**3GPP TSG-RAN WG2 Meeting #113-e R2-210xxxx**

**Online, January 25th – February 5th 2021**

**Agenda Item: 8.14**

**Source: China Unicom**

**Title: Summary of [AT113-e][039][eQoE] RAN2 conclusions on QoE (China Unicom)**

**Document for: Discussion and decision**

# Introduction

This document is intended to summarize the offline discussion on NR QoE SI.

* [AT113-e] [039][eQoE] RAN2 conclusions on QoE (China Unicom)

Scope: Continue the discussion based on R2-2102243. Prioritize items that are believed to be needed in the TR, e.g. address the open points as listed by R3, e.g. it was commented online that Mobility is such a topic. Generally include RAN2 parts that would go into a WID. Attempt to define in more detail what is the expected Reuse of LTE solution, i.e. elaborate P1 in the summary so it becomes agreeable. For technical discussion, can prioritize parts where agreement/progress seems possible.

 Intended outcome: Report with Points worded in such way that they can be easily agreed online, the points being technical agreements, items that should be addressed in the WI, and can also be points for which we cannot conclude.

Initial deadline (for companies' feedback):  2nd week Mon, UTC 1200

 Initial deadline (for rapporteur's summary):  2nd week Tue, UTC 1200

RAN2 GTW session agreements:

* Management based QoE configuration should not override signaling based QoE configuration. Details can be discussed during the WI phase.
* QoE reports are sent via a separate SRB (separate from current SRBs) in NR, as this reporting is lower priority than other SRB transmissions.
* Configuration and Reporting for multiple simultaneous QoE measurements for a UE can be supported (can determine whether there is AS impact in the WI phase)
* RRC signaling is used by the gNB to indicate the UE to pause or resume the QoE reporting.
* The details of pause/resume mechanism need to be resolved in potential WI phase, e.g. is pause/resume for all QoE reports or per QoE configuration, how long can the UE store the reports, limit for stored reports size etc. (these points can be captured in TR 38.890)
* Whether the UE stores its QoE configuration when going to RRC INACTIVE state for potential use when the UE moves back to RRC Connected state will be decided in the WI phase.

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# Discussion

## Points being technical agreements

Based upon the email discussion R2-2102243 the below proposals have been drafted.

**Proposal 1: RAN2 agree NR QoE can take LTE QoE solution as baseline. Details can be discussed during the WI phase.**

**LTE QoE solution includes the following key parts:**

1. **Both signaling based and management based initiated cases are allowed**
2. **The LTE QoE feature is activated by Trace Function from the MDT frame work**
3. **Application layer measurement configuration received from OAM or CN can be encapsulated in a transparent container, which is forwarded to UE in a downlink RRC message. Application layer measurements received from UE's higher layer can be encapsulated in a transparent container and sent to network in an uplink RRC message**

**Question: Do companies agree with the above proposal 1?** **Can also provide comments if any.**

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**Proposal 2: Collection of radio related measurements, if needed, should be done by existing methods when they exist such as MDT. There is no intention to duplicate any such functionality from RAN2 point of view.**

**Question: Do companies agree with the above proposal 2? Can also provide comments if any.**

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**Proposal 3: Discuss the collection of radio related measurements and QoE measurements.**

In summary, there are two options:

**Option 1:** QoE reports are extended to include radio measurements (e.g. MDT measurements, L2 measurements), and then RAN can make the correlation between the two measurements. [18]

**Option 2:** Enable time alignment between MDT and QoE measurement, e.g. QoE reference ID can be used to bind the MDT measurements to the QoE measurements. [13]

**The following contributions are about the colletion of radio measurements and QoE measurements:**

[13] R2-2101273 Analysis of QoE measurements at OAM and RAN Ericsson discussion FS\_NR\_QoE

[18] R2-2101806 Discussion on NR QoE management CMCC discussion Rel-17

**Question: Which option do companies prefer? Can also provide comments if any.**

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## FFSs in the TR related with RAN2

**Proposal 4: If the UE is configured with MR-DC, Secondary Node can provide QoE configuration directly to the UE and receive QoE reports directly from the UE.**

For P4, company view are encouraged to input.

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**Proposal 5: The details of QoE handling in MR-DC need to be resolved in a potential WI phase, e.g. how does SN receive QoE configuration from CN/OAM, which SRB is used by SN, whether/how MN-SN coordination is needed (these points can be captured in TR 38.890).**

For P5, company view are encouraged to input.

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TR 38.890 contains an exemplary procedure for RAN visible QoE information reporting, but contains the following FFS;

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| Editor's NOTE: It is FFS whether RAN awareness of QoE information is useful, and whether UE reporting is needed. |

Since companies have different views on the potential mechanism for RAN aware QoE, it is proposed to discuss and agree a Text Proposal capturing advantages and disadvantages as well as specifications impact of different approaches for RAN visible QoE from RAN2 perspective.

**Proposal 6: RAN2 tries to agree on the TP capturing advantages and disadvantages as well as specifications impact of different approaches for RAN visible QoE from RAN2 perspective.**

**Option 1:**  The otherConfig IE of the RRCReconfiguration message can carry the RAN visible QoE Configuration (if support) and QoE measurement configuration container for the QoE configuration transfer.

**Option 2:** Include some high level light QoE metrics (e.g., QoE score per metric of interest or a binary flag per metric of interest) outside the QoE measurement container as part of measReportAppLayer visible to RAN. The light QoE metrics indicate whether QoE requirements are fulfilled or not.

**Option 3:** UE reports two containers: one legacy QoE container and one RAN aware QoE container. RAN aware container is derived from the current QoE container using SA4 defined rule. UE reports the RANaware QoE measurement in the MeasurementReport together with RRM measurements when event-trigger conditions are met and reports the detailed traditional QoE measurements for application optimizations over SRB4 in a similar fashion as LTE QoE reporting.

**Option 4:** There is no requirement towards UE and gNB to extract information from QoE XML Config and Report for the RRC message.QoEConfig and QoEReport should be handled in a transparent manner in RAN. Otherwise, the additional tasks in the UE Access Stratum and gNB, would require tremendous efforts to translate or maintain the XML file in RRC layer (e.g. any changes in the XML file could require additional encoding rules).

**Option 5:** Other options if not included above.

For P6, company view are encouraged to input.

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**Proposal 7: RAN2 should discuss whether RAN is allowed to release an ongoing QoE measurement configuration and reporting. Details can be discussed during the WI phase.**

For P7, company view are encouraged to input.

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## Progress on candidate solutions

**Proposal 8: RAN2 discuss how to capture the solutions about mobility.**

**Option 1:**

- UE indicates to the gNB when the QoE measurement session starts and source gNB forwards this information to target gNB upon handover.

- When the UE leaves the measurement area, QoE configurations for this measurement area are released during handover by the target gNB unless the measurement session is ongoing.

- In case the UE is configured with a QoE configuration, the UE always assumes to be in the measurement area scope and is allowed to trigger a measurement session.

**Option 2:**

- Upon handover, the target gNB includes withinArea indication for QoE configurations which are valid under its coverage.

- The UE is allowed to trigger QoE measurement only for QoE configurations with withinArea indication.

- The UE is allowed to continue ongoing QoE measurements even without withinArea indication.

**Option 3:**

- The gNB configures the UE with the area configuration for each QoE configuration.

- The UE checks the configuration before triggering the QoE measurement.

- The UE continues an ongoing QoE measurement even when leaving the configured measurement area.

For P8, company view are encouraged to input.

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**Proposal 9: RAN2 to discuss whether QoE measurements in RRC IDLE/INACTIVE state should be supported, e.g. for MBS.**

For P9, company view are encouraged to input.

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**Proposal 10: RAN 2 can discuss whether RRC segmentation is needed for transmission of QoE reports. Details can be discussed during the WI phase.**

For P10, company view are encouraged to input.

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## Text Proposal

RAN2 agreements of this meeting are assumed to be captured as a TP to the TR, to be integrated by RAN3.

# 4 Conclusions

*To be added…*

# 5 References

1. R2-2100597 Generic requirements for QMC in NR Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_QoE
2. R2-2100598 QMC procedures principles Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_QoE
3. R2-2100706 Discussion on QoE configuration and reporting vivo discussion Rel-17 FS\_NR\_QoE
4. R2-2100846 Discussion on QoE measurement collection in NR OPPO discussion Rel-17 FS\_NR\_QoE
5. R2-2100879 Discussions on the QoE SI Metrics and Collection Procedures Apple discussion Rel-17 FS\_NR\_QoE
6. R2-2100967 Discussion on NR QoE CATT discussion FS\_NR\_QoE
7. R2-2100995 QoE measurements in NR LG Electronics Inc. discussion Rel-17
8. R2-2101189 Discussion on QoE configuration and report aspects Huawei, HiSilicon discussion Rel-17 FS\_NR\_QoE
9. R2-2101190 Discussion on QoE handling during UE mobility Huawei, HiSilicon discussion Rel-17 FS\_NR\_QoE
10. R2-2101191 Discussion on other QoE aspects Huawei, HiSilicon discussion Rel-17 FS\_NR\_QoE
11. R2-2101271 Solution for QoE Management Ericsson discussion FS\_NR\_QoE
12. R2-2101272 Mobility Support for NR QoE Management Ericsson discussion FS\_NR\_QoE
13. R2-2101273 Analysis of QoE measurements at OAM and RAN Ericsson discussion FS\_NR\_QoE
14. R2-2101338 Handling of NR QoE measurements QUALCOMM INCORPORATED discussion Rel-17
15. R2-2101339 Handling of NR QoE reporting QUALCOMM INCORPORATED discussion Rel-17
16. R2-2101496 Ranking and prioritization of QoE enhancement features QUALCOMM Incorporated discussion Rel-17
17. R2-2101581 Discussion on the RAN2 related work on NR QoE China Unicom discussion FS\_NR\_QoE
18. R2-2101806 Discussion on NR QoE management CMCC discussion Rel-17
19. R2-2101878 Transport of NR QoE report Samsung discussion Rel-17
20. R2-2101879 RRC signaling for NR QoE Samsung discussion Rel-17
21. R2-2101880 Alignment with RAN3 agreements for NR QoE Samsung discussion Rel-17
22. R2-2101917 Miscellaneous discussion on QoE ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_QoE
23. R2-2101918 Discussion on NR QoE continuity during handover ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_QoE
24. R2-2101919 Stop an ongoing QoE measurement reporting ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_QoE