**3GPP TSG-RAN WG2 Meeting #128 R2-24xxxxx**

**Orlando, USA, 18 – 22 November, 2024**

**Title:** Report of [AT128][503][QoE] QoE reporting SRB change issue (Huawei)

**Source:** Huawei, HiSilicon

**Agenda item:** 7.0.2.15

**Document for:** Discussion/Decision

# Introduction

Based on the Chair Notes **R2\_128 R18 MBS, R18 QoE and R19 XR session notes (Dawid) 2024-11-18 1840**, the following discussions were made.

**7.0.2.15 Enhancement on NR QoE management and optimizations for diverse services**

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

[R2-2410654](file:///D%3A%5C3GPP%5CTSGR2%5CTSGR2_128%5CDocs%5CR2-2410654.zip) Correction on UE behaviours when reporting SRB is modified Huawei, HiSilicon CR Rel-18 38.331 18.3.0 5178 - F NR\_QoE\_enh-Core

* Ericsson thinks HO case is different because the UE disconnects from the source node. With SRB change case the UE can still report. Ericsson does not think the change is needed
* QCM agrees with the intention of the CR. QCM wonders if the already received segments can be forwarded between MN and SN?
* Huawei think MN and SN need to coordinate. Huawei asks if Ericsson assumes the UE will finalize the reporting over the old SRB? Ericsson confirms.
* Samsung thinks there is no forwarding of segments between MN and SN. Samsung thinks the reporting SRB should be changed if there is no reporting ongoing.
* Ericsson think there can be some collision cases.
* QCM does not think the UE can send something over the non-existing configuration. Supports Samsung suggestion that the command is not sent from the network in the middle of reporting.
* Nokia thinks that when SRB is changed, the old SRB can be removed. Supports suggestion from Samsung.
* Huawei is also OK with Samsung suggestion.
* QCM is OK with suggestion from Samsung and thinks it should be captured in stage-2.
* The issue described in R2-2410654 can be avoided by network implementation, i.e. the network may avoid changing the reporting SRB for QoE if there is ongoing QoE reporting. FFS whether the network may keep the previous SRB even when changing the reporting SRB to let the UE finish the ongoing reporting over the old SRB
* Capture this in stage-2.
* [AT128][503][QoE] QoE reporting SRB change issue (Huawei)

 Scope: Discuss the FFS and stage-2 CR

 Intended outcome: Agreeable proposal and stage-2 CR

 Deadline: Report and CR ready for discussion during CB session on Thursday

This Tdoc is to report offline progress of [AT128][503][QoE].

# Discussion

During online discussions, there are two cases for SRB switching:

**Case 1: SRB switching with bear change**

**Case 2: SRB switching without bear change**

Case 2 is corresponding to “**FFS whether the network may keep the previous SRB even when changing the reporting SRB to let the UE finish the ongoing reporting over the old SRB**” in the Chair Notes.

Here are more details for both cases.

**Case 1: SRB switching with bear change**

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| **Steps** | **UE/NW behaviours** |
| Step 1 | The UE is configured with reportingSRB=SRB5 in NR-DC, and the UE is doing QoE reporting for a specific *measConfigAppLayerId* |
| Step 2 | When the UE is sending MeasurementReportAppLayer message (transmitted but not confirmed yet), the UE also receives reportingSRB indication + bear change configuration (i.e. SRB5 is de-configured) from NW (=SRB4), i.e. old SRB5 is removed and new SRB4 is to be enabled for QoE reporting purpose. |
| Step 3 | after RRCReconfiguration:* For new QoE reports, they should be sent via SRB4. No problem
* For old QoE reports (transmitted via old SRB5 but not confirmed), UE behaviours are unclear
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For Case 1, the common understanding is that in step 3, the UE is not able to send the non-confirmed segments/messages via old SRB5. So whether the UE should send them via new SRB4 or just discard them is unclear.

**Case 2: SRB switching without bear change**

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| **Steps** | **UE/NW behaviours** |
| Step 1 | The UE is configured with reportingSRB=SRB5 in NR-DC, and the UE is doing QoE reporting for a specific *measConfigAppLayerId* |
| Step 2 | When the UE is sending MeasurementReportAppLayer message (transmitted but not confirmed yet), the UE also receives reportingSRB indication from NW (=SRB4), i.e. old SRB5 is kept and new SRB4 is to be enabled for QoE reporting purpose. |
| Step 3 | after RRCReconfiguration:* For new QoE reports, they should be sent via SRB4. No problem
* For old QoE reports (transmitted via old SRB5 but not confirmed), UE behaviours are unclear
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For Case 2, regarding how the UE handles the non-confirmed segments/messages, there are two views:

1st view: since old SRB5 is kept and available, the UE should send the non-confirmed segments/messages via the old SRB5

2nd view: in step 2, the UE has got NW indication via DL RRC message, the UE should follow NW order and thus the UE should send the non-confirmed segments/messages via the new SRB4

For 1st view, after checking with Ericsson (Cecilia), please find more information/clarifications as below:

For section 5.7.16, it is about QoE reporting, and the UE just follow the configured SRB for QoE reporting (see the highlighted text below). In this case, maybe one suitable network implementation is that: if the NW see ongoing QoE reporting, the NW can keep the old SRB and switch the reporting SRB. The UE will send non-confirmed QoE reports (including segments, if any) via old SRB, and send new QoE reports via new SRB. Later, the NW can initiate another RRC message to remove old SRB. With this network implementation, the issue can be solved.

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| **5.7.16 Application layer measurement reporting**2> else if *reportingSRB* is configured for the *measConfigAppLayerId*:3> if the encoded RRC message is larger than the maximum supported size of one PDCP SDU specified in TS 38.323 [5]:4> if the RRC message segmentation is enabled based on the field *rrc-SegAllowedSRB4* received in *appLayerMeasConfig* and the *reportingSRB* is SRB4, or4> if RRC message segmentation is enabled based on the field *rrc-SegAllowedSRB5* received in *appLayerMeasConfig* and the *reportingSRB* is SRB5:5> initiate the UL message segment transfer procedure as specified in clause 5.7.7 for transmission via the SRB indicated in the field *reportingSRB* in *MeasConfigAppLayer*;4> else:5> discard the RRC message;3> else:4> submit the *MeasurementReportAppLayer* message to lower layers for transmission via the SRB indicated in the field *reportingSRB* in *MeasConfigAppLayer*. |

Regarding Case 2 discussion, please companies provide your opinions in the table below.

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| **Email (Name)** | **Comments** |
| Jun.chen@huawei.com (Jun) | We prefer the 2nd view, and the 2nd view is the same to Case 1. Thus, we can directly remove the FFS from the Chair Notes. |
| jianhua@qti.qualcomm.com (Jianhua) | Prefer 2nd view, 1st view changes UE behaviors. |
| cecilia.eklof@ericsson.com (Cecilia) | It is currently specified according to the 1st view, no need to change this. In the reporting procedure in 5.7.17.2, when the UE receives a QoE report from upper layers, the UE builds the MeasurementReportAppLayer message and submits it to lower layers. After the report has been submitted to lower layers, the UE never checks the parameter reportingSRB anymore, so any change of the reportingSRB will not impact an ongoing transmission. The SRB bearer is configured in the srbToAddModList and is not impacted by a reconfiguration of reportingSRB. It is clear that the UE can be configured with both SRB4 and SRB5 at the same time, as different QoE configurations can have different reportingSRB.2> else if *reportingSRB* is configured for the *measConfigAppLayerId*:3> if the encoded RRC message is larger than the maximum supported size of one PDCP SDU specified in TS 38.323 [5]:4> if the RRC message segmentation is enabled based on the field *rrc-SegAllowedSRB4* received in *appLayerMeasConfig* and the *reportingSRB* is SRB4, or4> if RRC message segmentation is enabled based on the field *rrc-SegAllowedSRB5* received in *appLayerMeasConfig* and the *reportingSRB* is SRB5:5> initiate the UL message segment transfer procedure as specified in clause 5.7.7 for transmission via the SRB indicated in the field *reportingSRB* in *MeasConfigAppLayer*;4> else:5> discard the RRC message;3> else:4> submit the *MeasurementReportAppLayer* message to lower layers for transmission via the SRB indicated in the field *reportingSRB* in *MeasConfigAppLayer*. |
| s90.jeong@samsung.com (Seung-Beom) | I have same understanding with Ericsson. Let me elaborate more. QoE report message can be segmented or not.* According to the highlighted texts in 38.331, when UE RRC submits MeasurementReportAppLayer message to lower layer, it is specified the message is sent via the SRB indicated by *reportingSRB*
* According to the highlighted texts in 38.331, when UE RRC submits RRC segments of MeasurementReportAppLayer message to lower layer, it is specified the message is sent via the SRB indicated by *reportingSRB* and all the segments are submitted together.

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| 5.7.16 Application layer measurement reporting<SKIP>5> initiate the UL message segment transfer procedure as specified in clause 5.7.7 for transmission via the SRB indicated in the field *reportingSRB* in *MeasConfigAppLayer*;<SKIP>4> submit the *MeasurementReportAppLayer* message to lower layers for transmission via the SRB indicated in the field *reportingSRB* in *MeasConfigAppLayer*.5.7.7.3 Actions related to transmission of *ULDedicatedMessageSegment* message<SKIP>1> submit all the *ULDedicatedMessageSegment* messages generated for the segmented RRC message to lower layers for transmission in ascending order based on the *segmentNumber*, upon which the procedure ends. |

Therefore, after the QoE report message or its segments are submitted to lower layer, there is no way (i.e., no spec. description) for UE to change the SRB (even if it is configured to change). So, my understanding is close to the 1st view.On top of this, what I want to clarify further is there are many NW implementation options to address this issue (i.e., reporting SRB change)* Option 1. As we agreed, NW may not change the SRB during ongoing QoE reporting.
* Option 2. NW can keep the old SRB for residual transmission (i.e., 1st view)
* Option 3. NW may change the reporting SRB and release the old SRB at the same time, even though there is ongoing transmission. It may lead to loss of QoE reports but NW may think this loss is not that critical.

So, we prefer to just leave as NW implementation without spec update.  |
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Regarding how/what to capture in TS 37.340, please companies provide your opinions in the table below.

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| **Email (Name)** | **Comments** |
| Jun.chen@huawei.com (Jun) | On top of 13.4.3.1 QoE Measurement Collection Activation and Reporting in NR-DC in TS 37.340, our suggestion is as below:For a UE in NR-DC, both SRB4 and SRB5 can be configured simultaneously for QoE reporting. The network explicitly and separately indicates to the UE whether to send encapsulated QoE reports and RAN visible QoE reports via SRB4 or SRB5, per QoE reference. The SRB for QoE reporting can be changed during the QoE measurement session. If there is ongoing QoE reporting associated to a *measConfigAppLayerId*, the network may avoid changing the reporting SRB. The command for changing the SRB used for reporting may be sent to the UE by the node that configured that specific QoE configuration. The node that currently receives the QoE reports via the Uu interface can request from the peer node that the QoE reporting path is changed to the peer node per QoE reference. The change of QoE reporting path needs to be approved by both nodes serving the UE. |
| jianhua@qti.qualcomm.com (Jianhua) | If there is ongoing QoE reporting associated to a *measConfigAppLayerId*, the network should by implementation avoid changing the reporting SRB.  |
| cecilia.eklof@ericsson.com | Agree that the network can avoid changing the reportingSRB if there is an ongoing transmission of a MeasurementReportAppLayer. However, there can be collision cases where the UE transmits a MeasurementReportAppLayer at around the same time as the network sends an RRCReconfiguration message. If the network wants to avoid that, it can first change reportingSRB and in a following message send srbToReleaseList. From our point of view, we don’t need to capture anything, but we could be fine with adding a sentence, but the sentence proposed above does not fully solve the problem. |
| s90.jeong@samsung.com (Seung-Beom) | Nothing is captured in spec. |
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**Minutes for F2F discussion** (10:30-11:10, outside RAN2 main room. Qualcomm, Nokia, Samsung, and Huawei. Other companies were in another offline discussions):

* Some companies think that before SRB switching, some QoE RRC reports may have been sent to lower layer, and some may have not (e.g. RRC segments are generated but just buffered in RRC layer). Then, for the QoE RRC reports that have been sent to lower layer but non-confirmed, after SRB switching without bear change, the UE should send them to the previous SRB; and for new QoE RRC reports and the QoE RRC reports that have not been sent to lower layer, after SRB switching without/with bearer change, the UE should send them to the new SRB. The companies think that the UE behaviours should be clear as per the current specification
* All participating companies think that the issue can be handled by network implementation, and there should be no impacts to UE behaviors and no CR is needed
* After this F2F discussion, the following text is proposed to be captured in the Chair Notes (replace the previous RAN2 agreement):

**Proposal: It is proposed to capture the following text in Chair Notes (replace the previous RAN2 agreement):**

**If there is an ongoing transmission of a *MeasurementReportAppLayer* and the network wants to change the reporting SRB, the network may keep or release the previous SRB by implementation.**

# Conclusion

After email discussion and F2F discussion, the following proposal is made, and no CR is expected.

**Proposal: It is proposed to capture the following text in Chair Notes (replace the previous RAN2 agreement):**

**If there is an ongoing transmission of a *MeasurementReportAppLayer* and the network wants to change the reporting SRB, the network may keep or release the previous SRB by implementation.**