3GPP TSG-RAN WG3 #117-e R3-22xxxx

15-24 Aug 2022

Agenda Item: 11.4

Source: Huawei (moderator)

Title: Summary of Offline Discussion on CB: # QoE3\_Others

Document for: Approval

# Introduction

**CB: # QoE3\_Others**

**- Evaluate and decide the left issues to be solved in R18**

**- Capture agreements and open issues**

(HW - moderator)

[NWM] Summary of offline disc R3-225012

Summary of offline disc

# For the Chairman’s Notes

**For chairlady to copy:**

The deadline for providing replies to Phase 1 is **Wednesday, August 17st at 8:00 am UTC.**

# Discussion

In this CB, we will try to discuss left-over features from Rel-17, as well as the enhancements of existing features which are not included in Rel-17. The discussion will take the papers from [1] to [14] into account.

In general, the AI this CB is associated with, is a small basket which contains quite a lot of diverse issues. For achieving the goal of an efficient discussion, the moderator suggests to first focus on the issues specified in the WID, which are:

- Specify per-slice QoE measurement configuration enhancement.

- Specify RAN visible QoE enhancements for QoE value, RAN visible QoE trigger event, RAN visible QoE Report over F1.

- Specify QoE reporting handling enhancement for overload scenario.

Other issues will be treated in a relatively low priority.

## Per-slice QoE measurement configuration enhancement.

Moderator’s note: Papers in [1], [2] and [3] all mentioned that per-slice QoE measurement information should be included in QoE configuration container, and LS to SA4 is needed. Besides, [4] and [5] both indicate that an alternative is introducing the slice scope in the Uu as an explicit IE, which will impact RAN2. It seems there is a consensus that the target of applying QoE measurement to slices indicated by CN/OAM is not fully satisfied yet, and enhancement is needed. The only issue here is which option we should take.

Then, enhancement to per-slice RAN visible QoE is proposed in [5] and [6], where the goal is to let gNB perform the optimization of resource allocation in terms of slice scope. Specifically, [5] proposes to add the slice ID information as an explicit IE over Uu in RVQoE configuration and report, with an alternative to add PDU session ID information in RVQoE configuration. Contribution in [6] has a similar proposal, which asks RAN2 to include S-NSSAI in RAN visible QoE configuration and report.

The moderator also notes that, PML also brings a contribution [7] related to slice along with two CRs [8] and [9], but in moderator’s view, the issues these papers are discussing is not really related to per-slice QoE measurement configuration enhancement, thus they will not be discussed in this section.

**Q1. Which option do you prefer, introduce the slice scope in the QoE configuration container or in the Uu as an explicit IE? Correspondingly, do you agree send a LS to SA4 or RAN2 depends on the solution we take.**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| Qualcomm | Yes for container | OAM can include a slice scope within the QoE configuration container which will be evaluated at UE APP to decide whether QoE measurements for a particular slice has to be collected. Otherwise a UE might collect QoE for even those slices for which OAM was not interested (e.g. when same service type is mapped to multiple slices).  LS to SA4 can be sent seeking support. |
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**Q2. Do you think enhancement to per-slice RAN visible QoE is needed? If yes, what kind of enhancement should be done?**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| Qualcomm | No | This is needed only if MCE and RAN have different objectives for optimizing per-slice QoE. If slice scope is included in QoE configuration container as in Q1, then the purpose of UE performing unnecessary QoE measurements is anyway resolved. |
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## RAN Visible QoE enhancements

### RAN visible QoE enhancements for QoE value

Moderator’s note: A couple of contributions in [1], [2], [3], [5] and [10] all think it is beneficial to introduce the QoE value to indicate subjective experience of an ongoing service. In [11], it is suggested to discuss whether an objective/qualitative representation of QoE metrics is beneficial. In the meanwhile, one paper [12] thinks it is not necessary to introduce such subjective value, and the reason is they believe such values will be used by OAM instead of RAN.

In addition, Qualcomm in [11] also proposed to discuss whether this objective/qualitative representation of QoE metrics is to be calculated based on measurements from a single QoE metric (per metric) or multiple QoE metrics. While some other companies think the definition of QoE value is out of RAN3’s scope, and LS to SA4 is needed as SA4 should define the QoE value.

Based on above, the moderator would like to first ask the following questions.

**Q1. Do you agree that the definition of QoE value is out of RAN3 scope? If yes, shall we send an LS to SA4？**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| Qualcomm | See comments | Agree this might out of RAN3 scope, but RAN3 as leading WG should at least identify proper requirements and provide some guidance on the definition of RVQoE value before sending any LS. We therefore propose to have at least some preliminary discussion for the below as mentioned in our paper [11].  **Proposal 2:** RAN3 should discuss whether this objective/qualitative representation of QoE metrics is to be calculated based on measurements from a single QoE metric or multiple QoE metrics  **Proposal 3:** RAN3 should discuss and down select among the 2 options if RVQoE value is calculated based on measurements from a single QoE metric:   * **Option 1:** NG-RAN can configure different levels for a QoE metric to the UE and UE reports them as a certain RVQoE value if a certain level is met * **Option 2:** UE reports RVQoE values autonomously based on a pre-defined formula in the specifications   **Proposal 4:** If RVQoE value is to be calculated based on measurements from multiple QoE metrics, RAN3 should discuss how to identify the set of QoE metrics and define a formula for this RVQoE value. |
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Moderator’s note: RAN-visible QoE value is defined as “a set of values derived from QoE metrics data through a model/function defined in collaboration with SA4”. Papers in [2], [3] and [5] clearly propose that QoE value should be generated by application layer.

**Q2: Do you agree that QoE value should be generated by application layer?**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| Qualcomm | See comments | UE APP generating a RVQoE value should be possible. But as mentioned before, let’s at least get clarity on the definition |
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Moderator’s note: The paper in [3] also suggests to define the RVQoE value target in RAN side, which indicates the QoE value that needs to be guaranteed by RAN for UE. According to [3], if the received RAN visible QoE value from UE exceeds the RVQoE value target in RAN side, the RAN node would take some corresponding action to adjust the scheduling strategy. Additionally, it is proposed such RVQoE target should be signaled by CN for signaling-based QoE and configured by OAM for management-based QoE.

**Q3: Whether a RAN visible QoE value target is needed? And does it need to be signaled/configured by CN/OAM?**

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| Company | Yes/No | Comment |
| Qualcomm | Not clear | How is this RVQoE value target even defined? For that, we should first know what RVQoE value is! If it’s a score of 0-5, RVQoE target can be set for a minimum/maximum score e.g. atleast score 2? Isn’t this just another event trigger for reporting QoE values? |
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### RAN visible QoE trigger event

Moderator’s note: It is suggested in [1] that we use the legacy mechanism that the RAN visible QoE results sent together with the QoE reporting container without specifying a trigger event, as the benefits of setting a RAN visible QoE trigger condition is unclear. Then, the paper in [11] and [12] suggest to consider triggers based on measured values of RAN Visible QoE metrics, as the results of RAN Visible QoE measurements when the measured values are “good” may not always be interesting for network optimization.

**Q4. Do you prefer to introduce a RAN Visible QoE metric-based event triggers, i.e., report RAN Visible QoE only upon crossing a threshold configured for that RAN Visible QoE metric?**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| Qualcomm | Yes | Value based triggers can be considered e.g., report only if buffer level > X. Whether this trigger is evaluated at UE AS or UE APP is up to RAN2. |
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Moderator’s note: Contributions in [5], [11], [12] and [13] also mention that events such as handover, RAN overload, RRC state transition, video stalling, high speed scenario, bad-coverage scenario and high-interference scenario can also be trigger to **report** RAN Visible QoE. In the meanwhile, in [4], the trigger event is used for RAN Visible QoE **measurement**.

Based on above, the moderator would like to first figure out the real intention of event-based trigger, and then to check companies’ views about the necessity of introducing such trigger.

**Q5.1. Is the event-based trigger designed for RAN visible QoE reporting or measurement?**

**Q5.2. Let’s assume the answer to Q5.1 is for reporting, then do companies believe event-based triggers are needed and should be introduced in R18? If so, which events should be prioritized?**

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| Company | Yes/No | Comment |
| Qualcomm | Q5.1: Reporting  Q5.2: Yes | Q5.1: The triggers should be for RVQoE reporting. The QoE meaurements are still performed based on the QoE configuration by OAM. The intention of event-based triggers is to report RVQoE only when a certain interesting event happens  Q5.2: We can consider handover scenario first. Also, whether an event trigger for high mobility scenario is needed can be decided post the discussion on CB#QoE1 on high mobility scenarios. Other triggers can be deprioritized. |
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### RAN visible QoE Report over F1

Moderator’s note: It is pointed out by many companies [1], [4], [5], [10] and [11] that, for RAN visible QoE, DU needs the PDU session ID to associate the received RAN visible QoE report with a specific DRB and then to optimize the DRB scheduling to improve the QoE. In addition, it is also suggested to include qos flow information to realize better resource optimization.

**Q6.1 Do you agree to introduce the PDU session ID as an explicit IE in the RAN visible QoE report over F1?**

**Q6.2 Do you agree to let UE report QoS flow information to RAN, and introduce QoS flow information (or DRB) as an explicit IE in the RAN visible QoE report over F1**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| Qualcomm | Q6.1: Maybe not  Q6.2: Yes | If we support QoS Flow ID, PDU session might not be needed as we already would have more granular information for optimizing DRB scheduling. |
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Moderator’s note: In [12], some new designs in F1 is proposed. Specifically, it is proposed to introduce a new class-1 procedure, with an initiating message sent from the DU to the CU, for requesting the RVQoE metrics, and the corresponding response from the CU to the DU. In addition, it is also proposed that DU can suggest to a CU the parameters to be used in the RVQoE configuration, and CU can notify a DU when RVQoE metrics are available.

**Q7. In your view, is the above mentioned enhancements to F1 needed?**

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| Company | Yes/No | Comment |
| Qualcomm | Clarification needed | OK to consider some enhancements. But some questions:   * Would we then have a class-1 message (DU initiated) in addition to the existing class-2 message (QoE Information Transfer)? * If CU has to notify a DU when RVQoE metrics are available anyway (as DU has no idea on which UEs are configured with RVQoE), what is the point of having a DU initiated procedure? |
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## QoE reporting handling enhancement for overload scenario

Moderator’s note: In [14], the proposal of the paper is considering a need for enhanced network management strategy in case of pausing of different QoE measurements configurations. Then in [1], [2] and [4], similar proposals are given, which is OAM sends the priorities for the management based QoE measurements to NG-RAN for overload scenario. In addition, both [1] and [2] mentioned that there is no need to send priority information to UE.

**Q8.1. Do you agree to let OAM sends the priorities for the management based QoE measurements to NG-RAN? Is priorities for the signaling based QoE measurements also desired?**

**Q8.2 Do you agree that there is no need to send priority information to UE?**

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| Company | Yes/No | Comment |
| Qualcomm | Q8.1 – Yes  Q8.2 – RAN2 can decide | Q8.1 – More details needed. Are these priorities for service types or slices? Also, we think these priorities can apply to both s-based and m-based QoE as it can be applicable whenever multiple QoE measurements are configured.  Q8.2 – Agree but RAN2 can decide whether any UE behavior needs to be defined on whether to handle the paused QoE reports in a special way based on priorities |
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## Others

Moderator’s note: The moderator notices that, there are also some other issues raised in contributions, which are out of scope.

* Papers in [7], [8] and [9] propose to introduce some QoS parameters and QoE measurement IE in Xn and F1.
* In [6], the issue of introducing MCE URI is raised.
* The issue of alignment between s-based QoE and m-based MDT measurements is also raised by [6].

**Companies are invited to share views on whether to treat these issues in this meeting, and feel free to add further issues if any.**

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| Company | Yes/No | Comment |
| Qualcomm | See comments | Proposal in [6] to enable streaming based QMC (by defining MCE URI) seems simple enough and can be agreed.  s-based QoE/m-based MDT alignment can be low priority and not even in WID scope |
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# Conclusion, Recommendations [if needed]

If needed

# References

1. R3-224589, Discussion on the support of R17 left-over features (Huawei)
2. R3-224866, Further discussion on R17 leftover issues (China Unicom)
3. R3-224938, Discussion on R17 QoE left-over issues (ZTE)
4. R3-224792, Discussion on Left-over issues (CATT)
5. R3-224839, NR QoE Discussion on left over from R17 (Samsung)
6. R3-224364, The Enhancements of QMC Rel-17 Features (Ericsson)
7. R3-224227, Consideration on Slice Grouping and Slice (PML)
8. R3-224228, Enable QoE reporting of Network Slice Groups and Slice(F1AP) (PML)
9. R3-224229, Enable QoE reporting of Network Slice Groups and Slice(XnAP) (PML)
10. R3-224760, Discussion on RVQoE value (Xiaomi)
11. R3-224613, Enhancements to RAN visible QoE (Qualcomm Incorporated)
12. R3-224363, The Enhancements of RAN Visible QoE Measurements and Reporting (Ericsson)
13. R3-224761, Discussion on event-triggered RVQoE (Xiaomi)
14. R3-224460, QMC enhancements for RAN overload (Nokia, Nokia Shanghai Bell)