**3GPP TSG-RAN WG2 Meeting #131 *R2-250xxxx***

**Bengaluru, India, Aug 25th – 29th, 2025**

**Agenda Item:** 8.7.6 (NR\_XR\_Ph3-Core)

**Source:** LG Electronics Inc.

**Title:** Report of [AT131][502][XR] MAC CE for XR rate (LGE)

**Document for:** Discussion and Decision

# Introduction

This document is the report of the following email discussion.

* [AT131][502][XR] MAC CE for XR rate (LGE)

                       Scope: Discuss the details of MAC CE format for XR rate control

                       Intended outcome: Report with agreeable proposals

                       Deadline: Report ready for Thursday CB session

# Discussion

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| --- |
| Agreements in RAN2#131:   * We go with implicit way * The mapping between the index in the rate control MAC CE and the QFI and the PDU session ID/DRB ID can be pre-defined/configured * Offline to discuss: * Whether we have a maximum number of flows rate-adaptable with MAC CE * Whether we introduce an identifier in RRC for mapping between PDU/DRB+Qos flow ID and an identifier used in MAC CE, or we use a mapping based on order of PDSU session and QF ID, including whether DRB ID or PDU session ID should be used for mapping * Any other issues for MAC CE format |

**Whether we have a maximum number of QoS flows rate-adaptable with MAC CE**

The maximum number of QoS flows rate-adaptable with MAC CE is related to the size of the UL rate control MAC CE. Based on the company’s contributions in this meeting, it seems that there are two ways as shown below options, but the majority want to have the maximum number of QoS flows included in the MAC CE and the number is 8.

* Option 1: No limitation, i.e., 64 QoS flows included in the MAC CE;
* Option 2: Having the maximum number of QoS flows, i.e., 8 or larger;

*Proposal. A maximum number of QoS flows rate-adaptable with MAC CE is 16.*

Discussion:

QC don’t want to have small maximum number. Ofinno prefer to define the max and ok with 8. ZTE indicate that less than 8 should be sufficient. Nokia is ok with 8 and also indicate that more than 8 would achieve small gain. HW clarify that it is applicable to both RRC and MAC and ok with more than 8. Xiaomi is ok with 8. Apple want to have more than 8. Vivio is ok with 8.

Conclusion:

**Proposal 1. A maximum number of QoS flows rate-adaptable with MAC CE is 16.**

**Bitmap approach VS extension field approach in order to indicate a QoS flow for UL rate control in the MAC CE**

Based on the above agreements, rapporteur’s understanding is that explicit DRB ID is ruled out now and PDU session/DRB ID + QFI are implicitly indicated in the UL rate control MAC CE. For this, there are two ways to implicitly indicate PDU session/DRB ID + QFI. One is a bitmap approach and another is extension field approach. However, considering the contributions in this meeting, majority want to have the bitmap approach, so the rapporteur proposes to have bitmap format for UL rate control MAC CE then would like to decides how to interpret the bitmap as the next step. Note that if extension field approach is selected, we don’t need to discuss how to interpret the bitmap.



Example Figures

*Proposal. A bitmap is included in the MAC CE in order to identify a specific QoS flow for UL rate control.*

Discussion:

HW indicates that bitmap is most agreeable and the max number is 16. Apple, ZTE, Xiaomi are fine with it.

Conclusion:

**Proposal 2. A bitmap is included in the MAC CE in order to identify a specific QoS flow for UL rate control.**

**How to interpret the bitmap in the UL rate control MAC CE**

Before diving into controversial part, the rapporteur wants to determine whether index or mapping rule should be based on PDU session ID+Qos flow ID or DRB ID+Qos flow ID:

* + - Option 1: PDU session ID + Qos flow ID;
    - Option 2: DRB ID + Qos flow ID.

Discussion:

The option 1 is agreeable to all.

There are two options on the table as discussed in the online session:

- Option 1: Introduce an index in RRC for mapping between the index and PDU session ID + Qos flow ID as in the current RRC running CR;

(e.g., Each bit in the bitmap corresponds to an index of a QoS flow configured in RRC for UL rate control)

- Option 2: Predefined mapping rule based on the order of PDU session ID + Qos flow ID.

(e.g., it can be ordered based on the ascending order of PDU session ID and Qos flow ID)

To understand the option 2, a rate-adaptable QoS flows is indicated by RRC, but there is no explicit index in the RRC and the bitmap is interpreted by ascending order of PDU session and QoS flow ID.

Discussion

Show of hands:

Option 1: 4

Option 2: 9

QC indicates that option 1 is more UE preferable. Nokia doesn’t think so. LG clarify that the option 1 is simple and clear considering reconfiguration. Lenovo indicate that option 2 is used many where in the current MAC spec. ZTE indicates that the option 2 may have difficulty at the network side, not UE side. ZTE clarify that anyway UE follows the latest config. LG mention reflective QoS and this can be problematic. Rapporteur clarify that reflective QoS may not be an issue since PDU session ID is used for mapping rule.

Conclusion:

**Proposal 3. Predefined mapping rule based on the order of PDU session ID + Qos flow ID is used for the bitmap. (e.g., it can be ordered based on the ascending order of PDU session ID and Qos flow ID)**

**Any other issues for MAC CE format**

It would be good to decide whether the UL Rate Query MAC CE has the same format as the UL Rate Control MAC CE.

*Proposal. The UL Rate Query MAC CE has the same format as the UL Rate Control MAC CE.*

Discussion:

It is agreeable to all.

Conclusion:

**Proposal 4. The Rate Query MAC CE has the same format as the Rate Control MAC CE.**

# Conclusion

After the offline discussion, it is proposed to agree to the following:

**Proposal 1. A maximum number of QoS flows rate-adaptable with MAC CE is 16.**

**Proposal 2. A bitmap is included in the MAC CE in order to identify a specific QoS flow for UL rate control.**

**Proposal 3. Predefined mapping rule based on the order of PDU session ID + Qos flow ID is used for the bitmap. (e.g., it can be ordered based on the ascending order of PDU session ID and Qos flow ID)**

**Proposal 4. The Rate Query MAC CE has the same format as the Rate Control MAC CE.**