3GPP TSG-RAN WG3 Meeting #111-e R3-211012

E-meeting, 25 January – 4 February, 2021

**Agenda item: 15.2**

**Source: Nokia (moderator)**

**Title: CB: # NRQoE2-Mobility - Summary of email discussion**

**Document for: Approval**

# 1 Introduction

This paper provides summary of discussions at RAN#111-e on:

**CB: # NRQoE2-Mobility**

**- Remove FFS on “Management-based QoE measurement shall not overwrite a corresponding signalling-based existing configuration”?**

**- Whether to exchange management-based QoE measurement configuration between source and target at mobility? No, CATT, Nokia, ZTE, HW, CMCC**

**- Framework type indication at mobility?**

**- How to support supporting QoE measurements in mobility scenarios fulfilling SA4 requirements i.e., avoid stopping a QoE measurement for an ongoing session, even if the UE moves across area boundaries?**

**- Sending the release command to the UE upon the UE’s moving outside the configured area for QoE measurement?**

**- Support inter-RAT mobility in R17? Support inter-system mobility in R17? If yes, how to support? How to handle the case when the target RAT/system does not support QoE measurement signalling?**

**- Support MR-DC scenario in R17? If yes, how to support?**

**- Capture agreements as TP for TR**

(Nok - moderator)

**If possible, please provide comments for phase 1 by Friday, Jan. 29, EOB so we can check whether clear phase 1 agreements can be formulated and in that case also start preparing phase 2 (TP for the TR) before the online session on Tuesday, Feb. 2.**

# 2 For the Chairman’s Notes

**Issue 1 - Measurement reporting continuity in intra-RAT mobility scenarios**

7 out of 9 companies propose not to exchange management based QoE measurement configuration between source and target nodes at mobility, however final solution will depend on RAN2 outcome.

**Conclusion 1: Measurement reporting continuity in intra-RAT mobility scenarios is supported for intra-node mobility for both m-based and s-based QoE. S-based QoE supports this also in case of inter-node mobility. No conclusion for m-based QoE, wait for RAN2 outcome.**

**E///:** the mobility **support for m-based is also necessary**. Just to clarify, **we are not proposing to send the entire m-based QoE \*configuration\* to the target** (although it cannot be assumed that all gNBs in an area will receive the sam m-based configuration). In fact, what needs to be sent to the target **is an indication whether there is an ongoing m-based measurement.** Otherwise the target may overwrite the configuration of an ongoing m-based measurement with another one. Moreover, the RAN node should be aware of an ongoing measurement at a moving UE in order to configure SRB-related resources for the UE, when the UE moves outside the area. Finally, **the mobility support is also necessary for RAN-visible QoE**.

So, we propose the following rewording:

**Conclusion 1: The SA4 requirements on measurement reporting continuity in intra-RAT mobility scenarios are supported for both intra- and inter-node mobility, for both m-based, s-based QoE and for RAN-visible QoE. The solution for supporting this for m-based QoE is pending RAN2 discussions. The solution for supporting this for RAN-visible QoE can be discussed in the normative phase.**

**Issue 2: Measurement reporting continuity in inter-RAT mobility scenarios**

**Conclusion 2: Measurement reporting continuity in intra-system inter-RAT mobility scenarios should be prioritized in Rel-17. Inter-system scenario to be handled in Rel-18.**

**E///:** OK

**Issue 3 - Management-based QoE configuration overwriting a corresponding signalling-based existing configuration**

Majority of companies consider that issue will not exist if we don’t transfer management based QoE context with inter-node mobility. No agreement for signalling of m-based/s-based indicator on network interfaces.

**Conclusion 3: Management-based QoE configuration overwriting a corresponding signalling-based existing configuration to be reconsidered after conclusion on issue 1.**

**E///:** we **disagree** with the conclusion. We explained our reasoning above in our feedback on Issue 1. This is not only about the mobility case. but about the general case.

**Question:** in the **non-mobility case, should an m-based configuration be able to overwrite** the s-based one?

Proposed rewording:

**Conclusion 3: For a given UE, Management-based QoE configuration for a certain service-type shall not overwrite an existing signalling-based configuration for the same service-type.**

**Issue 4: MR-DC scenario**

Two main camps:

* No support: It is assumed that 'no support' means that only the MN can configure QoE in the UE, or no particular network support (e.g. to detect conflicting configurations) is needed in case RAN2 agrees QoE configuration on SRB3.
* Support: Some supporting companies high-light flexibility (MN vs SN) for QoE configuration, while one company high-lights flexibility for QoE reporting (MN leg vs SN leg).

**Conclusion 4: Support to be further considered based on outcome of CB QoE6 (feature ranking) and RAN2 outcome.**

**E///: Disagree,** the MR-DC support should exist in Rel17, and there is **operator interest in the MR-DC support**. We also gave an example of use case, as follows: in case of **RAN overload in MR-DC connectivity** (and **overload is an extremely interesting use case for QoE**), the overloaded RAN node can transfer the QoE reporting towards the non-overloaded RAN node. So, the main benefit is **that, thanks to MR-DC, reporting need not stop at overload, which is beneficial for both RAN and OAM**. When the overload is solved, the RAN node previously in overload may request and obtain from the other RAN node the QoE reports received during the overload.

Way forward: in the SI we can agree that MR-DC scenario is supported and we can set a minimum set of principles (some examples are given by other companies during Phase 1), for which the solutions can be discussed in the normative phase.

Proposed rewording:

**Conclusion 4: The MR-DC scenario for QoE management is supported in Rel17.**

#  Discussion

## 3.1 Phase 1

### 3.1.1 Issue 1 - Measurement reporting continuity in intra-RAT mobility scenarios

The following questions captured by the chairman relate to measurement reporting continuity in intra-RAT mobility scenarios. These questions are:

**- Q1: Whether to exchange management-based QoE measurement configuration between source and target at mobility? No, CATT, Nokia, ZTE, HW, CMCC**

**- Q2: How to support ~~supporting~~ QoE measurements in mobility scenarios fulfilling SA4 requirements i.e., avoid stopping a QoE measurement for an ongoing session, even if the UE moves across area boundaries?**

**- Q3: Sending the release command to the UE upon the UE’s moving outside the configured area for QoE measurement?**

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| **Company** | **Comment** |
| Nokia | Q1: no. Q2: measurement reporting continuity covering both inter-node mobility and idle mode transitions can be fulfilled based on s-based QoE.Q3: not needed. The RRC layer in the UE is aware of the area scope, and the application client session will not be able to handle such release command. |
| Qualcomm | Q1: No. To keep it simple and avoid handling the prioritization of signaling based QoE over management based QoE, we propose to not exchange management based QoE context upon handover. OAM can configure a new management based QoE to NG-RAN if needed.Q2: RAN2 is discussing this. UE should be configured with the allowed area config or a WithinArea indication to decide whether it should perform QoE measurements for new application sessions upon moving into a new area. UE APP layer doesn’t stop QoE measurements for ongoing APP sessions and UE AS will report it even if it has moved across area boundaries (satisfies SA4 requirement by default)Q3: Not needed. Same view as Nokia |
| ZTE | Q1-No need to exchange management based QoE measurement configuration between source and target. The configuration of the source node should not be used for a new QoE session.Q2-For S-based QOE , in order to support QoE measurements in mobility scenarios, the area scope list or withinarea indicator could be used, depends on RAN2 ‘s progress.Q3-No necessary. Same view as Nokia. |
| CATT | Q1: NO. Q2: RAN2 is discussing the issue.Q3:Not sure. RAN2 discuss what kind area information will be sent to UE. |
| Samsung | Q1-NoQ2-Same view as QCQ3-not needed. There are two ways to handle QoE measurement when UE moving outside the configured area. One is gNB sends the withinArea indication to UE, another is UE checks the area itself according to the LocationFilter (already supported in SA4 spec). |
| Huawei | For management based, maybe there is no need to exchange since very likely the target side may also receive similar QoE measurement requestAs to second and third bullet above, the simple way is to release the QoE measurement, or we could let UE to continue the ongoing session, when QoE report is available, AS layer could decide whether to submit, discard or keep it for a while and submit when back to configured area, but it is mainly RAN2 discussionFor Q3, no strong view, anyway we need a clear rule for both RAN and UE… |
| China Unicom | Q1-For management based QoE measurement, no need to exchange the QoE measurement configuration during HO, while some other essential IE, e.g., IP address of MCE, should be exchanged to fulfil SA4 requirements, i.e., avoid stopping a QoE measurement for an ongoing session, even if the UE moves across area boundaries. |
| CMCC | Q1: No.Q2: UE can be configured with withinarea indication as requested by SA4, or area scope to avoid stopping ongoing session.Q3: The mechanism may not be needed if we have other solutions indicated in Q2. Also ok to further discuss in normative phase. |
| **Ericsson** | **Q1: Yes.** As long as UE is inside the area, the m-based configuration does not need to be passed to the target, but **if the UE goes outside the area, and session is not over, then target should know that there is an ongoing session and measurement**, don’t you think?**Q2:** We **prefer using the WithinArea indication**. As for Nokia comment on Q2, we do not understand how can one claim that it is **enough that only s-based flavour satisfies the SA4 requirements**? In fact, the SA4 requirements directly target the m-based flavour because in m-based we have a defined area, while in the s-based the area scope is not necessarily defined.As for QC comment on Q2, we want to clarify that the RAN node should be aware of an ongoing measurement at a migrating UE in order to configure SRB-related resources for the UE, when UE moves outside the area.**Q3:** This is an **inferior alternative to WithinArea** indication, because:* It does in fact not fulfil the SA4 requirements – it needs to be enhanced with a **pending release** command to fulfil them.
* Network deletes the QoE configuration of the subject UE from the UE context, so if the UE comes back to the area it should be reconfigured again.
* It requires another indication to cancel the pending release, if UE comes back to the area.

So, the **release-based solution enhanced with the pending release feature would work.** |

**Summary:**

**- Q1: Whether to** **exchange management-based QoE measurement configuration between source and target at mobility? No, CATT, Nokia, ZTE, HW, CMCC**

Answers:

* No: 7 companies
* Yes (full information or part of the configuration information): 2 companies

Proposal 1: Not to exchange management-based QoE measurement configuration between source and target at mobility.

**- Q2: How to support QoE measurements in mobility scenarios fulfilling SA4 requirements i.e., avoid stopping a QoE measurement for an ongoing session, even if the UE moves across area boundaries?**

* The majority of companies refer to ongoing RAN2 discussions.

**- Q3: Sending the release command to the UE upon the UE’s moving outside the configured area for QoE measurement?**

* Not needed: 4
* Not preferred solution: 1
* Not sure or may depend on RAN2: 3

### 3.1.2 Issue 2 - Measurement reporting continuity in inter-RAT mobility scenarios

**- Support inter-RAT mobility in R17? Support inter-system mobility in R17? If yes, how to support? How to handle the case when the target RAT/system does not support QoE measurement signalling?**

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| **Company** | **Comment** |
| Nokia | We should ideally support reporting continuity in intra-system inter-RAT HO scenario in Rel-17, but feasibility depends on decision taken for NR QoE, e.g. support of multiple QoE reporting configurations, which may be not straight-forward to propagate to LTE QoE. |
| Qualcomm | We also agree to support intra-system inter-RAT scenario if feasible. FFS on how E-UTRAN will handle multiple QoE configuration and RAN visible QoE (if agreed) upon inter-RAT context transfer.Deprioritize inter-system scenarios (signalling needed over NG and S1) |
| ZTE | For intra-system inter-RAT scenario, We share the above view.For inter -system scenario, we think it is also need to be consider. Since QoE measurement in UE is in Application layer. The measurement agnostic to the RAT or system. Meanwhile LTE QoE actually already supported. It is possible for a UE roaming to other system and continue QoE measurement in Application layer. |
| CATT | Agree with QC and Nokia. In R17, we don’t think we need support inter-system QoE |
| Samsung | Same view as QC |
| Huawei | Continuity support during inter-RAT/inter-system mobility brings additional spec work yet the benefits remain questionable, e.g. target RAT needs to support the QoE measurement reporting, how the area scope is configured to indicate the QoE measurement continuity, how QoE measurement continuity and service continuity is handled, etc. |
| China Unicom | The SA4 requirements are RAT-independent and shall therefore be applied to the mobility solution for QoE measurement in NR, as well.Therefore, inter-RAT/system mobility should be supported in SI phase and with low priority in normative work as the details will based on the intra-RAT mobility mechanism. |
| CMCC | Agree with China Unicom. |
| **Ericsson** | QoE measurements are **RAT-independent** and **RAN should fulfil the SA4 requirements for inter-RAT and inter-system mobility scenarios,** as well. In other words, **inter-RAT and inter-system mobility is needed for service types supported in both LTE and NR** (e.g. streaming). Otherwise, **shall we drop e.g. a streaming session at inter-RAT/system mobility even if the target supports the service type in question?****RAN2 agreements** must also be respected – for example, **if the target RAT does not support the source RAT configurations** (including QoE configuration) the **UE RRC should take appropriate action**. We should **discuss this in RAN3 and liaise RAN2** based on the outcome.Out of these two, inter-RAT case should be dealt with higher priority than inter-system.  |

**Summary:**

Intra-system handover:

* Need for support is questionable / deprioritized: 1
* Support is preferred: 6
* Support is needed: 1

Inter-system handover:

* No need, or need for support is questionable / deprioritized: 5
* Support is preferred:3
* Support is needed: 0

### 3.1.3 Issue 3 - Management-based QoE configuration overwriting a corresponding signalling-based existing configuration

**- Remove FFS on “Management-based QoE measurement shall not overwrite a corresponding signalling-based existing configuration”?**

**- Framework type indication at mobility? (i.e., “signalling based” or “management based”)**

Discussion can be found in (at least) 0529 and 0847. Do we need any solution to avoid that a new management-based QoE configuration overwrites a signalling-based configuration? Comment on the solution proposed in 0529? Any other solution? The topic has mobility impact but also seems linked to whether to support or not multiple QoE configurations in the UE which might be in the scope of the CB NRQoE3-RANConfig\_Report.

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| **Company** | **Comment** |
| Nokia | This may not be an issue with m-based QoE limited to intra-node mobility, and stopping at transition to idle mode. |
| Qualcomm | Issue will not exist if we don’t transfer management based QoE context with mobility. |
| ZTE | -Yes, share above views, issue will not exist . The FFS should be removed. - No need for framework type indication at mobility. |
| CATT | Agree with QC.  |
| Samsung | Same view as above |
| Huawei | Yes, for signalling based QoE measurement configuration, the local management based QoE measurement configuration received from OAM/CN at target side should not override the signalling based QoE measurement configuration received from source side; and for management based, the target node decides whether to continue/release the original one if received from the container or, configure a new one based on its local configuration received from CN/OAM. |
| China Unicom | The FFS should be removed. |
| CMCC | We are not sure here if we are discussing a general principle, or the case for a specific mobility scenario. The general principle can be further discussed during normative phase. |
| **Ericsson** | We should **remove the FFS.**As explained earlier, mobility in the m-based flavor should be supported. If target does not know what services are configured/sessions ongoing, how to decide on configuring new configuration without ruining the ongoing measurements?Also, having in mind that **the target should not overwrite an s-based with an m-based configuration, the indication of framework type is necessary.** |

**Summary:**

* Issue will not exist if we don’t transfer management based QoE context with inter-node mobility: 5
* Signalling of m-based/s-based indicator is necessary: 1
* Other answers: 3

### 3.1.2 Issue 4 - MR-DC scenario

**- Support MR-DC scenario in R17? If yes, how to support?**

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| **Company** | **Comment** |
| Nokia | QoE measurements are done at application layer which will not be aware of AS configuration like MR-DC. It is up to RAN2 whether to support measurement configuration and reporting on SRB3. |
| Qualcomm | Don’t support MR-DC scenario in R17. QoE configuration and reporting in MR-DC involves considering multiple things such as • For MR-DC, can MN and SN both be allowed to configure QoE measurements to UE (at same time?) or only node should be allowed? If only one node, which one?• For MR-DC, can UE send QoE reports to SN directly via SRB3 or indirectly via MN?Also considering QoE is application layer measurement, it does not matter which node (MN or SN) configures the QoE as the objective is not to optimize anything at RAN. Unless there is a requirement to optimize MN and SN separately, say for the case of RAN visible QoE, there is no immediate use case.Propose to deprioritize this. |
| ZTE | In general , QoE measurement in UE does not aware MR-DC. While RAN part QoE measurement e.g MDT has not fully support MR-DC. Therefore, it is propose to consider MR-DC scenario in R18. |
| CATT | We should study the benefit for the MRDC supportRAN visible QoE may different between MN and SN.RAN2 is discussing the SRB4 for QoE report transfer. But no conclusion on if it can be configured in SN.If support MR-DC, when the stop due to overload happened, the report may be offload to another leg.  |
| Samsung  | Not for R17, same view as Nokia, QC and ZTE |
| Huawei | This was also captured in CB#3, anyway, in our discussion paper 0820, we have:* when a QoE measurement request is received, the receiving end, i.e. the gNB, could select a UE in MR-DC operation including NSA, even if this gNB is acting as SN for that UE, and could configure the QoE measurement directly towards that UE over SN leg.
* for MR-DC operation including NSA, only one node is allowed to configure the QoE measurement, and the MN could decide which node to configure the QoE measurement for a certain service type
 |
| China Unicom | MR-DC operation including NSA could be studied in SI phase and some high level principles are proposed to agree:* Only one node is allowed to configure the QoE measurement (including configuration and reporting)
* MN could decide which node to configure the QoE measurement for a certain service type.
 |
| CMCC | We support to discuss MR-DC in R17. The details can be discussed during normative phase.For QoE configuration, some high level principle could be discussed during SI phase, and we prefer to discuss from m-based QoE and s-based QoE perspective separately.For QoE collection and reporting, most of the work could be done in RAN2 on which node to receive the report,etc. during normative phase. |
| **Ericsson** | We **should support the MR-DC scenario.** The benefits are clear - this is not about whether the APP layer sees two legs or not, or about the reconfiguring the legs as QC argues **– this is about benefiting from the fact that we have two legs at our disposal**, so why not use the potential benefits of DC? **Potential use case**: in case of **RAN overload in MR-DC connectivity** (and **overload is an extremely interesting use case for QoE**), the overloaded RAN node can transfer the QoE reporting towards the non-overloaded RAN node. So, the main benefit is **that, thanks to MR-DC, reporting need not stop at overload, which is beneficial for both RAN and OAM**. When the overload is solved, the RAN node previously in overload may request and obtain from the other RAN node the QoE reports received during the overload.As for QC question *(“For MR-DC, can UE send QoE reports to SN directly via SRB3 or indirectly via MN?”)* – the reports should be sent over SRB4, which may be set up as an SCG bearer.Regarding the QC comment that *it is irrelevant if MN or SN configures the UE with QoE measurements*, we have the following question: what if both MN and SN configure the UE? How should this conflict be coordinated?We do not need to work out all the details in the SI, we can adopt high-level principles |

**Summary:**

* No need for network support or deprioritize in Rel-17: 4
* Some support is needed in Rel-17: 5

No support: It is assumed that 'no support' means that only the MN can configure QoE in the UE, or no particular network support (e.g. to detect conflicting configurations) is needed in case RAN2 agrees QoE configuration on SRB3.

Support: Some supporting companies high-light flexibility (MN vs SN) on configuration side, while one supporting company high-light flexibility for QoE reporting (MN leg vs SN leg).

## 3.2 Phase 2 - TP handling

It is assumed that this CB will handle TPs towards section 6.6 of the TR. The following TPs have been submitted towards this section:

* R3-210529 (E///)
* R3-210658 (Nokia)
* R3-210771 (CATT)
* R3-210849 (ZTE)
* R3-210863 (Huawei)

Please provide your views on the draft TP, e.g. whether it corresponds to discussion status / agreements, or whether additional aspects should be covered e.g. based on contents in submitted TPs.

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| Company | Comment |
| Nokia | For further clarification relative to inactive state handling, we propose to include: "The RRC procedure for resumption of QoE measurement reporting at the RRC layer for an ongoing application client session when the UE transits from INACTIVE state to CONNECTED state may be confirmed by RAN2 in normative phase." |
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# 4 Conclusion, Recommendations [if needed]

If needed

# 5 References

[1] R3-21xxxx, Title, Company