3GPP TSG-RAN WG3 #115-e R3-22xxxx

21 Feb - 3 Mar 2022

Online

**Agenda Item: 15.4**

**Source: ZTE - Moderator**

**Title:** **Summary of Offline Discussion on CB: # QoE6\_MDTAlignment**

**Document for: Approval**

# **Introduction**

**CB: # QoE6\_MDTAlignment**

**- Whether to support the alignment between s-based QoE and m-based MDT.**

**- More clarification/enhancement on the agreed UE-assisted solution?**

**- Clarify the association between QoE and MDT, and clarify the case in which the MDT should or should not be (de)activated according to the start/end of QMC session.**

**- Down selection between the two options for supporting MDT-QoE Alignment in split architecture. Some clarification/revision on Option 1? Option 2?**

**- Whether to support MDT-QoE alignment across multiple gNBs?**

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

(ZTE - moderator)

Summary of offline disc

Please Note:

There would be two rounds of email discussion.

The 1st round is to be ended by Friday (12:00 UTC, 2022-2-25).

The 2nd round is to be ended before the email deadline at second week (13:00 UTC, 2022-3-1).

# **2 For the Chairman’s Notes**

Propose to capture the following:

# **3 Discussion (1st round)**

**3.1 Alignment between s-based QoE and m-based MDT**

*FFS whether to support the alignment between s-based QoE and m-based MDT.*

[1][2][3][4][5] think the alignment of s-based QoE and m-based MDT should be supported.

It is proposed in [1] that when the OAM configures an s-based QoE, it can also request the RAN node to align the s-based QoE with an already configured m-based MDT running at the same time in the same area for the UE.

[5] mentioned that NG-RAN node can select the UE to perform m-based MDT measurement for alignment if the UE satisfies the requirement of MDT.

[2] thinks the alignment can be supported by configuring an m-based MDT measurement in the same area where an s-based QoE measurement is configured for the UE.

[4] thinks OAM can ensure that s-based QoE and m-based MDT have the same area scope and proposes that the alignment and QoE and MDT should only be supported when they have the same area scope.

[6][7] think the alignment of s-based QoE and m-based MDT should not be supported in Rel-17.

The proposals from companies can be concluded as the two options, which have also been discussed at last meeting:

**Option 1:** **OAM can configure an m-based MDT in the same area where an s-based QoE measurement is configured for the UE and ask the RAN node to align the s-based QoE and m-based MDT measurement.**

**Option 2: OAM can request the RAN node to align the s-based QoE with an already configured m-based MDT running at the same time in the same area for the UE.**

**Q1: Whether the alignment of s-based QoE and m-based MDT should be supported in Rel-17? Which option you prefer if it is to be supported?**

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| Company | Yes/No?If yes, Option 1/2/other? | Comments |
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**Q2: Do you think the alignment of QoE and MDT should only be supported when they have the same area scope?**

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**3.2 Clarification/enhancement on the UE-based solution**

UE assisted solution can be used for MDT-QoE alignment. UE can indicate to NG-RAN via a flag whether a QoE measurement session started/ended. If the NG-RAN knows there is an MDT configuration associated with a QoE configuration (e.g., upon receiving NG-RAN Trace ID in the QoE configuration from OAM),

· NG-RAN can configure the UE with that associated MDT configuration upon receiving the QoE measurement session start indication from the UE

· NG-RAN can deactivate the associated MDT configuration upon receiving the QoE measurement session end indication from the UE

[4][7][8] think some clarification is needed on the UE-based solution which was agreed at last meeting. For example, It is mentioned in [8] that the cases of ‘QoE associated MDT’ and ‘normal MDT’ should not be treated the same way by UE-assisted solution. [4] tried to clarify that the (de)activation of MDT based on QoE measurement session start/end indication is used only when RAN receives the QMC and MDT configuration at the same time. [7] further clarifies the different cases and the difference of handling the cases, e.g., the case that MDT and QoE configured simultaneously the case that QMC configured when there is ongoing MDT. All the three papers have one common view that some principle of the UE-based solution shall not always be generally applied — it depends on the cases.

Moderator try to summarize the clarification below:

There are two cases for the alignment of MDT and QoE.

**Case 1**: QoE and MDT are configured simultaneously

**Case 2**: QoE is configured when there is ongoing MDT

For case 1, the MDT is only used for QoE. NG-RAN can configure the UE with that associated MDT configuration upon receiving the QoE measurement session start indication from the UE. NG-RAN can deactivate the associated MDT configuration upon receiving the QoE measurement session end indication from the UE.

For case 2, the MDT is not only used for QoE. NG-RAN cannot deactivate the MDT measurement due to receiving the QoE measurement session end indication.

Based on the clarification above, the agreement related to UE-based solution from last meeting is proposed to be revised as:

UE assisted solution can be used for MDT-QoE alignment. UE can indicate to NG-RAN via a flag whether a QoE measurement session started/ended.

Case 1: QoE and MDT are configured simultaneously, where MDT is only used for QoE.

* NG-RAN can configure the UE with that associated MDT configuration upon receiving the QoE measurement session start indication from the UE
* NG-RAN can deactivate the associated MDT configuration upon receiving the QoE measurement session end indication from the UE

Case 2: QoE is configured when there is ongoing MDT, where MDT is not only used for QoE.

NG-RAN cannot deactivate the MDT measurement due to receiving the QoE measurement session end indication.

**Q3: Do you agree with the above clarification and the revision of previous agreement?**

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Besides, a flag-based solution is proposed in [2], as an enhancement for the UE-based solution we agreed at last meeting. It proposes that NG-RAN can include ‘session start/end indication needed per QoE configuration’ flag in the QoE configuration sent to UE, to solve the problem that UE might blindly send the session start/end indication for all QoE configurations. In addition, NG-RAN can also have a catch-all flag to inform UE that session start/end indication is needed for all QoE configurations.

**Proposal 1:** NG-RAN can include a “**session start/end indication needed per QoE configuration**” flag in the QoE configuration sent to UE indicating that UE should send QoE measurement session start and end indication only for those QoE configurations which require MDT-QoE alignment

**Proposal 2:** NG-RAN can include an “**session start/end indication needed always**” flag in the QoE configuration sent to UE indicating whether UE should send QoE measurement session start and end indication for all QoE configurations

**Proposal 3:** If “**session start/end indication needed always**” flag is set, then “**session start/end indication needed per QoE configuration**” is not to be included in the QoE configuration or should be ignored by the UE if included due to wrong network configuration

Pls note that the UE behavior and RAN2/CT1 impact will be discussed later if the above proposals are agreed.

**Q4: Do you agree with the above proposals?**

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**3.3 MDT-QoE alignment in split architecture**

RAN3 to down select between the following 2 options:

· Option 1: gNB-CU-CP can send the MCE address of the QoE configuration to gNB-DU and gNB-CU-UP so that it can forward the correlated MDT reports to the MCE. Agree to the E1/F1 and TS 38.401 TPs.

· Option 2: OAM should make sure that the MCE and TCE have the same IP address for the correlated QoE-MDT configurations

[3][7][9] select option 1. [3] emphasizes that, in the operator point of view, it is more flexible and feasible to support two network elements for TCE and MCE rather than one same IP address. [7] brought some discussion on the drawbacks of option 2 and want companies to further consider the potential issues which would be caused by option 2.

* Only the QoE reports in the MCE which has the same address with TCE can be correlated with MDT, which puts a unexpected limitation for MDT alignment.
* If OAM has to make sure MCE has the same IP address with TCE, it would go against the requirement from SA5.
* Requirement for OAM to make sure MCE and TCE has the same IP address, which is totally not realistic.

[1][4] prefer option 2 for simplicity. [2] slightly prefers option 2, because this option has less impact on interfaces.

[9] would prefer option 1 with some enhancement, which cares about the situation when the gNB-CU-CP receives a session end indication from UE, but there is still ongoing QoE measurement associated with MDT,which means the MDT reporting should not be deactivated yet. So it proposes that the gNB-CU-CP can just send the MCE address related to the QoE measurement session which just ended, to gNB-DU/gNB-CU-UP to inform it to stop forwarding the MDT reports to the corresponding MCE. For those QoE measurements that are still ongoing, i.e., end indication not received yet, the MDT reports would keep transmitting to related MCE(s).

The proposed revision of Option 1 is as follows:

 **gNB-CU-CP can send the MCE address of the QoE configuration to gNB-DU and gNB-CU-UP so that it can forward the correlated MDT reports to the MCE. Upon receiving the QoE measurement end indication, gNB-CU-CP can send the MCE address of the corresponding QoE session to gNB-DU and gNB-CU-UP, so that it can stop forwarding the correlated MDT reports to the corresponding MCE.**

 **Q5: Which option do you prefer for the alignment in split architecture?**

Pls note: If your select option 1, please share your view about whether the enhancement proposed in [9] on option 1 can be accepted. If you select option 2, please discuss how the drawbacks of option 2 can be solved.

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| Company | Yes/No | Comments |
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It is propsoed in [5] that the following enhancement is needed, if option 1 is selected.

* Include QoE reference in QMC start indication over Uu
* Include the MCE IP addresses in CELL TRAFFIC TRACE message over NGAP
* Include the MCE IP address in Trace Start and UE/Bearer Context Modification request message.

For the first bullet, note that we have the following agreement at last meeting:

 NG-RAN can add a coarse QoE measurement session start/end timestamp autonomously in the QoE report sent to MCE based on QoE measurement session start/end indication from UE.

Moderator assume it is a common understanding in RAN3 that the QoE measurement session start/end indication should be be able to let RAN node understand which QoE measurement job it is related to, otherwise the RAN node would not be able to link the start/end time to the related QoE report. Regarding the QoE reference in start indication, it is acknowledged that RAN2 usually use the RRC level id to identify the QoE measurement job and they would probably make the start/end indication mapped with specific QoE measurement job based on our LS, so it might not be necessary that we add QoE reference in start indication. From moderator’s point of view, a further clarification on the start/end indication would suffice. An example of clarification is provided in proposal 4 below.

The second bullet is proposed for AMF to forward the Trace id and UE identity to MCE (same principle as to TCE), so that the MCE can understand which MDT report is from the same UE.

For the third bullet which is related to signalling procedures, it would be further discussed if option 1 is agreed.

So the enhancements raised in [5] can be reflected into the following two proposals:

**Proposal 4: The QoE measurement session start/end indication should be associated with the QoE measurement job, to enable the RAN node to identify which QoE measurement session has started/ended.
Proposal 5: Include the MCE IP addresses in CELL TRAFFIC TRACE message over NGAP**

 **Q6: Do you agree with the above proposals?**

Pls note: revision on wording is also welcome.

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| Company | Yes/No | Comments |
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**3.4 MDT-QoE alignment across multiple gNBs**

*FFS whether to support the scenario where QoE measurement session span across multiple gNBs configured with m-based MDT with different Trace Reference. The following is to be clarified:*

*· Is this scenario to make sure MCE understands the same UE?*

*· There is no requirement today to ensure an incoming UE (handover from another gNB) is selected for m-based MDT. Isn’t that needed for the above scenario?*

For the first question to be clarified, [5] explains the scenario is to make sure MCE align the MDT reports generated in separated gNBs with the QoE report generated by the UE, noting that there is still no consensus on whether OAM can make sure that TCE and MCE have the same IP address.

For the second question, [2] clarifies that there is no requirement today to ensure that an incoming UE (handover from another NG-RAN) is selected for m-based MDT, but such a scenario is possible for some UEs.

Companies have different view on whether MDT-QoE alignment across multiple gNBs should be supported in Rel-17.

[4][7] think there is no need to support this scenario in Rel-17. [1] proposes to postpone the discussion to R18. [6] thinks this is not a good direction to take, and a reasonable compromise can be that QMC/MDT alignment for a m-based MDT is supported for intra-node operation.

[5] prefers to include QoE Reference in MDT reports, i.e., NG-RAN can include QoE reference in MDT Configuration IE and UE/Bearer Context Modification Request message over F1AP/E1AP so that the gNB-DU and gNB-CU-UP can include the QoE reference in the MDT report for the alignment. This solution has E1/F1 impact and has more impact with MDT reports.

[2] prefers to include Trace ID list in QoE report, which has no impact on MDT reports. But for the final gNB to be informed of the Trace ID of the m-based MDT that UE has experienced, there would be NGAP and XnAP impact.

[3] suggests that RAN3 can select a solution with less impact on MDT mechanism, and further discuss in Rel-18.

Moderator provide the following options based on companies discussion papers:

**Option A: This scenario is not supported in R17. MDT-QoE alignment for m-based MDT can be supported for intra-node operation.**

**Option B-1: Support this scenario by including QoE reference in MDT reports, which might bring E1/F1 impact.**

**Option B-2: Support this scenario by including Trace ID list in QoE reports, which might bring NG/Xn impact.**

**Q7: Which option do you prefer for the scenario of MDT-QoE alignment across multiple gNBs?**

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| Company | Option | Comments |
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**3.5 Measurement content correlation**

[5] mentions that MDT M6 and M7 measurements are measured per DRB, but it is possible that only a subset of the DRBs are served for the service that is associated with the QoE measurement. If the MCE is not aware of the DRB(s) correlation information for QoE alignment, the DRB related measurements in the MDT reports are useless for QoE analysis.

The following proposals are raised in [5]:

**Proposal 6, NG-RAN node can only report the measurements of the related DRBs to the MCE according to the received PDU session ID from UE.**

**Proposal 7, RAN 3 agree to include PDU session ID or QoS flow ID along with the QMC start indication over Uu for DRB related measurement correlation.**

**Proposal 8, RAN3 agree to include DRB ID or QoS flow ID in MDT Configuration IE over F1AP and E1AP for DRB correlation in MCE.**

**Q8: Do you agree with the above proposals?**

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**Other issues:**

If there are any other concerns not covered in the discussion above, please list in the table here.

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| Company | concerns |
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# **4 Conclusion, Recommendations**

See section 2.

# **5 References**

1. R3-221680, (TP for QoE BL CR for TS 38.300) The Alignment of Radio-related Measurements and QoE Measurements (Ericsson)
2. R3-221754, Open issues regarding MDT-QoE alignment (Qualcomm Incorporated)
3. R3-221929, Further discussion on alignment of MDT and QoE Measurements (China Unicom)
4. R3-222226, Further discussions on alignment between QoE measurement and MDT measurement (Huawei)
5. R3-222281, (TP for BL CR to TS 38.473 and TS 38.463) Alignment of MDT and QoE (Samsung)
6. R3-221865, Remaining open points on QMC/MDT alignment (Nokia, Nokia Shanghai Bell)
7. R3-222367, Further consideration on MDT alignment (ZTE, China Telecom)
8. R3-222209, Discussion on Alignment of MDT and QoE Measurements (CATT)
9. R3-222368, Further discussion on MDT alignment in Split architecture (ZTE)