, synchronization thresholds will be provided by UE in gNB.

[R2-2402762](file:///D:\3GPP\Extracts\R2-2402762_xrMultiModality.docx) RAN enhancements for Multi-Modality support ZTE Corporation, Sanechips discussion

Proposal 1: RAN2 should specify solutions for handling the varied QoS requirements along with synchronization and combined delivery requirements of the traffic components associated with multi-modality applications

Proposal 2: RAN level awareness for multi-modality is required to support multi-modal applications and such awareness can be either provided to RAN by the UE using UAI or via NGAP signalling from CN (the latter is up to SA2 and we can send an LS asking them for further information)

Proposal 2 RAN2 should study the control plane procedure design for multi-modality coordination, e.g., coordinated access control.

Proposal 1: RAN2 should specify solutions for handling the varied QoS requirements along with synchronization and combined delivery requirements of the traffic components associated with multi-modality applications

DISCUSSION on how multi-modal indication is supposed to be used by RAN:

* Intel suggests to agree that RAN will somehow know the multi-modality indication.
* Apple wonders whether we should also clarify whether we will focus on both DL and UL etc.
* LGE supports to have a generic agreement that gNB should know multi-modal indication. LGE thinks that we need some enhancements for UL.
* Lenovo indicates there are requirements for synchronization, should be done for both UL and DL to meet QoS requirements.
* OPPO indicates that also UE needs to know the association, RAN2 can focus on UL, RAN3 is doing DL.
* Huawei thinks we need to focus on use cases and requirements. Both UL and DL is important for sync and HO. For UL sync – not very useful as Uu is first hop only. But we can study both.
* CMCC indicates that based on SA requirements coordination and sync are needed. For UL, UE can know association by implementation. For UL, RAN2 needs to study, for DL it depends on SA2. We should send LS to SA2.
* Nokia thinks we can study based on assumption that we have an indication from CN. For UL, Nokia does not see clear benefits for now. We need to identify benefits, then discuss solutions.
* QCM also would like to identify use cases. For sync and QoS requirements, indication always comes from CN. For UL, sync requirement is not clear.
* NEC shares views CMCC, we can study both UL and DL. We can ask SA2 about requirements, e.g. sync or admission control etc.
* Mediatek thinks we need to show benefits in terms of capacity and power saving, as per SI
* Google asks whether we should also assume the knowledge of synchronisation requirement?
* ZTE indicates that there are sync requirements which we should try to meet them, so RAN needs to be aware of them to be able to meet them. There are high-level requirements on association and there can be per-packet sync requirements.
* Intel thinks we can ask SA2 about what their assumption is for QoS treatment of multi-modality traffic.
* Vivo indicates that synchronization requirements are already there and we need to study how to meet them.
* For the purpose of study, RAN2 assumes that UE and gNB have some kind of multi-modal information. FFS what information is needed/useful, e.g. just mulit-0modal ID, association between the flow, synchronization requirement etc.
* RAN2 will study both UL and DL directions based on the assumption of multi-modality association knowledge at RAN/UE
* RAN2 will focus on analysing potential usage and benefits (e.g. in terms of capacity and power saving) of multi-modal association knowledge
* Areas to study include: synchronization between the flows, FFS impact on QoS insurance and other areas

**Traffic mapping**

[R2-2402400](file:///D:\3GPP\Extracts\R2-2402400_R19-XR_Awareness-MultiModal.docx) Justification and areas of interest for Multi-modal Services Intel Corporation discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3. For different XR traffic flows belonging to the same Multi-modal service, UE/RAN should be able to provide differentiated QoS handling over the air.

Proposal 4. To discuss whether UE AS/RAN need to enhance its operation for packets of different XR traffic flows belonging to the same multi-modal service in order to meet their inter- synchronization (or maximum tolerable) delays (i.e., between packets of those different XR traffic flows when arriving at the receiver side).

[R2-2402443](file:///D:\3GPP\Extracts\R2-2402443%20R19%20XR%20Multi-Modality.docx) Multi-Modality Support in RAN Samsung discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1. In Rel-19 XR, RAN2 assumes 1-1 mapping between modality and QF for RAN enhancement.

Proposal 3. In Rel-19 XR, RAN2 enhancement of multi-modality will focus on multi-modal inter-dependent traffic is served by the same DRB.

Proposal 4. In Rel-19 XR, multi-modal traffic served by different DRBs are assume to be independent. RAN2 specification does not support inter-dependency procedure across DRBs.

[R2-2402510](file:///D:\3GPP\Extracts\R2-2402510_Initial%20Considerations%20on%20multi-modality.docx) Initial Consideration on Multi-Modality CATT discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 2: Regarding to the QoS flow/DRB mapping for multi-modality service, 1:1 mapping between QoS flow and DRB can be used as baseline.

Proposal 1. In Rel-19 XR, RAN2 assumes 1-1 mapping between modality and QF for RAN enhancement.

Proposal 3. For different XR traffic flows belonging to the same Multi-modal service, UE/RAN should be able to provide differentiated QoS handling over the air.

* RAN2 assumes that traffic of different modals having different QoS requirements is mapped to different QoS flows
* For different XR traffic flows belonging to the same Multi-modal service and having different QoS requirements, it should be possible to provide differentiated QoS handling over the air. RAN2 should study if that is possible with current mechanism or new ones are needed

Proposal 3. In Rel-19 XR, RAN2 enhancement of multi-modality will focus on multi-modal inter-dependent traffic is served by the same DRB.

Proposal 2: Regarding to the QoS flow/DRB mapping for multi-modality service, 1:1 mapping between QoS flow and DRB can be used as baseline.

DISCUSSION on QoS flow to DRB mapping:

* Lenovo thinks we cannot put QoS flow with different requirements to the same DRB.
* Apple thinks CATT’s proposal makes more sense, legacy framework.
* LGE believes 1:1 is a baseline, but would not like to preclude other mapping options.
* Existing QoS flow to DRB mapping framework is used as a baseline, i.e. up to gNB how to map QoS flows to DRBs

**DRX enhancements**

[R2-2403223](file:///D:\3GPP\Extracts\R2-2403223%20-%20Discussion%20on%20multi-modality.docx) Discussion on multi-modality Ericsson discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1 Support multiple active DRX configurations to limit the delay and optimize power saving of UEs with multi-flow XR services.

[R2-2402953](file:///D:\3GPP\Extracts\R2-2402953.docx) Support of Multi-Modal XR applications Lenovo discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 6: RAN2 to study the usage of multiple active DRX configuration and the DCI-based switching/activation of DRX configurations.

[R2-2402278](file:///D:\3GPP\Extracts\R2-2402278_multi-modal.doc) Discussions on Multi-modality Awareness Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402353](file:///D:\3GPP\Extracts\R2-2402353.doc) Discussion on XR Multi-modality Spreadtrum Communications discussion Rel-19

[R2-2402474](file:///D:\3GPP\Extracts\R2-2402474%20Discussion%20on%20multi-modal%20XR_final.docx) Discussion on multi-modal XR Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402549](file:///D:\3GPP\Extracts\R2-2402549%20Discussion%20on%20multi-modality%20support%20for%20XR.docx) Discussion on multi-modality support for XR CMCC, CSPG discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402628](file:///D:\3GPP\Extracts\R2-2402628_Discussion%20on%20Multi-modality.doc) Discussion on Multi-modality vivo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402841](file:///D:\3GPP\Extracts\R2-2402841%20Discussion%20on%20Multi-modal%20support%20for%20XR.docx) Discussion on Multi-modal support for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402879](file:///D:\3GPP\Extracts\R2-2402879%20Views%20on%20Multi-Modality%20Services%20for%20XR.docx) Views on Support of Multi-Modality Services in Rel-19 XR Apple discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402979](file:///D:\3GPP\Extracts\R2-2402979%20Discussion%20on%20Multi-Modality%20XR.docx) Discussion on Multi-Modality XR Meta discussion

[R2-2403091](file:///D:\3GPP\Extracts\R2-2403091%20%20Discussion%20on%20Multi-modality%20support%20for%20XR.docx) Discussion on Multi-modality support for XR TCL discussion Rel-19

[R2-2403118](file:///D:\3GPP\Extracts\R2-2403118%20Discussion%20on%20multi-modality%20enhancement%20for%20XR%20traffic.docx) Discussion on multi-modality enhancement for XR traffic China Telecom discussion

[R2-2403133](file:///D:\3GPP\Extracts\R2-2403133%20-%20Discussion%20on%20the%20multi-modality%20support.docx) Discussion on the multi-modality support OPPO discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2403294](file:///D:\3GPP\Extracts\R2-2403294%20(R19%20NR%20XR%20A872_Multi%20modality%20support).docx) Multi-modality support for XR InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2403407](file:///D:\3GPP\Extracts\R2-2403407.docx) Discussion on multi-modality support NEC Corporation discussion

[R2-2403411](file:///D:\3GPP\Extracts\R2-2403411%20Multi-modality%20work%20in%20Rel-19.docx) Multi-modality work in Rel-19 Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2403569](file:///D:\3GPP\Extracts\R2-2403569%20Consideration%20on%20RAN%20enhancements%20for%20Multi-Modality.docx) Consideration on RAN enhancements for Multi-Modality China Unicom discussion NR\_XR\_Ph3-Core

[R2-2403659](file:///D:\3GPP\Extracts\R2-2403659%20Multi-modality%20support%20for%20XR.docx) Multi-modality support for XR Google Inc. discussion

[R2-2403674](file:///D:\3GPP\Extracts\R2-2403674.docx) Discussion on multi-modality MediaTek Inc. discussion Rel-19

### 8.7.3 RRM measurement gaps restrictions related enhancements

Objective: Specify enhancements to enable transmission/reception in gaps/restrictions that are caused by RRM measurements (from inter-frequency RRM measurement gaps, or intra-frequency measurements, or other scheduling restrictions etc).

**This agenda item will not be treated during RAN2#125bis and no contributions should be submitted for this AI for this meeting.**

### 8.7.4 Scheduling enhancements

Objective: For the UL, Study and if justified, Specify enhancements using delay/deadline information, for support of UL scheduling to enable high XR capacity while meeting delay requirements/avoiding too late PDUs.

Including aspects such as: identification of current scheme drawbacks/limitations, enhancement directions.

**LCP enhancements – solution directions**

[R2-2402952](file:///D:\3GPP\Extracts\R2-2402952.docx) Enhanced Uplink Scheduling for XR Lenovo discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1: RAN2 to agree that enhanced LCP procedure is introduced which considers also remaining delay/time of the data.

Proposal 2: RAN2 to discuss further the detailed enhanced LCP procedure, e.g. adapting LCH priority based on remaining time or multiplexing delay-critical data before multiplexing any other data (e.g. DRBs) into a TB or assigning UL resources based on a packet priority.

[R2-2402880](file:///D:\3GPP\Extracts\R2-2402880%20Views%20on%20Delay-Aware%20Operations%20for%20XR.docx) Views on Delay-Aware Operations in Rel-19 XR Apple discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1: RAN2 should not pursue the approach based on dynamic adaptation of LCH parameters (e.g. priority) based on buffer delay.

Proposal 2: A new type of uplink grant dedicated to delay-critical data can be introduced. The UE should only select the LCHs buffered with delay-critical data for LCP procedures on such grants.

[R2-2403143](file:///D:\3GPP\Extracts\R2-2403143%20Delay-aware%20scheduling%20enhancements_v3.docx) Delay-aware scheduling enhancements Huawei, HiSilicon discussion Rel-19

Observation 3: Delay-critical data can be delayed due to the non-delay-critical data from LCHs with higher LCH priority when using the existing LCP procedure. Such delay of the delay critical data can be resolved by prioritising the transmission of delay-critical data.

Proposal 1: RAN2 to study potential LCP enhancements to prioritize the transmission of delay-critical data from the following alternatives:

* Alternative 1: Enhance LCP restrictions.
* Alternative 2: Enhance LCH prioritization.

DISCUSSION:

* Intel asks whether except delay/remaining, we should also consider other factors, e.g. importance. Lenovo does not think we should consider importance, PSI is for congestion.
* Ericsson has simulations showing that prioritizing urgent data may decrease capacity.
* Mediatek indicates that traffic with different PDB requirements can be mapped to different DRBs.
* Intel asks whether we should also consider low importance and high importance data.
* Nokia thinks this should be handled per LCH, not per importance.
* ZTE would like to ensure there is no impact on SRB traffic. Nokia thinks network can handle this.
* CMCC would like to capture FFS on whether importance is considered.
* Nokia does not like LCP restrictions as it may impact capacity.
* RAN2 will study whether/how to resolve the issue of data with low remaining time being delayed due to other data from LCHs with higher LCH priority when using the existing LCP procedure. At least the following alternatives will be studied:
  + - Alternative 1: Enhance LCP restrictions/LCH selection.
    - Alternative 2: Enhance LCH prioritization.
* RAN2 should consider potential impact on traffic from SRBs.

**LCP enhancements – data multiplexing**

[R2-2403225](file:///D:\3GPP\Extracts\R2-2403225%20-%20UL%20scheduling%20enhancements.docx) UL scheduling enhancements Ericsson discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3 Transmission order of PDU Sets inside one LCH can be decided based on their importance or other factors such as remaining delay.

[R2-2403052](file:///D:\3GPP\Extracts\R2-2403052%20Scheduling%20Enhancements%20for%20XR.docx) Scheduling Enhancements for XR Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1: LCH granularity must still be used for the LCP procedure. Note that it does not exclude priority changes of LCHs based on delay information if needed.

**DSR enhancements**

[R2-2402325](file:///D:\3GPP\Extracts\R2-2402325%20-%20Discussion%20on%20scheduling%20enhancements%20for%20XR.docx) Discussion on scheduling enhancements for XR OPPO discussion

Observation 2 The principle of delay-aware enhancement for BSR/DSR is to provide the serving gNB with more comprehensive information including both delay-critical data and non-delay-critical data at the same time to schedule uplink resources for delay-critical data more efficiently and more effectively.

Proposal 3 RAN2 discusses whether to support delay-aware enhancement for BSR/DSR. FFS on the detailed solution.

[R2-2403591](file:///D:\3GPP\Extracts\R2-2403591.docx) Discussion on UL scheduling enhancements MediaTek Inc. discussion Rel-19

Proposal 1: Introduce multiple pairs of (remaining time and Buffer Size) in DSR MAC CE.

DISCUSSION:

* Nokia would like to generalize the enhancement to be studied.
* Ericsson thinks we need to enhance DSR.
* OPPO asks whether we just focus on delay-critical data or also non-delay critical data.
* LGE would not like to impact BSR operation.
* Vivo agrees with OPPO to consider non-delay critical data.
* Nokia and Qualcomm want to focus on delay-critical data.
* Vivo asks whether we can consider BSR enhancements.
* Apple thinks importance is more useful in BSR than DSR. In DSR it is not needed.
* RAN2 will study enhancing existing DSR with additional information, e.g. multiple pairs of remaining time/buffer information, importance. FFS whether this only includes more information on delay-critical data or also information about non-delay critical data.

[R2-2402314](file:///D:\3GPP\Extracts\R2-2402314%20%20Discussion%20on%20Scheduling%20enhancements%20in%20XR.docx) Discussion on Scheduling enhancements in XR TCL discussion Rel-19

[R2-2402339](file:///D:\3GPP\Extracts\R2-2402339.doc) Discussion on XR scheduling enhancement Spreadtrum Communications discussion Rel-19

[R2-2402389](file:///D:\3GPP\Extracts\R2-2402389%20Discussion%20on%20delay-aware%20scheduling.docx) Discussion on delay-aware scheduling Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402401](file:///D:\3GPP\Extracts\R2-2402401_R19-XR_UL-Scheduling.docx) Areas of interest for UL scheduling enhancements of XR traffic Intel Corporation discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402444](file:///D:\3GPP\Extracts\R2-2402444%20R19%20XR%20Scheduling%20Enhancement.docx) Scheduling Enhancements for Delay-Critical Data Transmission Samsung discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402511](file:///D:\3GPP\Extracts\R2-2402511_Consideration%20on%20XR%20specific%20scheduling%20enhancement.docx) Consideration on XR specific scheduling enhancement CATT discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402550](file:///D:\3GPP\Extracts\R2-2402550%20Discussion%20on%20scheduling%20enhancement%20for%20XR.docx) Discussion on scheduling enhancement for XR CMCC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402629](file:///D:\3GPP\Extracts\R2-2402629_Discussion%20on%20scheduling%20enhancement%20for%20XR.docx) Discussion on scheduling enhancement for XR vivo discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402675](file:///D:\3GPP\Extracts\R2-2402675%20Discussion%20on%20scheduling%20enhancements%20of%20XR%20traffic.doc) Discussion on scheduling enhancements of XR traffic Xiaomi Communications discussion

[R2-2402684](file:///D:\3GPP\Extracts\R2-2402684%20Discussion%20on%20delay-based%20UL%20scheduling%20enhancements.docx) Discussion on delay-based UL scheduling enhancements HONOR discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402763](file:///D:\3GPP\Extracts\R2-2402763_xrSchedulingEnh.docx) Scheduling enhancements for XR ZTE Corporation, Sanechips discussion

[R2-2402980](file:///D:\3GPP\Extracts\R2-2402980%20Discussion%20on%20Scheduling%20Enhancement%20for%20XR.docx) Discussion on Scheduling Enhancement for XR Meta discussion

[R2-2403045](file:///D:\3GPP\Extracts\R2-2403045_Considerations%20on%20delay-sensitive%20scheduling%20for%20XR.docx) Considerations on delay-sensitive scheduling for XR NEC Corporation discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2403065](file:///D:\3GPP\Extracts\R2-2403065_UL%20Scheduling%20enhancements%20for%20XR_v1a.docx) UL Scheduling enhancements for XR Sony discussion Rel-19 NR\_XR\_Ph3

[R2-2403119](file:///D:\3GPP\Extracts\R2-2403119%20Discussion%20on%20scheduling%20enhancements%20for%20XR%20traffic.docx) Discussion on scheduling enhancements for XR traffic China Telecom discussion

[R2-2403295](file:///D:\3GPP\Extracts\R2-2403295%20(R19%20NR%20XR%20A874_Scheduling%20enhancements).docx) Scheduling enhancements for XR InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2403415](file:///D:\3GPP\Extracts\R2-2403415%20Discussion%20for%20scheduling%20enhancements.docx) Discussion for scheduling enhancements III discussion NR\_XR\_Ph3-Core

[R2-2403626](file:///D:\3GPP\Extracts\R2-2403626.docx) Discussion on resource allocation for XR Google Inc. discussion NR\_XR\_Ph3-Core

[R2-2403669](file:///D:\3GPP\Extracts\R2-2403669%20Discussion%20on%20Scheduling%20enhancement%20for%20XR.docx) Discussion on scheduling enhancement for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2403690](file:///D:\3GPP\TSGR2\TSGR2_125bis\docs\R2-2403690.zip) UL related Scheduling Enhancements for XR Rakuten Mobile, Inc discussion Rel-19

### 8.7.5 RLC enhancements

Objective: RLC re-transmission related enhancements for operation of RLC Acknowledged Mode (AM) with small packet delay budget.

Including aspects such as: identification of current scheme drawbacks/limitations, enhancement directions.

**RLC AM or RLC UM**

[R2-2402839](file:///D:\3GPP\Extracts\R2-2402839%20RLC%20%20Enhancements.docx) RLC Enhancements for XR Nokia discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1: discuss whether fast RLC retransmissions should be triggered using RLC UM or RLC AM as basis.

DISCUSSION:

* IDT asks if the suggestion is to switch between RLC modes?
* Nokia assumes we use RLC UM for XR currently and we can add retransmission mechanism to it.
* LGE thinks the goal is to make RLC AM usable for XR. RLC UM is out of scope according to SI.
* QCM thinks that in case we use retransmissions, then it is easier to do it in RLC AM.
* Mediatek thinks we need RLC retransmissions and we should do it via enhancing RLC AM.
* We focus on RLC AM

**Faster retransmission triggering**

[R2-2402390](file:///D:\3GPP\Extracts\R2-2402390%20Discussion%20on%20RLC%20enhancements.docx) Discussion on RLC enhancements Qualcomm Incorporated discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 1. If configured by network, a RLC AM transmitter can retransmit a RLC PDU if one of the following conditions is met:

- after the remaining time of the PDU has dropped below a configured threshold; or

- after the PDU has failed a configured number of HARQ transmissions; or

- if the PDU is in the RLC retransmission buffer and there are spare PUSCH resources available after the LCP procedure.

[R2-2403296](file:///D:\3GPP\Extracts\R2-2403296%20(R19%20NR%20XR%20A875_RLC_enhancements).docx) RLC enhancements for XR InterDigital discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3: Study enhancements to RLC status reporting to reduce the RLC status reporting delay in the downlink.

[R2-2402354](file:///D:\3GPP\Extracts\R2-2402354.doc) Discussion on RLC enhancements for XR Spreadtrum Communications discussion Rel-19

Proposal 2: Introduce additional STATUS PDU trigger for XR service considering traffic pattern.

Proposal 3: Study the enhancement of Polling mechanism for instant STATUS PDU reporting.

DISCUSSION:

* Mediatek thinks there can be lower layer indication as well.
* Samsung thinks that for DL, there is no need for enhancement.
* RAN2 will analyse solutions to ensure timely RLC retransmission(s) for XR
* RAN2 will analyse how to avoid unnecessary retransmissions (e.g. to avoid reTx of out-dated packets)

**Avoiding unnecessary retransmissions**

[R2-2402573](file:///D:\3GPP\Extracts\R2-2402573.docx) Discussion on RLC enhancements in XR CMCC discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 6: The retransmissions of a RLC SDU or a segment that has exceeded the PDB could be discarded to avoid the unnecessary resource waste.

[R2-2402630](file:///D:\3GPP\Extracts\R2-2402630_Discussion%20on%20RLC%20enhancement%20for%20XR.docx) Discussion on RLC enhancement for XR vivo discussion Rel-19 NR\_XR\_Ph3-Core

Proposal 3: The transmitter discards the corresponding RLC SDU and RLC SDU segment when the RLC retransmission is skipped, and the transmitter should inform the receiver of the SN gap due to discard of RLC SDU.

[R2-2402699](file:///D:\3GPP\Extracts\R2-2402699_KDDI_XR_RLC_Enh.docx) Considerations on RLC re-transmission related enhancements for XR KDDI Corporation discussion

Proposal 2: RAN2 agree to introduce the indication of the RLC sequence numbers of discarded RLC PDUs, the indication is from the transmitting side to the receiving side.

Proposal 3: RAN2 agree that after the SN indication of discarded RLC PDUs, the reviving side AM entity will not include NACK\_SN information of discarded RLC PDUs in STATUS PDU, will include ACK\_SN information of discarded RLC PDUs in STATUS PDU instead.

[R2-2402212](file:///D:\3GPP\Extracts\R2-2402212%20-%20Discussion%20on%20RLC%20re-transmission%20related%20enhancements.docx) Discussion on RLC re-transmission related enhancements OPPO discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402254](file:///D:\3GPP\Extracts\R2-2402254%20RLC%20re-transmission%20enhancements%20for%20XR.docx) RLC re-transmission enhancements for XR ITRI discussion NR\_XR\_Ph3-Core

[R2-2402279](file:///D:\3GPP\Extracts\R2-2402279%20Discussions%20on%20RLC%20enhancements.docx) Discussions on RLC enhancements Fujitsu discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402318](file:///D:\3GPP\Extracts\R2-2402318.docx) RLC AM retransmission enhancements Xiaomi discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402402](file:///D:\3GPP\Extracts\R2-2402402_R19-XR_RLC-Enh.docx) RLC AM retransmission enhancements Intel Corporation discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402512](file:///D:\3GPP\Extracts\R2-2402512_Consideration%20on%20RLC%20Retransmission%20Enhancement%20for%20XR.docx) Consideration on RLC Retransmission Enhancement for XR CATT discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402515](file:///D:\3GPP\Extracts\R2-2402515%20Discussion%20on%20RLC%20AM%20enhancements.docx) Discussion on RLC AM enhancements Huawei, HiSilicon discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402685](file:///D:\3GPP\Extracts\R2-2402685%20Discussion%20on%20RLC%20enhancements%20for%20XR.docx) Discussion on RLC enhancements for XR HONOR discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402734](file:///D:\3GPP\Extracts\R2-2402734%20AM%20RLC%20enhancement.docx) AM RLC enhancement Lenovo discussion Rel-19

[R2-2402764](file:///D:\3GPP\Extracts\R2-2402764%20xrRlcEnh.docx) RLC enhancements for XR ZTE Corporation, Sanechips discussion

R2-2402817 RLC AM enhancement NEC discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402881](file:///D:\3GPP\Extracts\R2-2402881%20Views%20on%20RLC-AM%20Enhancements%20for%20XR.docx) Views on RLC-AM Enhancements for Rel-19 XR Apple discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2402981](file:///D:\3GPP\Extracts\R2-2402981%20Discussion%20on%20RLC%20Enhancements%20for%20XR.docx) Discussion on RLC Enhancements for XR Meta discussion

[R2-2403090](file:///D:\3GPP\Extracts\R2-2403090-RLC%20AM%20retransmission%20enhancement%20for%20XR.docx) RLC AM retransmission enhancement for XR TCL discussion Rel-19

[R2-2403102](file:///D:\3GPP\Extracts\R2-2403102.docx) Discussion on RLC enhancements on small packet delay budget scenario MediaTek Inc. discussion Rel-19

[R2-2403368](file:///D:\3GPP\Extracts\R2-2403368%20-%20Discussion%20on%20RLC%20AM%20Enhancements.docx) Discussion on RLC AM Enhancements Ericsson discussion Rel-19

[R2-2403462](file:///D:\3GPP\Extracts\R2-2403462%20Consideration%20on%20RLC%20enhancements%20for%20XR.docx) Consideration on RLC enhancements for XR LG Electronics Inc. discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2403504](file:///D:\3GPP\Extracts\R2-2403504%20Discussion%20on%20RLC%20enhancements%20for%20XR_v3.docx) Discussion on RLC enhancements for XR Samsung discussion Rel-19 NR\_XR\_Ph3-Core

[R2-2403675](file:///D:\3GPP\TSGR2\TSGR2_125bis\docs\R2-2403675.zip) Discussion on RLC Retransmission Enhancements for XR Rakuten Mobile, Inc discussion Rel-19