**3GPP TSG-RAN WG3 Meeting #113-eR3-214198**

**Online, August 16th- 26th 2021**

Agenda Item: 15.3

Source: Ericsson (moderator)

Title: Summary of Offline Discussion on RAN-visible QoE

Document for: Approval

# Introduction

This is the SoD for the following comeback: **CB: # QoE5\_RANVisible**

The deadline for providing replies to Phase 1 is **Friday, August 20th at 23.59 UTC.**

Relevant papers:

1. R3-213320 RAN-visible QoE Metrics (Ericsson)
2. R3-213321 RAN-visible QoE Configuration and Reporting (Ericsson)
3. R3-213491 RAN visible QoE configuration and reporting (China Unicom, China Southern Power Grid)
4. R3-213656 Support for RAN Visible QoE (Qualcomm Incorporated)
5. R3-213685 Analysis of metrics for RAN visible QoE (Nokia, Nokia Shanghai Bell)
6. R3-213948 Discussion on RAN visible QoE configuration and reporting (CATT)
7. R3-213949 [Draft]LS on the configuration and report of the RAN-visible QoE (CATT)
8. R3-213967 Discussion on RAN visible QoE (Samsung)
9. R3-213968 (CR for TS38.473) Support of QoE information transfer (Samsung)
10. R3-214046 Further consideration on RAN visible QoE (ZTE, China Telecom)
11. R3-214047 [draft] LS on RAN visible QoE (ZTE, China Telecom)
12. R3-214075 Further discussions on RAN-visible QoE (Huawei)
13. R3-214076 Draft LS on RAN-visible QoE conclusions (Huawei)
14. R3-214109 Further discussions on RAN visible QoE (CMCC)

# For the Chairman’s Notes

**TBW**

# Discussion

**Disclaimer:** In each topic for which a WA exists, the starting point for the discussion is a potential proposal confirming the WA, provided that not much opposition is found in the submitted papers. To downscope the work, the issue of RVQoE values has been postponed.

## Issue 1: Metrics

The candidates for RVQoE metrics were discussed in papers [1, 4, 5, 8, 12]. Certain metrics received only positive, while certain received both positive and negative votes.

**Q1: For each metric listed below, please indicate whether the metric should be specified as RVQOE metric or not, and provide a short motivation (for both DASH streaming and VR, unless indicated otherwise):**

* **Buffer Level**
* **Average Throughput**
* **Playout Delay**
* **Play List (simplified version)**
* **Interaction latency (VR only)**
  + **Note: This is not a legacy QoE metric, it is a part of a TR 26.929.**

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| **Company** | **Answer** |
| **Ericsson** | Yes to all, **except**:   * Average Throughput – we are not sure how informative this is, given that the throughput can vary based on the media content as well, not only due to network conditions. Besides, the throughput is already measured in the MDT framework. * Interaction latency – in fact, this metric was captured in the TR 26.929, but did not make it into the spec TS 26.118. Perhaps the use case should be discussed first. |
| Huawei | Yes to Buffer level, Average Throughput could also be considered.  For the rest of the three, we are not sure what could bring to RAN. |
| CMCC | At least buffer level: most companies supported that it is beneficial to adopt Buffer Level, which is applicable to streaming services and AR services, for RAN awareness to help RAN adjust the resource allocation for the UE. For example, the base station will consider scheduling more radio resources to those streams which reports lower buffer level so that to guarantee the stream will be processing properly. |
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## Issue 2: Configuration

The related topics covered in the contributions are:

* Activation/deactivation [14]
* Who generates the RVQoE configuration? [2, 3, 4, 6, 12]
* How to indicate from the OAM to the RAN which RVQoE metrics are available? [2, 3, 4, 12]
* Dependence on legacy QoE [2, 3, 4, 12]
* Configuration of multiple QoE measurements [2, 3, 4, 6, 12]
* Content of RVQoE configuration [6]
* The identifier of RVQoE [2, 4, 6, 12]

**Potential proposal 2-1: Upon:**

* **RAN visible QoE measurement activation, UE AS indicates to UE APP that RAN visible QoE measurement has been triggered, potentially with RAN visible QoE metrics needed to be collected at UE APP as requested by RAN.**
* **RAN visible QoE measurement deactivation, UE AS indicates to UE APP that RAN visible QoE measurement has been terminated, and then UE APP stops to provide RVQoE measurement results to UE AS.**

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| **Company** | **Answer** |
| **Ericsson** | **Agree.** This is needed for RVQoE to work. |
| Huawei | Agree with bullet 1.  For bullet 2, so we would like to introduce a deactivation mechanism? Do we also consider a pause/resume mechanism? |
| CMCC | Agree both. We can start with activation/deactivation case, and further to investigate the possibility to introduce pause/resume mechanism. We also support to introduce pause/resume mechanism for RVQoE. |
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**Potential proposal 2-1: Turn into an agreement the WA that the RAN generates the RVQoE measurement configuration.**

**Potential proposal 2-2: The OAM indicates to the RAN, outside the QoE configuration container, which RVQoE metrics are available for the RAN to configure the UE to collect.**

**Q2-1: Please state your view on OAM generating the OAM configuration.**

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| **Company** | **Answer** |
| **Ericsson** | **Agree** to both proposals.  **Q2-1**: RAN is the consumer and RAN decides what it is interested in so we see no strong reasons why OAM would be generating the configuration. We also have concerns about having two different approaches standardized. |
| Huawei | Agree to both proposals. For proposal 2-2, we think the metrics to be collected should be part of what are configured inside the container.  For Q2-1, similar view as E///. |
| CMCC | Share view with E/// and HW. |
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**Potential proposal 2-3: Turn into an agreement the WA that the ID used to identify QoE measurements is reused for identifying the RVQoE measurements.**

**Potential proposal 2-4: Turn into an agreement the WA stating that RVQoE collection can be configured only if QoE measurements are configured for the same service type.**

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| **Company** | **Answer** |
| **Ericsson** | **Agree** to both |
| Huawei | **Agree** to both |
| CMCC | Agree both. |
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**Potential proposal 2-5: Turn into an agreement the WA stating that multiple simultaneous RVQoE measurements are supported.**

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| **Company** | **Answer** |
| **Ericsson** | **Agree,** just as for the legacy metrics. |
| Huawei | Agree. |
| CMCC | Agree |
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**Q2-2: Should the RAN-visible QoE configuration be fixed?**

**Q2-3: Which of the below items need to be included in a RVQoE configuration sent to UE:**

* **Service type**
* **QoE measurement ID (QoE reference may be used)**
* **Metrics to be reported**
* **Sample percentage**
* **Location/Area scope**
* **Start Time**
* **Duration**
* **Reporting Interval for periodic case**

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| **Company** | **Answer** |
| **Ericsson** | **Q2-2: No,** RAN should decide about what it is interested in.  **Q2-3:** Several of the parameters are **redundant**, as they are already present in the configuration container, e.g.: Service Type, QoE measurement ID, Location/Area scope. Other points should be discussed.  We would like to add two additional points:   * **Triggering Event.** One example: “video stalling”, or “buffer alarm threshold”, as proposed by [5]. * **DRB information (or QoS flow information), to be reported,** as an optional parameter as proposed by [8]. |
| Huawei | Q2-2: not needed. RAN knows which metric(s) it is interested in.  Q2-3: Only Metrics to be reported. In general, we think measurement configuration for QoE should be applied to visible QoE metric collection (e.g. Start Time, Duration Reporting Interval for periodic case). In addition, we are not sure about Sample percentage. |
| CMCC | Q2-2: No need to be fixed. Flexible configuration will also save the reporting overhead.  Q2-3: At least QoE measurement ID, metrics to be reported and time info (FFS on details for time info) are needed. Our understanding is that the above three parameters are basis for QoE reporting. |
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## Issue 3: Reporting

The questions and proposals are derived based on proposals in papers [2, 3, 4, 6, 8, 12].

**Potential proposal 3: Turn into an agreement the WA stating that the RVQoE report is provided inside a dedicated IE, outside the QoE report container.**

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| **Company** | **Answer** |
| **Ericsson** | Agree – RAN visible QoE |
| Huawei | Agree |
| CMCC | Agree |
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**Q3-1: Should the FFS stating that RVQoE reporting is upon RAN request be turned into an agreement?**

**Q3-2: Should RVQoE and legacy QOE *always* be reported together, or can they be reported separately?**

**Q3-3: Can the RVQoE report can be signalled from the target to the source node post a successful handover?**

**Q3-4: Should the DRB information (or QoS flow information) be included in the QoE report for QoS aware scheduling?**

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| **Company** | **Answer** |
| **Ericsson** | **Q3-1: Yes**  **Q3-2: Separately,** given that the consumers of RVQoE and QoE reports are different, we see no reason not to allow separate reporting.  **Q3-3: Yes,** we think this is quite useful for HO performance evaluation.  **Q3-4:** This could be considered as an **optional** parameter. |
| Huawei | Q3-1: yes  Q3-2: we think they should be reported together, since they are configured together; if separately, RAN may need to remember all the configured QoE measurement and visible metric measurements. And if the two are reported separately, it may increase the complexity of APP.  Q3-3: not needed, we are not sure what this could bring any benefits, since target is not the consumer.  Q3-4: no strong opinion, seems to us DRB info and service type/slice may not be one to one mapping, also the APP does not know the DRB info. Therefore if RAN3 think some information is useful for QoS aware scheduling, we think the PDU session and QoS flow information can be reported. |
| CMCC | Q3-1: Yes.  Q3-2: It seems to be more beneficial for RAN optimization if RVQoE report can be reported separately.  Q3-3: Yes. Note that the intention of this question has indicated the source is the consumer.  Q3-4: Yes. Reporting DRB info/QoS flow info enables RAN to optimize parameters configured for a radio bearer, Qos flow to DRB mapping, etc. |
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## Issue 4: Mobility support

The question is derived based on proposals in papers [3, 4].

**Q4: Should the RVQoE configuration be propagated from the source to target node upon mobility in RRC\_CONNECTED and during context retrieval upon resumption from RRC\_INACTIVE?**

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| **Company** | **Answer** |
| **Ericsson** | **Yes,** in both. |
| Huawei | We think the current mechanism already allows such behaviour. The target node can know the RVQoE configuration based on the RRC context in the handover request message. |
| CMCC | OK to agree it as a basic principle, and we can further look into details when we prepare stg3 TPs and check RAN2 RRC running CR. |
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## Issue 5: UE capability indication

The question is derived based on proposals in papers [2, 14].

**Q5: Should RAN3 send an LS asking RAN2 to define in the RRC specification a UE capability indication of RVQoE support?**

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| **Company** | **Answer** |
| **Ericsson** | **Yes,** this is necessary, since not every UE may support RVQoE collection. |
| Huawei | UE capability indication is needed. We think RAN2 can discuss it directly. RAN3 does not need to send an LS. |
| CMCC | Yes. Since RVQoE is led by RAN3, we need to inform RAN2 to implement the requirement identified by RAN3. |
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## Issue 6: Sending the RVQoE report over F1

The proposal is derived based on papers [2, 4, 8, 12].

**Potential proposal 6: Turn into an agreement the WA stating that the gNB-CU may signal RVQoE report to gNB-DU over F1.**

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| **Company** | **Answer** |
| **Ericsson** | **Agree,** the scheduler may benefit from this info. |
| Huawei | Agree. |
| CMCC | Agree |
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## Issue 7: LSs to other groups

This issue depends on the outcome of Issues 1-6.

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| **Company** | **Answer** |
| Huawei | Yes, we think LS to SA4 is needed to inform the conclusions of this meeting and last meeting, for SA4 to take into account. |
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