**3GPP TSG-RAN WG2 Meeting #130 *R2-250xxxx***

**St Julian’s, Malta, 19 – 23 May 2025**

**Agenda item: 8.7.1**

**Source: Xiaomi**

**Title: Open issues of Rel-19 XR UE capabilities**

**Document for: Discussion and Decision**

# Introduction

In RAN2#129bis meeting, following was agreed on XR UE capabilities [1]:

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| --- |
| 1. RAN2 assumes that we define separate UE capabilities for different XR features (as in Rel-18 XR). 2. RAN2 to confirm that AS UE capability for multi-modality is not needed in Rel-19. 3. An optional UE capability with signalling (e.g. lcp-PriorityAdjustment-r19) is introduced to indicate the support of dynamic logical channel priority based on delay status of buffered data. No dependency on support of delayStatusReport-r18. 4. An optional UE capability with signalling (e.g. enhancedDelayStatusReport-r19) is introduced to indicate the support of enhanced delay status report of the buffered data associated with multiple thresholds. FFS A UE supporting this feature shall also indicate support of delayStatusReport-r18. 5. An optional UE capability with signalling (e.g. autonomousRLC-Retx-r19) is introduced to indicate the support of autonomous RLC retransmission based on delay status. The capability does not have pre-requisites. 6. An optional UE capability with signalling (e.g. enhancedPolling-r19) is introduced to indicate the support of enhanced polling based on delay status. The capability does not have pre-requisites. 7. An optional UE capability with signalling (e.g. ul-RateControl-r19) is introduced to indicate the support of UL rate control MAC CE from the gNB to the UE. The capability does not have pre-requisites. FFS whether there is a separate UE capability for UL rate query. 8. For the above Rel-19 XR UE capabilities defined by RAN2 are per UE, not FDD-TDD DIFF, not FR1-FR2 DIFF. 9. Clarify RAN2#128 agreement as “the UE may also support including non-delay-reporting data ahead of delay-reporting data for buffer size calculation of Rel-19 DSR, based on the capability indication” (the exact terminology to be discussed as part of CR review) |

Email discussion is “[POST129bis][506][XR] UE capabilities CRs (Xiaomi)” was held to review the running 38.306 and 38.331 CRs for UE capabilities.

In this contribution, we discuss open issues of Rel-19 XR UE capabilities, and provide:

* A list of easily agreeable proposals on UE capabilities.
* A list of open issues to be discussed by company contributions.

# Discussion

## Easily agreeable proposals

In RAN2#129bis meeting, following was agreed “Clarify RAN2#128 agreement as “the UE may also support including non-delay-reporting data ahead of delay-reporting data for buffer size calculation of Rel-19 DSR, based on the capability indication” (the exact terminology to be discussed as part of CR review)”. The granularity of the capability is straightforward, i.e. per UE, not FDD-TDD DIFF, not FR1-FR2 DIFF. As for the pre-requisite, this feature depends on enhanced DSR reporting with multiple thresholds according to the highlighted agreement above.

**Proposal 1**: 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.

In RAN2#129bis meeting, it was agreed that “An optional UE capability with signalling (e.g. ul-RateControl-r19) is introduced to indicate the support of UL rate control MAC CE from the gNB to the UE. The capability does not have pre-requisites. FFS whether there is a separate UE capability for UL rate query.” Capability for UL rate query was labelled as FFS since rate query feature was a working assumption when decision was made on UE capability. The working assumption of rate query was later confirmed in RAN2#129bis meeting: “The working assumption is changed to agreements on rate query MAC CE.” Consequently, corresponding UE capability can be introduced. The pre-requisite of UL rate query is UL rate control MAC CE (*ul-RateControl-r19*), similar as legacy relationship between *recommendedBitRateQuery* and *recommendedBitRate*, as below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Definitions for parameters | Per | M | FDD-TDD DIFF | FR1-FR2 DIFF |
| ***recommendedBitRate***  Indicates whether the UE supports the bit rate recommendation message from the gNB to the UE as specified in TS 38.321 [8]. | UE | No | No | No |
| ***recommendedBitRateQuery***  Indicates whether the UE supports the bit rate recommendation query message from the UE to the gNB as specified in TS 38.321 [8]. This field is only applicable if the UE supports *recommendedBitRate*. | UE | No | No | No |

**Proposal 2**: 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.

## Open issue list

Open issue 1: the pre-requisite of enhanced delay status report

This was discussed in RAN2#129bis meeting (as shown below) and an FFS was captured: “FFS A UE supporting this feature shall also indicate support of delayStatusReport-r18.”

* LGE, QCM thinks we do not need to couple R18 and R19 DSR. Vivo thinks reasonable UE will implement R18 if implements R19, but does not want to couple in specs.
* Huawei does not think it is possible to support R19 without R18

Open issue 2: whether to have separate or joint UE capability for UE Tx and Rx operations for unnecessary retransmission avoidance.

The issue was discussed in RAN2#129 meeting, with related meeting notes copied below:

DISCUSSION:

* QCM thinks whether it is possible to stop retransmission should be a UE capability.
* Sharp thinks what QCM wants is purely Rx based solution.
* Ericsson agrees we will need some capability and is OK to have separate ones for Rx and Tx side.
* Lenovo would prefer not to decouple the two parts.

If separate UE capabilities are introduced, discussion is needed on pre-requisite, e.g. Proposal 3 of R2-2502673 states that “Define an (optional) per-UE capability with signalling for the Tx-side aspect, conditional on the UE capability for the Rx-side”.

Open issue 3: whether RAN2 to define the UE capability for UAI for a ratio of gap occasions

In RAN4 LS R4-2504972 / R2-2503328, RAN4 indicates the agreement to define UAI for a ratio of gap occasions, and “Supporting of UAI is optional for UE with optional UE capability." Typically such capability should be defined in RAN4 UE feature list. However, this feature is special that RAN4 will not specify UE behavior / requirements or gNB behavior / requirement in response to UAI. RAN2 might need discussion on whether to define this capability by RAN2.

# Conclusion

In this contribution, we discuss open issues of Rel-19 XR UE capabilities and propose the following

**Proposal 1**: 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.

**Proposal 2**: 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.

Company contributions can focus on following open issues:

* Open issue 1: the pre-requisite of enhanced delay status report
* Open issue 2: whether to have separate or joint UE capability for UE Tx and Rx operations for unnecessary retransmission avoidance.
* Open issue 3: whether RAN2 to define the UE capability for UAI for a ratio of gap occasions.

# References

[1] R2-2502985, Session chair (Huawei), “Report from session on R19 XR”