3GPP TSG-RAN WG3 #115-e [R3-22](https://ericsson-my.sharepoint.com/personal/filip_barac_ericsson_com/Documents/WORK/3GPP.exe/Meetings/RAN3%23113-e.exe/Meetings/RAN3%23113/chairnotes/Inbox/R3-214141.zip)2442

Online, 21st Feb – 3rd Mar 2022

Agenda Item: 15.3

Source: Qualcomm (moderator)

Title: Summary of Offline Discussion on CB: # QoE5\_RANVisible

Document for: Approval

# Introduction

**CB: # QoE5\_RVQoE**

**- Check LS from RAN2, discuss the reporting of RVQoE metrics and reply if needed**

**- Whether the RVQoE metrics configured at the UE should be sent to the target node in RRC container?**

**- Further discuss the values of the reporting periodicity**

**- Whether RAN visible QoE reporting should be paused at overload or not?**

**- Whether to introduce user consent mechanism for RVQoE?**

**- Other related issues of RVQoE configuration and reporting?**

**- Capture agreements and provide TPs if agreeable.**

(Qualcomm - moderator)

Summary of offline disc [R3-222442](https://qualcomm-my.sharepoint.com/personal/shakrish_qti_qualcomm_com/Documents/Desktop/Dropbox/Pentari%20Systems/RAN3/115-e/Inbox/Drafts/CB%20%23%20QoE5_RVQoE/Inbox/R3-222442.zip)

# For the Chairman’s Notes

# Phase-II Discussion

# Phase-I Discussion

## Reply LS to RAN2 on RVQoE metric reporting

RAN2 sent an LS in R2-2202026 and asked RAN3 to provide feedback on Issue 2 (RVQoE metric reporting) mentioned in the LS.

**Issue 2: RVQoE metric reporting**

RAN2 discussed how to report the RVQoE metrics of buffer level and playout delay for media startup, considering the potential signalling overhead, and arrived at the following possible assumptions as starting points. However, RAN2 understands RAN2 is not the main responsible group for definition of RV QoE metrics, so the decision whether to use these assumptions is in the hands of SA4 and RAN3.

Assumption 1a: RAN2 specifies the maximum number of buffer level entries (ASN.1 value) for each buffer level metric report in one reporting message.

Assumption 1c: It is UE implementation on which buffer level entries should be reported for each buffer level metric report when the received number of buffer level entries exceeds the maximum number.

Assumption 2a: The time parameter “t” is not reported for each buffer level entry.

Assumption 2b: It is expected that application layer does not send parameter “t” to AS layer.

Assumption 3: Taking the granularity 10ms for level value as baseline, i.e., integer value 1 corresponds to 10ms, value 2 corresponds to 20ms, and so on.

Assumption 4a: Taking the maximum value of 5min as baseline for level value range.

Assumption 4b: UE sets the value to 5min if the received level value is more than 5min.

Assumption 5: Taking the maximum value 30 seconds as baseline for playout delay for media startup value range.

Assumption 6: Taking the granularity 1ms as baseline for playout delay, i.e., integer value 1 corresponds to 1ms, value 2 corresponds to 2ms, and so on.

Ericsson in [2] provided the following proposals for replying to the LS by RAN2:

* **P1:** RAN3 approves the RAN2 Assumptions 2a, 2b, 3, 4a, 4b, 5 and 6, with the clarification on Assumption 5 that the largest value in the range, i.e., 30 seconds, should be used for all values greater than or equal to 30 seconds.
* **P2:** With respect to the Assumption 1a, RAN3 thinks that only a single Buffer Level value (the latest measured value) should be reported in each RVQoE report, rather than a list of values.
* **P3:** RAN3 thinks that the Assumption 1c should be modified. It should rather say that the UE should use the latest value.

**Q1: Companies are requested to provide their views on the above proposals (P1-P3)**

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| Company | Yes/No for P1, P2 and P3 | Comment |
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## Other proposals on RVQoE metrics

Few additional proposals on RVQoE metrics were also proposed and copied below:

**[2], Ericsson**

**Proposal 1:** RAN3 to agree that:

Playout Delay for Media Startup as an RVQoE metric is reported only once per session.

The RVQoE report containing the Playout Delay for Media Startup may not be the first RVQoE report delivered during the session.

**[8], CMCC**

**Observation 1:** According to RAN2’s assumption, each buffer level entry can be represented by 15bits over Uu for RVQoE reporting.

**Observation 2**: Buffer level is reasonable to be recorded not less than every 100ms according to RAN2 assumptions.

**Observation 3:** The number of bits required for each buffer level entry is heavily dependent on the integer n which stands for the buffer level is recorded every n ms, and a constant of 15 bits per entry would cause huge waste over Uu.

**Proposal 1:** OAM is required to explicitly signal the integer n indicating the buffer level is recorded every n ms to NG-RAN.

**Proposal 2:** The integer n mentioned in Proposal 1 is used for determining how many bits are used for each buffer level entry in RVQoE report, and an LS to RAN2 may be needed for RRC details.

**Q2: Companies are requested to provide their views on the above proposals summarized below:**

* **P1:** Playout Delay for Media Start up should be reported only once per session
* **P2:** OAM should explicitly configure to NG-RAN the periodicity with which the buffer level is recorded in the UE so that NG-RAN can decide how many bits are used for each buffer level entry

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| Company | Yes/No for P1 and P2 | Comment |
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## Whether RVQoE configuration is transferred from source to target node upon mobility and during context retrieval

**[2], Ericsson 🡪 Yes**

**Proposal 3:** During Xn- and NG-based handover preparation and UE context retrieval over Xn, the source node sends to the target node the RAN visible QoE configuration, including the RVQoE metrics configured at the UE, and the RAN visible QoE reporting periodicity.

**Proposal 4:** The RAN visible QoE configuration is sent:

During Xn-based handover preparation and UE context retrieval: inside the RRC Context IE in the HANDOVER REQUEST message.

During NG-based handover preparation: inside the Source to Target Transparent Container IE in the HANDOVER REQUIRED and HANDOVER REQUEST messages.

During (Xn based) UE context retrieval: inside the RRC Context IE (which in turn is included in the UE Context Information – Retrieve UE Context Response IE) in the RETRIEVE UE CONTEXT RESPONSE message.

**[3], Qualcomm 🡪 Yes**

Proposal 5: Convert the WA into agreement

*During handover preparation, source NG-RAN node sends to the target NG-RAN node the RVQoE metrics configured at the UE in RRC container*

**Nokia, [4] 🡪 Yes**

Proposal 1: RAN visible QoE configuration is transferred from the source to the target node upon mobility and during context retrieval.

**CATT, [6] 🡪 Upto RAN2**

Proposal 1: RAN2 make decision on whether include RVQoE configuration in HandoverPreparationInformation

**Huawei, [7] 🡪 Yes**

Proposal 2: RAN visible QoE metrics configured at the UE are included in RRC container during the handover procedure.

**ZTE, [11] 🡪 No**

Proposal 2: There is no need to transfer the RVQoE metrics configured at the UE from the source node to the target node.

It is moderator’s view that the RVQoE configuration from source node is automatically propagated to target node during mobility as it is part of UE’s AS context and no RAN2/RAN3 spec impacts are needed.

But considering the majority of companies have proposed to propagate the RVQoE configuration during mobility, the moderator proposes to convert the previous WA into the following agreement for common understanding:

**Moderator Proposal 1:** RAN visible QoE configuration can be transferred from the source to target node upon mobility and during context retrieval and as follows:

* During Xn-based handover preparation: inside the RRC Context IE in the HANDOVER REQUEST message
* During Xn based UE context retrieval: inside the RRC Context IE (which in turn is included in the UE Context Information – Retrieve UE Context Response IE) in the RETRIEVE UE CONTEXT RESPONSE message
* During NG-based handover preparation: inside the Source to Target Transparent Container IE in the HANDOVER REQUIRED and HANDOVER REQUEST messages

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| >RRC Context | Either includes the *HandoverPreparationInformation* message as defined in subclause 10.2.2. of TS 36.331 [14], or the *HandoverPreparationInformation-NB* message as defined in subclause 10.6.2 of TS 36.331 [14], if the target NG-RAN node is an ng-eNB, or the *HandoverPreparationInformation* message as defined in subclause 11.2.2 of TS 38.331 [10], if the target NG-RAN node is a gNB. |

**Q3: Companies are requested to provide their input if they agree on Moderator proposal 1**

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| Company | Yes/No | Comment |
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## Whether to transfer RVQoE report from target to source node after successful HO

**[4], Nokia**

The RVQOE report may arrive with quite significant delay to the target node, at a point in time where source node has released the UE context. Offline analysis of handover performance, based on QMC aligned with MDT, therefore seems more suitable.

Proposal 7: No mechanism is needed in Rel-17 for transfer of RVQoE report from the target to the source node after a successful handover.

**[6], CATT**

Proposal 2: RVQoE report with old RRC ID should be discarded by the target if received after handover

Proposal 3: The RVQoE report will not be sent to the MCE

**[10], Samsung**

Observation 4: The RVQoE reporting period is close to the handover triggering time and execution time

Observation 5: It is highly possible that the RVQoE report can reflect the UE experience during handover.

Observation 6: The legacy QoE report should be re-transmitted after handover.

Proposal 5: RAN visible QoE report should be transmitted on Xn

**Q4: Companies are requested to provide their views on whether to transfer RVQoE report from the target to source node after a successful handover**

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## RVQoE handling during overload

**[2], Ericsson 🡪 Option 3**

Proposal 7: Regular QoE reporting and the corresponding RVQoE reporting can be paused and resumed independently of each other, e.g., using separate pause/resume indications for regular QoE reporting and RVQoE reporting, respectively.

**[3], Qualcomm 🡪 Option 2**

Proposal 2: RVQoE reporting should also be paused upon RAN overload.

Proposal 3: If the legacy QoE reporting is paused/resumed, RVQoE reporting should be paused/resumed as well

**[4], Nokia 🡪 Option 2**

Proposal 5: Same handling for RVQOE reports and legacy QoE reports in case of pause (overload).

**[6], CATT 🡪 Option 2 or 3?**

Proposal 6: RAN visible QoE reporting should be paused at overload

**[7], Huawei 🡪 Option 2 or 3?**

Proposal 4: RAN visible QoE reporting should be paused at overload.

**[8], CMCC 🡪 Option 1**

Proposal 3: No need to pause RVQoE reporting at RAN overload.

**[10], Samsung 🡪 Option 1 or 2**

**Proposal 3:** RAN3 to down select below options for handling RVQoE reporting at overload.

Option 1: RVQoE reporting will not be paused even the legacy QoE reporting is paused.

Option 2: RVQoE reporting will be paused together with legacy QoE reporting upon receiving the pause indication from the network, when reporting resumed, the original reporting time should be included in the resumed RVQoE report for better decision in RAN side.

**Q5: Companies are requested to provide their preference among the following options for handling RVQoE during RAN overload:**

* **Option 1:** No need to pause/resume RVQoE reporting during/post RAN overload (pause/resume flag of regular QoE doesn’t impact RVQoE reporting)
* **Option 2**: RVQoE reporting will be paused/resumed **together** with regular QoE reporting upon receiving the pause/resume indication from the network
* **Option 3:** Regular QoE reporting and the corresponding RVQoE reporting can be paused and resumed **independently** of each other, e.g., using separate pause/resume indications for regular QoE reporting and RVQoE reporting, respectively

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| Company | Option 1/2/3 | Comment |
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## Whether to have additional reporting periodicities for RVQoE

**[2], Ericsson 🡪 Yes**

**Proposal 5:** RAN3 to agree the following additional RAN visible QoE reporting periodicities: ms2048, ms5120, ms10240, ms20480, ms40960, min1, min6, min12, min30, min60**.**

**Proposal 6:** If the reporting periodicity of RVQoE is not explicitly indicated in the RVQoE configuration, RVQoE reports can be sent together with the legacy QoE reports.

**[3], Qualcomm 🡪 No**

Proposal 1: There is no need to support additional reporting periodicities for RVQoE than what was agreed in R3#114bis-e

**[4], Nokia 🡪 No**

Proposal 4: Not request different periodicities for RAN visible QoE reports and legacy QoE reports in Rel-17.

**[6], CATT🡪 No**

Proposal 4: The reporting periodicity can be ms120, ms240, ms480, ms640, ms1024 and remove the value larger than ms1024

**[7], Huawei🡪 No**

Proposal 3: The max value of the RAN visible QoE reporting periodicity is 1024ms.

**[11], ZTE🡪 No**

**Proposal 1:** For the reporting periodicity of RVQoE, keep the values already agreed and remove the values with FFSs. No more values for reporting periodicity to be introduced in Rel-17.

Considering the majority of companies don’t seem to prefer to support additional periodicities than what was agreed in R3#114bis-e, the moderator has the following proposal:

**Moderator Proposal 2a:** There is no need to support additional reporting periodicities for RAN visible QoE in Rel-17 than what was agreed in R3#114bis-e (i.e., no need to support the following reporting periodicities for RVQoE - ms2048, ms5120, ms10240, ms20480, ms40960, min1, min6, min12, min30, min60)

Also, the moderator proposes to agree the Proposal 6 provided in [2] to clarify the UE behavior as copied below:

**Moderator Proposal 2b:** If the reporting periodicity of RVQoE is not explicitly indicated in the RVQoE configuration, RVQoE reports can be sent together with the legacy QoE reports.

**Q6: Companies are requested to provide their input if they agree on Moderator proposal 2a and 2b?**

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## User consent for RVQoE

**[3], Qualcomm 🡪 No**

Proposal 6: There is no need to introduce any user consent for legacy QoE or RAN visible QoE

**[4], Nokia🡪 No**

Proposal 6: Not introduce user consent mechanism for RAN visible QoE metrics.

**[7], Huawei🡪 Yes**

Some users may have concerns on the privacy of reporting the application layer results to the NG-RAN. Therefore, we think the user consent for the RAN visible QoE is needed

Proposal 5: To introduce user consent mechanism, similar as in MDT, for RAN visible QoE metrics.

**[11], ZTE🡪 No**

Proposal 3: There is no need to introduce user consent mechanism for RAN visible QoE metrics.

**Q7: Companies are requested to provide their input on whether user consent for RVQoE is needed?**

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## Per-slice RVQoE

**Qualcomm, [3]**

Proposal 4: Including PDU session ID in RVQoE report is sufficient. There is **no need to include S-NSSAI in RVQoE report**

**Nokia, [4]**

Proposal 2: Not send the slice scope as explicit RRC IE during QMC configuration or RVQOE configuration.

Proposal 3: **Not to send slice information** in RAN visible QoE report.

**CATT, [6]**

Proposal 7: **Slice information is not included** in RAN visible QoE report over Uu

**Samsung, [10]**

Observation 1: One PDU session may have different QoS flows to serve different services.

Observation 2: Only reporting PDU session ID along with RVQoE report is ambiguous for scheduling.

Observation 3: UE Application is aware of QoS flow identifier just the same as PDU session ID.

Proposal 1: The **QoS flow ID** should be included in RVQoE report over Uu to realize QoE-aware scheduling.

Proposal 2: Either **DRB ID or QoS flow ID** should be included in QoE information transfer message over F1AP for accurate scheduling.

Q8: Companies are requested to provide their input on the following:

1. In addition to the already agreed PDU session ID, include in RVQoE report over Uu the following:
   1. Slice information (e.g., S-NSSAI)
   2. DRB ID
   3. QoS flow ID
2. Include the following in the QoE information transfer over F1AP
   1. DRB ID
   2. QoS flow ID

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| Company | Preferences for i) and ii) | Comment |
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## Available RVQoE metrics

The following was already agreed last meeting:

During handover preparation, source NG-RAN node sends to the target NG-RAN node the available RVQoE metrics (received as part of QMC configuration) in XnAP/NGAP IEs

Huawei in [7] provided more details on which messages should include the available RVQoE metrics over XnAP and NGAP as follows:

* P1: Include the available RAN visible QoE metrics of **signalling based QoE** in Xn HANDOVER REQUEST and RETRIEVE UE CONTEXT RESPONSE messages.
* P2: Include the available RAN visible QoE metrics of **signalling based QoE** in NG HANDOVER REQUEST message.
* P3: No need to include the available RAN visible QoE metrics of management based QoE in the above Xn and NG messages
* P4: No need to include the available RAN visible QoE metrics in the NG HANDOVER REQUIRED message

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| Company | Yes/No for P1-P4 | Comment |
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# Conclusion, Recommendations

If needed

# References

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| [1] | [R3-221672](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221672.zip) | Reply LS on RAN visible QoE (RAN2) |
| [2] | [R3-221679](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221679.zip) | The Remaining Issues for RAN Visible QoE (Ericsson) |
| [3] | [R3-221753](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221753.zip) | Open issues regarding RAN visible QoE (Qualcomm Incorporated) |
| [4] | [R3-221864](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221864.zip) | Remaining open points on RAN visible QoE (Nokia, Nokia Shanghai Bell) |
| [5] | [R3-221909](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221909.zip) | (TP for QoE BL CR for TS 38.423) RAN visible QoE for NR QoE Measurement Collection (China Unicom) |
| [6] | [R3-222208](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222208.zip) | Discussion on RAN visible QoE configuration and reporting (CATT) |
| [7] | [R3-222225](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222225.zip) | Further discussions on RAN visible QoE metrics (Huawei) |
| [8] | [R3-222263](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222263.zip) | Leftover issues on RVQoE (CMCC) |
| [9] | [R3-222280](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222280.zip) | (TP for BL CR to TS 38.473) RAN visible QoE (Samsung) |
| [10] | [R3-222366](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222366.zip) | Further consideration on RVQoE (ZTE) |