3GPP TSG-RAN WG3 #114bis-e R3-221040

Online, 17th – 26th Jan 2022

Agenda Item: 15.4

Source: Qualcomm Incorporated (moderator)

Title: SoD on CB: # QoE6\_MDTAlignment

Document for: Approval

# Introduction

**CB: # QoE6\_MDTAlignment**

**- Alignment approach: Network based or UE based?**

**- Whether OAM need to include QoE Reference of QMC inside MDT configuration? Whether to include QoE Reference in MDT configuration sent to UE?**

**- Include QoE reference in MDT report for ID correlation in case of QoE Reference associated with multiple MDT reports?**

**- MDT/QMC alignment in split architecture. E1/F1 enhancement?**

**- Whether RAN needs to add time stamp information for MDT and QMC reports to assist with correlation? Other information included by RAN and sent to MCE? e.g., UE’s serving cell CGI, C-RNTI, etc.?**

**- Alignment scenarios: s-based QMC and m-based MDT?**

**- Whether and how to achieve alignment in case QoE reporting is paused? Any enhancement needed or not?**

**- DRB information related to the QoE measurement should be indicated to the gNB or QoE server for correlation?**

**- Focus on key issues, capture agreements and provide TPs if agreeable.**

(Qualcomm - moderator)

Summary of offline disc [R3-221040](https://qualcomm-my.sharepoint.com/personal/shakrish_qti_qualcomm_com/Documents/Desktop/Dropbox/Pentari%20Systems/RAN3/114bis-e/CB/CB%20%23%20QoE6_MDTAlignment/Inbox/R3-221040.zip)

# For the Chair’s Notes

**Proposal 1:** UE assisted solution can be used for MDT-QoE alignment. UE can indicate to gNB via a flag whether QoE Measurement Collection (QMC) is ongoing in the UE. Upon receiving the ongoing QMC indication from the UE, the NG-RAN can configure the UE with an Immediate MDT configuration. Send LS to RAN2 with the agreement.

**Proposal 2**: There is no need for OAM to include the QoE Reference of a QoE configuration in the MDT configuration sent to NG-RAN

**Proposal 3:** There is no need to send any QoE measurement status information from the gNB-CU-CP to the gNB-CU-UP and gNB-DU for the purpose of QoE–MDT alignment. The gNB-CU-CP sends the Immediate MDT configuration to the split RAN entities only after the ongoing QMC indication has been received from the UE.

**Proposal 4:** 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.

**Proposal 6:** Only session start and end timestamps are needed for MDT-QoE correlation. It is not necessary for NG-RAN to timestamp the QoE reports sent in the middle of an ongoing session. MCE can use the *reportTime* included in the QoE report to know the timestamps of those QoE reports.

**Proposal 10:** There is no need for the NG-RAN to include the UE’s C-RNTI and UE mobility history in the QoE report sent to MCE

**To be discussed in 2nd round:**

**Proposal 7**: RAN3 should down select among the following 3 options on adding timestamp information in QoE report:

* **Option 1:** NG-RAN can add session start/end timestamp information in the QoE report sent to MCEautonomously without UE assistance(but this might be inaccurate)
* **Option 2:** NG-RAN can add session start/end timestamp information in the QoE report sent to MCEaccuratelyvia UE assistance of the exact time e.g., UE reports the time elapsed between actual session start/end and the time of reporting the session start/end via RRC.
* **Option 3:** *startTime* / *stopTime* already included by UE in the QoE report can be used for correlating MDT-QoE at MCE

**Proposal 8:** FFS whether to support the scenario where QoE measurement session span across multiple gNBs configured with m-based MDT with different Trace IDs. 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?

**Proposal 9:** FFS whether the scenario that the Trace Recording Session Reference (TRSR) is duplicated among different gNBs when multiple cells are selected as the area scope for the same MDT job is a corner case and hence there is no need for NG-RAN to include the UE’s serving CGI in the QoE report to uniquely identify the TRSR of the correlated MDT.

**To be discussed next meeting:**

**Proposal 5**: FFS whether to support the alignment between s-based QoE and m-based MDT.

# Round-2 Discussion

## Any comments on the Proposals

|  |  |  |
| --- | --- | --- |
| Company | Proposal # | Comment |
|  |  |  |
|  |  |  |

## LS to RAN2 on UE-assisted solution

The moderator requests **Ericsson** to provide a draft LS based on Proposal 1.

**Proposal 1:** UE assisted solution can be used for MDT-QoE alignment. UE can indicate to gNB via a flag whether QoE Measurement Collection (QMC) is ongoing in the UE. Upon receiving the ongoing QMC indication from the UE, the NG-RAN can configure the UE with an Immediate MDT configuration. Send LS to RAN2 with the agreement.

Companies are requested to provide their comments on the draft LS either directly or via comments below:

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |

## Time stamp information in QoE report sent to MCE

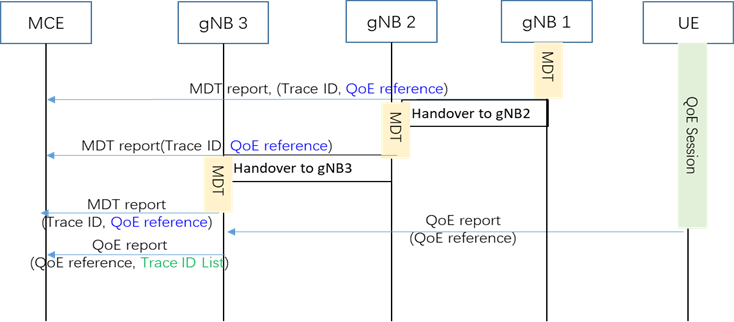
**Proposal 7**: RAN3 should down select among the following 3 options on adding timestamp information in QoE report:

* **Option 1:** NG-RAN can add session start/end timestamp information in the QoE report sent to MCEautonomously without UE assistance(but this might be inaccurate)
* **Option 2:** NG-RAN can add session start/end timestamp information in the QoE report sent to MCEaccuratelyvia UE assistance of the exact time e.g., UE reports the time elapsed between actual session start/end and the time of reporting the session start/end via RRC.
* **Option 3:** *startTime* / *stopTime* already included by UE in the QoE report can be used for correlating MDT-QoE at MCE

**Please provide your option preference:**

|  |  |  |
| --- | --- | --- |
| Company | Option 1/2/3 | Comment |
|  |  |  |

## Case when QoE measurement session span across multiple gNBs with different Trace IDs



**Proposal 8:** FFS whether to support the scenario where QoE measurement session span across multiple gNBs configured with m-based MDT with different Trace IDs. 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 this a new requirement?

**Please clarify and provide your comments whether this scenario should be pursued further. Nd if companies acknowledge the scenario, which option to be considered:**

* **Option 1:** Include QoE Reference in MDT report
* **Option 2:** Include “Trace ID **List**” in QoE report

|  |  |  |
| --- | --- | --- |
| Company | Yes/No for the scenario and Option preference (if Yes) | Comment |
|  |  |  |

## Whether NG-RAN should add UE’s serving cell CGI in the QoE report sent to MCE

**Proposal 9:** FFS whether the scenario that the Trace Recording Session Reference (TRSR) is duplicated among different gNBs when multiple cells are selected as the area scope for the same MDT job is a corner case and hence there is no need for NG-RAN to include the UE’s serving CGI in the QoE report to uniquely identify the TRSR of the correlated MDT.

**Please clarify and provide your comments whether this scenario should be pursued further:**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No for the scenario | Comment |
|  |  |  |

# Round-1 Discussion

## Alignment approach

The following options to align radio-related measurement with QoE measurement have been considered in the previous meetings:

* **Option 1 (OAM based alignment):** OAM can activate/deactivate QoE and MDT appropriately (already agreed)
* **Option 2 (UE assisted alignment):** UE indicates start/stop of QMC to the gNB (application session start and end). Upon receiving the start indication from the UE, the RAN configures the UE with an Immediate MDT configuration
* **Option 3 (UE based alignment)**: UE access stratum keeps MDT configuration pending until the application layer session starts

In this section, the moderator seeks inputs on whether option 2 or option 3 should be supported in addition to option 1 (which is already agreed). Companies’ views in the contributions are summarized below:

**[1], Ericsson: 🡪 option 2**

**Proposal 1:** Send an LS asking RAN2 to specify in RRC signalling the Measurement Session Start and Measurement Session End indications, based on the draft LS presented in Annex A of this paper.

**[6], Samsung 🡪 option 2**

**Proposal 4:** RAN3 agrees that session start indication should be transmitted from UE when the QoE measurement starts at UE Application for the time alignment.

**Proposal 8:** The session start indication and session end indication of QoE measurement should be transmitted over Uu.

**[7], CATT: 🡪 option 2 or option 3**

**Proposal 1**: UE assisted solution (e.g., UE indicates start/stop time of QoE, UE keeps MDT configured pending at RRC till session starts) should be supported if the MDT is configured only for QoE analysis

**[2], Qualcomm:**

Observation 1: Start and stop time of QoE measurements are already included by UE APP in the QoE report sent to OAM/MCE as seen from the following clause in TS 26.114:

*The startTime and stopTime attributes identifies the client NTP time when the measurements included in the report were started and stopped. The time is based on the local real-time clock in the client and might not be consistent with the true NTP time. However, assuming that the reporting is done without any extra delay the server can use the stopTime attribute to correct the timestamps if necessary.*

**Proposal 1:** There is no need to include session start/stop indication from the UE access stratum over RRC for aligning legacy QoE and MDT; start/stop time included by UE APP in the QoE report to OAM is sufficient for alignment purposes. 🡪 No for option 2

**Proposal 2:** OAM based alignment approach i.e. OAM should activate/deactivate QoE/MDT appropriately (e.g., based on startTime/stopTime) is sufficient for aligning radio-related measurements and QoE measurements **🡪 option 1**

**Proposal 3:** UE based alignment approach i.e., the UE keeps MDT configuration pending at RRC till an application session starts should not be considered as such a “suspend” mechanism at RRC doesn’t exist in the current specifications. 🡪 No for option 3

**[3], Nokia**

Proposal 4: The gNB will use the first application layer report sent by the UE to trigger MDT configuration, so there is no need to make the Recording Session Indication explicitly visible to the gNB (hence no RRC impact for session start indication). 🡪 No for option 2

Proposal 5: The gNB adds time stamps to MDT and QMC reports using the same clock at the point in time when the reports transits via the gNB.

**[5], Huawei**

**Proposal 1:** RAN3 to discuss which option to adopt as the solution to the alignment between MDT measurement and QoE measurement. 🡪 Neutral

Considering there is not much support for option 3 and the concern raised by Proposal 3 in [2], the moderator proposes to only discuss Option 2 in Q1 below:

**Q1: Whether option 2 (UE indicating session start/end) needs to be supported in addition to already agreed option 1 (OAM can align MDT/QoE appropriately and is also assisted via session start/end timestamps in QoE report)?**

|  |  |  |
| --- | --- | --- |
| Company | Whether Option 2 is needed | Comment |
| ZTE | No | The start/end time is included in the QoE report by UE APP. There is no need for UE to send any start/end indication to gNB. After all, it is the MCE to perform the correlation of MDT and QoE measurements. |
| Qualcomm | No | Session end indication is definitely not needed (as OAM can use the *stopTime* included in the QoE report to deactivate the MDT if and when needed).  We understand *startTime* included in the QoE report might not be useful to activate MDT immediately upon session start, specially if QoE report is sent only at the end of the session or after a long periodicity. But we still think that MDT and QoE are two independent mechanisms and activation/deactivation of one should not depend on the other. MCE can always correlate the two based on the *startTime*/*stopTime* of the QoE report. |
| Samsung | Yes | Session start and end indications are definitely needed, we don’t think this indication will break any rules of MDT activation/deactivation, MDT can still start before QoE session. For that scenario that MDT starts before QoE session, if we have session start/end indication sent to gNB, one of the merits is that gNB can send the MDT report to MCE according to the indication, otherwise MDT report are no need to be sent to MCE. This is a more efficient way for correlation, as you know the duration of MDT measurement is much longer than that of QoE session in most times, and also one possible scenario is during the whole session of MDT measurement there’s no any QoE measurement session, as QoE measurement depends on UE’s behavior, gNB cannot predict whether the UE will use the service or not in advance, which means the MDT reports send to the MCE are totally useless for QoE analysis in this case.  So sending session start/end indication to gNB will bring benefits for the correlation |
| Huawei | Maybe not | Anyway, it is MCE to correlate the measurements, as long as MCE knows the timing for MDT report. It is true that the two measurements will not be timely synchronized, but that doesn’t impact the correlation. |
| **Ericsson** | **Yes** | * At the RAN3#114-e meeting we agreed a **WA that the measurement status is passed to the target at HO**. * This means that **RAN node needs to be notified by the UE** when the **measurement has started**. * RAN also needs to **know when the session has ended** because it should not pass info about a QMC configuration for which the measurements have ended. * Also note that, in split RAN architecture, we avoid spec impact (chapter 4.3) thanks to session start indication from the UE. * So, **UE should explicitly indicate to RAN that session started/ended**. * This **indication from the UE must be explicit** – the reception of the first report will not do the job because the UE may be configured to send one report per session only, i.e., at the end of the session. * Given the above, and the fact that we already agreed that Ran timestamps the QoE and MDT reports, we conclude that **Option 2 comes for free**. Also, as mentioned by Samsung, OAM cannot predict when application session will start, so an OAM wanting to correlate QoE and MDT might end up throwing away MDT reports if the App session does not start during the MDT meas. This means that **Option 2 is needed.** |
| **CATT** | **Yes and comments** | Firstly, we should separate the UE indicating session start/end and option choice for alignment MDT. SA5 already specified the UE indicating session start/end in 28.405. RAN2 is discussing it and tend to agree it. The UE indicating session start/end is existing function for other purpose.  Secondly, yes, the option 1 can fulfil the correlation between QoE report and MDT report based on the timestamp in MCE. But it is not efficient as SS and E/// said. And also it is not follow our agreement in the SI phase.  Thirdly, the option 2 and option 3 is free and not introduce any more signaling load. The UE indicating session start/end already is there. We just use it to trigger the MDT start. So we can save lots of resource of the UE and network. As SS said, the MDT measurement report out of the QoE start/end is not useful and waste lots signalling and other resource.  Fourthly, option 2 and option 3 is same except who hold the MDT configuration. in option 3, the UE hold the configuration and start the measurement after AS layer receive the QoE start from APP layer. It is more in time than option2.  Fifthly, Regarding the P3 in [2] Qualcomm, UE based alignment approach i.e., the UE keeps MDT configuration pending at RRC till an application session starts should not be considered as such a “suspend” mechanism at RRC doesn’t exist in the current specifications. We think the discussing QoE report pause /resume is the suspend mechanism at RRC. It is feasible and good approach. Also the QoE measurement in app layer also use the suspend mechanism. It starts after application start not immediately start after configured |
| China Unicom | Yes and comments | Since MCE will do the correlation job, UE may not have to indicate session start/end to NG-RAN. However, as UE session start/end indication will be included in the mobility scenario as we discussed in last meeting, it may provide assisting information for NG-RAN like Samsung and E/// mentioned before. |
| Nokia | already sufficiently covered | * We notice the following comment from E///: This **indication from the UE must be explicit** – the reception of the first report will not do the job because the UE may be configured to send one report per session only, i.e., at the end of the session.   We have a different understanding based on SA4 and SA5 spec: TS 26.114: "*When a new session is started, the QoE reporting AT command +CAPPLEVMR [161] shall be used to send a Recording Session Indication. Such an indication does not contain any QoE report, but indicates that QoE recording has started for a session.*").  One can understand from TS 28.405 that the Recording Session Indication is conveyed using the same message as QoE reports (RRC *MeasurementReportAppLayer* message).  So we expect that even if the UE is configured to send one report per session only, it will still additionally trigger a RRC *MeasurementReportAppLayer* message carrying the Recording Session Indication info to the NG-RAN node.  [Moderator]: Not clear. So from your comments, you do seem to support UE sending this Recording Session Indication (session start) to the NG-RAN explicitly over Uu (this is not currently supported). In that case, I assume this is a yes for Option 2?  When it comes to informing the RAN about end of QMC session, we expect that could be nice to have (so that related MDT session could be stopped), but prefer to consider such enhancement in later release. |
| CMCC | Yes | We share view with SS and E///. If the start/stop indication is not introduced, RAN has no clue when to trigger MDT measurement. |

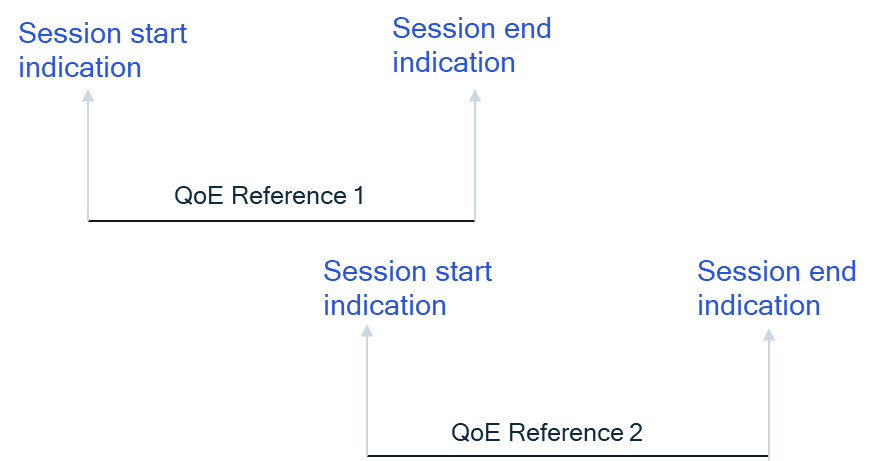
**Moderator Summary:**

Yes (6/9), No (3/9)

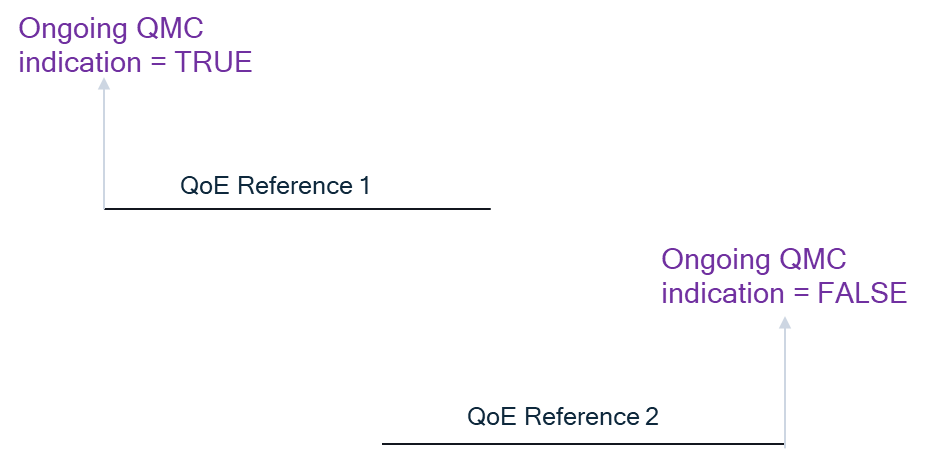
Since this topic has been discussed for several meetings, moderator proposes to follow the majority view and introduce some kind of UE assistance to align MDT and QoE.

It is however not clear to the moderator whether the UE assistance should be per session (option 1) or per UE (option 2).

**OPTION 1 (Session start/end indication)**



**OPTION 2 (Ongoing QMC indication)**



Considering some companies had concerns regarding the overhead in Uu for Option 1 i.e., if UE assistance is sent per each session, the moderator proposes to use Option 2 as a compromise.

**Proposal 1:** UE assisted solution can be used for MDT-QoE alignment. UE can indicate to gNB via a flag whether QoE Measurement Collection (QMC) is ongoing in the UE. Upon receiving the ongoing QMC indication from the UE, the NG-RAN can configure the UE with an Immediate MDT configuration. Send LS to RAN2 with the agreement.

## Whether OAM need to include QoE Reference of QMC inside MDT configuration?

**[1], Ericsson:**

**Observation 6**: Based on the TR received from the OAM in the QoE configuration, the RAN can configure the same UE with an m-based Immediate MDT configuration.

**Proposal 7:** There is no need to include the QoE reference in the MDT configuration for the purpose of enabling the RAN to select the same UEs for MDT and QMC.

**[3], Nokia:**

**Proposal 2**: OAM includes the QoE reference of the QMC configuration in m-based MDT configuration sent to NG-RAN in order to enable the gNB to select same UEs for MDT and QMC and to link the MDT configuration to the corresponding QMC configuration for which alignment is requested.

**Proposal 7**: OAM includes the QoE reference of the QMC configuration in s-based MDT configuration sent to NG-RAN in order to enable the gNB to link the MDT configuration to the corresponding QMC configuration for which alignment is requested.

**[4], CUC:**

**Proposal 1**: OAM should configure an m-based MDT along with m-based QoE with the same area scope.

**Proposal 2**: NG-RAN should ignore the new MDT configuration along with the m-based QoE if there is an ongoing MDT measurement for the selected UE.

**Proposal 3**: An explicit indication for NG-RAN to perform alignment of MDT and QoE should be needed.

**[5], Huawei:**

Proposal 4: Not need to introduce the QoE reference in the MDT configuration.

**[8], ZTE:**

Proposal 1: There is no need for OAM to additionally include the QoE Reference of QMC configuration in m-based configuration sent to NG-RAN.

**[2], Qualcomm:**

**Proposal 7**: Alignment of m-based MDT and m-based QoE can only be achieved for UEs which satisfy the area scope of both MDT and QMC. Alignment can’t be achieved for UEs which don’t satisfy the common area scope.

**Proposal 9:** UE selection process for m-based MDT and m-based QoE should not be impacted for the sake of MDT-QoE alignment, for example, OAM should not include the QoE reference of the QMC configuration in m-based MDT configuration sent to gNB in order to select same UEs for MDT and QMC

**Q2: Whether OAM need to include the QoE Reference of QMC inside MDT configuration sent to NG-RAN?**

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comment |
| ZTE | No | We don’t think any impact on current MDT mechanism should be introduced. |
| Qualcomm | No | UE selection process for m-based MDT and m-based QoE should not be impacted for the sake of MDT-QoE alignment, for example, OAM should not include the QoE reference of the QMC configuration in m-based MDT configuration sent to gNB in order to select same UEs for MDT and QMC  Alignment of m-based MDT and m-based QoE can only be achieved for UEs which satisfy the area scope of both MDT and QMC. And for those UEs, we already agreed to include TR/TRSR in QoE configuration to achieve correlation. |
| Samsung | Yes | Now we know that the MDT activation and QMC activation are not in the same message, so for s-based QMC and MDT, include QoE reference in the MDT configuration is needed, so that the gNB knows this MDT is for the alignment and will send the MDT report to the MCE, otherwise it won’t send the MDT report to MCE.  But for the m-based QMC and MDT, gNB is responsible for UE selection, so the gNB is aware of relations between QMC and MDT.  **[Moderator view]:** gNB should know the relation between QMC and MDT even in case of s-based MDT. Say, if a s-MDT is initially configured and then a s-based QMC is sent along with the Trace ID of the s-MDT, so the gNB will now know that this QMC is associated a previously configured MDT and will start sending the subsequent MDT reports belonging to that Trace ID to the MCE as well. |
| Huawei | No | The MCE can associate all the results of the same UE, in addition, we should not bring any impacts on the existing MDT function. |
| **Ericsson** | **No need** |  |
| **CATT** | **no** |  |
| China Unicom | No | Not need to include the QoE reference in the MDT configuration since OAM would be aware of which MDT measurement is for alignment job. |
| Nokia |  | For simplicity we can be fine to follow the majority's view not to include the QoE Reference in m-based MDT configuration for the purpose of avoiding impact on MDT. But this also means that in practice the operator will not be able to use MDT/QMC alignment for m-based activation because the m-based MDT will be configured in UEs independently of any QMC.  **[Moderator view]:** True the m-based MDT will be configured independent of the QMC i.e., no effort will be made to ensure the same UE is configured with m-based MDT and m-based QMC. But in case there is a UE in the same area scope and configured with both m-based MDT and m-based QMC, then we can achieve correlation by sending the m-based MDT reports to MCE as well. |
| CMCC | No | We share the view that OAM will understand which MDT is used for QoE alignment and configure the proper CE address accordingly. |

**Moderator summary:**

No (8/9), Yes (1/9)

**Proposal 2**: There is no need for OAM to include the QoE Reference of a QoE configuration in the MDT configuration sent to NG-RAN

## MDT/QMC alignment in split architecture

**[1], Ericsson:**

**Proposal 4**: There is no need to send the QoE measurement status information from the CU-CP to the CU-UP and DU for the purpose of QoE – MDT alignment.

**Proposal 5:** The CU-CP sends the Immediate MDT configuration to the split RAN entities only after the QoE Measurement Session Start indication has been received from the UE.

**[6], Samsung:**

**Proposal 9**: In split architecture, the session start indication and session end start indication of QoE measurement should be transmitted over F1AP and E1AP.

**Proposal 10:** If option 1 “Pending Immediate MDT measurements until the session start is indicated” is agreed, an indicator is needed to notify the UE/DU/CU-UP not start MDT measurement once configured.

**[8], ZTE:**

**Proposal 3:** The corresponding procedure for split architecture should be specified in 38.401, considering s-based QoE and s-based MDT, m-based QoE and m-based MDT, no matter E1/F1 enhancement is needed or not.

**Observation 1:** In split architecture, gNB-CU-CP, gNB-DU and gNB-CU-UP can all perform MDT measurements, as specified in clause 8.13 of TS38.401. For gNB-CU-CP, the SA solution can be applied and no enhancement is needed. For gNB-DU and gNB-CU-UP, E1 and F1 enhancement is needed for alignment of MDT and QoE.

**Observation 2:** With the QoE Assistance information, the gNB-DU and the gNB-CU-UP can be notified about the information needed for the alignment of QoE and MDT, such as when to send the MDT and QoE reports to the MCE and when to stop, the IP address of the MCE, etc.

**Proposal 5**: To introduce QoE Assistant Information IE over F1AP and E1AP for alignment of QoE report and MDT report.

**[2], Qualcomm:**

**Proposal 6**: CU-CP should inform DU and CU-UP (the entities that are performing a portion of the MDT measurements e.g., M5/M7) about the MCE address where the aligned QoE/MDT reports are collected so that it can send the MDT reports to MCE as well (in addition to TCE)

**Q3: Whether any F1/E1 enhancement needed to support MDT-QoE alignment in split gNB architecture?**

* **Option 1:** There is no need to send the QoE measurement status (session start/stop) information from the CU-CP to the CU-UP and DU for the purpose of QoE – MDT alignment. The CU-CP sends the Immediate MDT configuration to the split RAN entities only after the QoE Measurement Session Start indication has been received from the UE.
* **Option 2**: gNB-DU and the gNB-CU-UP can be notified about the information needed for the alignment of QoE and MDT, such as status change information to indicate DU/CU-UP to start/stop sending MDT reports to MCE, the IP address of the MCE, etc.

It is moderator’s view that the support of session start/stop indication from CU-CP to DU and CU-UP in case of option 2 also depends on the discussion in section 4.1. However, whether CU-CP can indicate the IP address of the MCE to DU and CU-CP (so that the split RAN entities can forward the MDT results to MCE in addition to TCE) can be an independent discussion.

|  |  |  |
| --- | --- | --- |
| Company | Option 1 or Option 2 | Comment |
| ZTE | Option2 with some revision | It seems our proposal has caused some ambiguity. We would like to make some clarification here.  Firstly we want to clarify on some wording in our proposal ‘when to send the MDT and QoE reports to the MCE and when to stop’, which is highlighted in green by Moderator. The words does not equal to the session start/stop indication discussed in section 4.1. btw we are not supporting start/stop indication in that part.  Actually ‘when to start/stop’ is related to the activation and deactivation of QMC, which we call called ‘QoE measurement status change’ in our paper (but seems the words ‘QoE measurement’ should be removed to avoid ambiguity). To be specific, if at least one QMC with the alignment indication(Trace ID) is received by CU-CP, the CU-UP/DU should starts sending MDT reports to MCE for alignment. Likewise, when all the QMC with alignment requirement are deactivated in CU-CP, the CU-UP/DU should be notified to stop sending MDT reports to MCE.  That’s why we propose to add the new IE ‘**QoE Assistance Information IE**’ over E1/F1. In order to prevent ambiguity, we try to make some revision on our proposal and further clarify our intention here.  The new introduced **QoE Assistance Information IE** over E1/F1, which includes the following two IEs:  **- ~~QoE measurement~~ status change information (e.g., start, stop, etc.)**  **- MCE IP address**  The status change information is used for CU-UP/DU to take corresponding actions like starting or stopping sending MDT reports to MCE, which at least includes the following two cases:   * when CU-CP receives at least one QMC configuration which includes a Trace Id (the implicit indicator as we agreed for MDT alignment) , the gNB-CU-CP should immediately send a QoE Assistance Information to CU-UP/DU, by setting status change information IE into ‘Start’, to notify the gNB-CU-UP or gNB-DU to start sending MDT reports to MCE. * when CU-CP receives the deactivation message resulting in the deactivation of all existing QMC with alignment requirement, it should send a QoE assistance Information IE to notify the CU-UP/DU to stop sending MDT reports to MCE, by setting the status change information into ‘Stop’.   We think the status change information is needed, so that the MDT reports in gNB-CU-UP and gNB-DU can be well handled for the alignment with QMC. And of course MCE IP address is also needed for CU-UP/DU to transmit the MDT reports to MCE.  Hope the discussion above clarifies.  And we try to make a revision on Option 2 as below to make it more clear:   * gNB-DU and the gNB-CU-UP can be notified about the information needed for the alignment of QoE and MDT, such as ~~when to send the MDT and QoE reports to the MCE and when to stop~~ status change information to indicate DU/CU-UP to start/stop sending MDT reports to MCE, the MCE IP Address, etc. |
| Qualcomm | Option 2 | gNB-DU and gNB-CU-UP should start/stop sending the MDT reports to MCE upon receiving a notification from gNB-CU-CP. MCE IP address should also be informed. |
| Samsung | Option 1 | We think the intension of the option 1 and option 2 are the same i.e. to notify DU/CU-UP to send the MDT reports to MCE , but option 1 is more efficient than option2. As we all know that the QoE measurement session may not start once configured, if option 2 is chosen, one possible scenario could be a lot of MDT reports sent to MCE, but there’s no any QoE report for correlation as the QoE measurement has not been started yet according to UE’s behavior. So all of those signalling on F1/E1 or between gNB and MCE are wasted and mean nothing for correlation. |
| Huawei | See comments | Not sure if we need such proposal. In our understanding, the mechanisms of MDT measurements should not be impacted at RAN side. Even if QoE measurement is temporarily stopped, the corresponding MDT could still be continued, since the QoE report will indicate the period of measurement being performed. |
| **Ericsson** | **Option 1** | Option 1 has an advantage of little to no spec impact, i.e., **it comes for free**. We think that the revised Option 2 (ZTE’s reply to this question) makes Option 2 even less attractive because the QoE session may never start, and MDT measurements are then collected in vain. |
| **CATT** | **Option 1** | But looks the two options are not in the same line and there are two solution for two different things |
| China Unicom | Option 1 |  |
| Nokia | Option 1 |  |
| CMCC | Option 1 | But we do not think MDT and QoE reports has impact on CU-UP or DU since it should be collected by CU-CP over SRBs. |

**Moderator summary:**

Option 1 (6/9), Option 2 (2/9), Neither (1/9)

Considering the majority view, Option 1 is proposed to be accepted. In addition, moderator proposes a subset of Option 2 i.e., the gNB-CU-CP to send the MCE address of the correlated QoE to gNB-CU and gNB-CU-UP

**Proposal 3:** There is no need to send any QoE measurement status information from the gNB-CU-CP to the gNB-CU-UP and gNB-DU for the purpose of QoE–MDT alignment. The gNB-CU-CP sends the Immediate MDT configuration to the split RAN entities only after the ongoing QMC indication has been received from the UE.

**Proposal 4:** 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.

## Alignment between s-based QoE and m-based MDT

**[1], Ericsson:**

**Observation 5:** The OAM may use the following solutions for the alignment of s-based QoE and m-based MDT measurement at a UE:

• Configuring an m-based MDT measurement in the same area where an s-based QoE measurement is configured for the UE and asking the RAN node to align the s-based QoE measurement and m-based MDT measurement.

• Requesting the RAN node (as part of s-based QoE configuration) to opportunistically align the s-based QoE measurement with any available MDT measurement for the UE.

**Proposal 2:** The Rel-17 NR QMC supports the alignment scenario between s-based QoE and m-based MDT measurements for the same UE.

**Proposal 3:** The OAM can request a RAN node to align any available MDT measurement with an s-based QoE measurement running at the same time at the UE.

**[3], Nokia:**

**Proposal 1:** Rel-17 NR QMC will NOT support the scenario: s-based QoE and m-based MDT

>> If this scenario were to be supported, a new UE selection mechanism for m-based MDT would be needed. This mechanism would have to ensure that UEs receiving s-based QMC activation are selected for m-based MDT, and we think that such mechanism doesn't fit well with legacy m-based MDT selection mechanisms and therefore should be avoided. Also, nothing prevents an operator to also provide s-based MDT configuration together with s-based QMC.

**[8], ZTE:**

**Proposal 4:** There is no need to support the alignment of s-based QoE and m-based MDT. It can be left to R18.

**[2], Qualcomm:**

**Proposal 8:** Alignment of s-based QoE and m-based MDT is not always guaranteed (as there is no guarantee that a UE configured with s-based QoE also meet the requirements of m-based MDT). Alignment can however be achieved for those UEs which are configured with s-based QoE and also meets the requirements of m-based MDT.

**Q4: Whether the alignment of s-based QoE and m-based MDT should be supported? If yes, which alignment options can be considered?**

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

**Option 2:** Requesting the RAN node (as part of s-based QoE configuration) to opportunistically align the s-based QoE measurement with **any available** MDT measurement for the UE.

* Extend the ***MDT Alignment Information*** CHOICE structure in the QoE BL CRs for TS 38.413 and TS 38.423 with an indication requesting the recipient NG-RAN node to align the s-based QoE measurement with any available MDT measurement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CHOICE *MDT Alignment Information* | O |  |  | Indicates the MDT measurements with which alignment is required. |
| >S-based MDT |  |  |  |  |
| >>NG-RAN Trace ID | M |  | OCTET STRING (SIZE(8)) | This IE is composed of the following: Trace Reference defined in TS 32.422 [11] (leftmost 6 octets, with PLMN information encoded as in 9.3.3.1), and Trace Recording Session Reference defined in TS 32.422 [11] (last 2 octets). |
| >M-based MDT |  |  |  |  |
| >>Trace Reference | M |  | OCTET STRING (SIZE(6)) | *Trace Reference* defined in TS 32.422 [11]. |
| >Any MDT Measurement |  |  |  | This option is present only in the case of s-based QoE measurement. |

|  |  |  |
| --- | --- | --- |
| Company | Option 1 and/or Option 2 | Comment |
| ZTE |  | We don’t see any strong necessity to support the alignment of s-based QoE and m-based MDT. Additional , how to ensure the UEs receiving s-based QMC activation are selected for m-based MDT is not clear. It can be left to R18 if needed.  And Option 1 cannot be accepted. As has been mentioned, MDT configuration should not be impacted by QoE, not even in the selection of area. |
| Qualcomm | Option 1 | We think Option 1 does not mean we have to support the alignment of s-based QoE and m-based MDT in all cases; but alignment can however be achieved for those UEs which are configured with s-based QoE and also meets the requirements of m-based MDT.  Further, we **seek clarification on option 2:**  What does it mean to align with any available MDT? By setting this indicator, does it mean any existing MDT can be activated/deactivated based on QoE session start/stop? If so, we don’t prefer this as this becomes too restrictive on all existing MDT configurations. Even without this indicator, NG-RAN will send MDT report to TCE and QoE report to MCE which can be correlated, if needed. |
| Samsung | Option 1 or 2 | Similar view as QC.  We think the scenario is possible. But we don’t see the difference between option 1 and option 2, if my understanding is right, we think both of them means that there should be an indication asking the NG-RAN node if there’s any m-based MDT can be used for alignment with s-based QMC. |
| Huawei |  | A bit tricky here. Since the OAM knows that which specific UE has been configured with QoE measurement for S-based QoE, but OAM doesn’t know if there is an ongoing MDT measurement for that UE even OAM knows that M-base MDT has been configured for that area. Then from OAM part, maybe there is no difference between asking for S-based or M-based MDT for S-based QoE? The main thing here is for RAN node to check if there is an ongoing M-based MDT measurement for that UE, if there is one, RAN node just tries to report together with timing info. So, the further question is, what additional spec impacts needed? |
| **Ericsson** | Both options | Answers to QC and Samsung are provided above. The answer to Huawei question: there is a small spec impact: we need the third codepoint in the Alignment Info CHOICE to enable this. |
| **CATT** |  | We don’t think we need support the alignment between s-based QoE and m-based MDT. It is introduce more complex scenario and it not guaranteed |
| China Unicom | Option 1 and option 2 | If there is no MDT measurement for the UE, Option 1 would provide the solution for configuring MDT and QoE simultaneously for alignment purpose, on the other hand, if there is an ongoing MDT measurement for the UE, Option 2 could be work out under this circumstance. |
| Nokia | not needed | We don't see any added value coming from aligning s-based QMC with m-based MDT, just standards and implementation cost… |
| CMCC |  | Not sure if we can go this far, which may restrict implementation. |

**Moderator summary:**

* Neither (4/9)
* Option 1 and Option 2 (3/9)
* Option 1 (1/9)
* Clarification required (1/9)

There is no consensus on whether to support the alignment between s-based QoE and m-based MDT and it is proposed to discuss the FFS next meeting.

**Proposal 5**: FFS whether to support the alignment between s-based QoE and m-based MDT.

## Timestamp information in QoE report sent to MCE

**[3], Nokia:**

**Proposal 5:** The gNB adds time stamps to MDT and QMC reports using the same clock at the point in time when the reports transits via the gNB.

**[8], ZTE:**

**Proposal 2:** MCE can use the session start and end information inside the QoE report to help with the correlation between MDT and QoE. There is no need for RAN to add the start and end time to the QoE measurement report. No enhancement is needed for the case that QoE reporting is paused.

**[2], Qualcomm:**

**Observation 1:** Start and stop time of QoE measurements are already included by UE APP in the QoE report sent to OAM/MCE as seen from the following clause in TS 26.114**:**

*The startTime and stopTime attributes identifies the client NTP time when the measurements included in the report were started and stopped. The time is based on the local real-time clock in the client and might not be consistent with the true NTP time. However, assuming that the reporting is done without any extra delay the server can use the stopTime attribute to correct the timestamps if necessary.*

**Proposal 4**: As UE already includes the session start and end time stamp in the QoE report sent to OAM, NG-RAN need not include the session start/end timestamp in the QoE report sent to MCE to avoid duplicity.

**Proposal 5**: Make following changes to the previous agreement:

*To enable time alignment between an already ongoing Immediate MDT and a QoE measurement started later, the start time and end time of the QoE measurement* ***included in the QoE report can be used****, in addition to the Trace Reference and Trace Recording Session ID~~, needs to be added to the QoE measurement report at the NG-RAN node~~.*

**Q5:** Companies are requested to provide their preference on the following 2 options for time alignment:

**Option 1:** startTime / stopTime already included by UE in QoE report is sufficient for time alignment at MCE

**Option 2:** NG-RAN needs to explicitly add session start/end timestamp information in the QoE report sent to MCE

|  |  |  |
| --- | --- | --- |
| Company | Option 1 or Option 2 | Comment |
| ZTE | Option 1 | Start time and stop time are already included in the QoE report. It seems unnecessary for the NG-RAN to add start/end time information with the QoE report sent to MCE. |
| Qualcomm | Option 1 | Same view as ZTE. We propose to refine the previous agreement as shown in Proposal 5 in [2] |
| Samsung | Option 2 | It had already agreed in previous meeting that we should use gNB clock for correlation as MDT report is using gNB clock as well. That’s the reason why gNB should add the session start/end timestamp in the gNB clock in the QoE report. |
| Huawei | No strong opinion | If timing info for MDT is included, which for sure would help MCE correlate; if there is no timing info for MDT report, as long as QoE report contains timing info and MCE will take the timing info when MDT report is received into account (assuming there is no significant delay of MDT report at RAN). With this understanding, RAN to include timing info about sending configuration and receiving report would be helpful. |
| **Ericsson** | **Option 2,** has already been agreed. | Why are we discussing this at all? We have already agreed this 2 meetings ago, so this discussion is closed in our view. |
| **CATT** | **Both are ok No strong opinion** | The gNB is responsible for the timestamp added for MDT report. And the QoE report already includes the time stamp. We may suppose the time is synchronized between UE and gNB |
| China Unicom | Option 1 | StartTime / stopTime included by UE in QoE report is sufficient. |
| Nokia | Option 2 | We also thought option 2 was already agreed. The MDT measurements are not timestamped by the UE (and many of those are BTW done by the network). So network time stamping is obviously needed for MDT. Then, as QC mentions: " *The time* [in the UE APP layer] *is based on the local real-time clock in the client and might not be consistent with the true NTP time.*" So it can't be assumed that UE time and network time are aligned. Hence also QoE reports need network time stamp. |
| CMCC | Option1 | But we share the view that the MDT time stamping is obviously needed. |

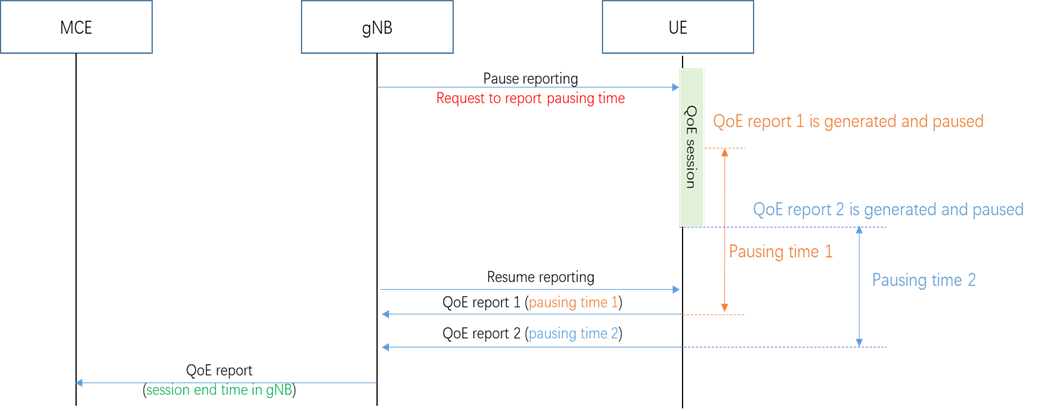
**Moderator summary:**

* Option 1 (4/9), Option 2 (3/9), No strong opinion (2/9)

Moderator acknowledges that the RAN based timestamping was agreed in previous meetings. But this topic is brought up again based on the latest observation by QC in [2] that the *startTime* and *stopTime* are already included by UE in the QoE report directly sent to MCE and can be directly used for correlating with the MDT reports. Using the RAN based timestamping (based on session start/stop indication from UE) can be inaccurate as well without the “Pausing time” discussed in section 4.6 and it might be better to depend on the absolute timestamp included in the QoE report sent by UE.

Moderator proposes to discuss this issue together with the “Pausing time” in section 4.6.

## QoE–MDT alignment when QoE reporting is paused



**[3], Nokia:**

Observation: MDT/QMC alignment in case of paused QoE reporting will require the UE to report the time elapsed between generating the QoE report and the time of reporting the QoE report via RRC.

**[5], Huawei:**

Observation 3: As long as QoE measurement start and end time corresponding to each QoE measurement report are available at RAN side, i.e., option 1 above is adopted, there will be no issue for the alignment between MDT and a paused QoE measurement report.

**[6], Samsung:**

Proposal 5: If the QoE report is paused, a pausing time should be included in the QoE report to help gNB calculate the actual session start and end time in gNB clock.

Proposal 6: A request to report pausing time should be notified to UE in advance to distinguish the normal QoE report without alignment requirements.

**[7], CATT:**

Proposal 4: In case of alignment between MDT and a paused QoE, UE does not report the time elapsed between generating the QoE report and the time of reporting the QoE report

**[8], ZTE:**

Proposal 2: MCE can use the session start and end information inside the QoE report to help with the correlation between MDT and QoE. There is no need for RAN to add the start and end time to the QoE measurement report. No enhancement is needed for the case that QoE reporting is paused.

**[2], Qualcomm:**

Proposal 10: There are no enhancements needed to support alignment between MDT and a paused QoE, for example, UE need NOT report the time elapsed between generating the QoE report and the time of reporting the QoE report i.e., when reporting is resumed

**Q6: Whether UE should report the Pausing time i.e., the time elapsed between generating the QoE report and the time of reporting the QoE report via RRC, to achieve alignment when QoE reporting is paused?**

It is moderator’s view that this “pausing time” is not only restricted to the pause/resume scenario in case of overload e.g., a UE would report the QoE report via RRC only when it has SRB4 and when there are sufficient grants available; so this delay is inherent and can’t be avoided in most cases.

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comment |
| ZTE | No | No matter how long the QoE reporting is paused, the start/end time in the QoE report can be enough for MCE to perform correlation. There is no need to report the time elapsed. |
| Qualcomm | No | We understand that this pausing time is for correcting the timestamps of all the intermediate QoE reports (not just related to the session start/stop timestamp).  But as the moderator highlighted this “pausing time” is not only restricted to the pause/resume scenario in case of overload e.g., a UE would report the QoE report via RRC only when it has SRB4 and when there are sufficient grants available; so this delay is inherent and can’t be avoided in most cases.  Asking UE to calculate this “Pausing time” for each QoE report is too much of an overhead. Further, we already have a solution in SA4 as each QoE report is timestamped via **reportTime** (as shown below) and can be used directly at the MCE.  From TS 26.247,  **@reportTime:** If present, is indication to the DASH client that each interactivity usage report by the DASH client should be accompanied by the wall-clock time at which the report is sent. |
| Samsung | Yes | It was agreed to use gNB clock in QoE report in previous RAN3 meeting, so if the report is paused, the gNB should know the elapsed time in order to include the right session start/end timestamp in gNB clock. |
| Huawei | Yes | In our understanding, it is better that UE includes the QoE measurement start and end time in the QoE measurement report message, for the RAN to forward together with QoE report to TCE, for correlation; |
| **Ericsson** | **Yes** | Same view as Samsung – we already agreed that RAN timestamps the reports, so without this correction, problems may arise when reporting is paused. Moreover, even if the “report delaying” scenario is not exclusive to overload, it still holds that the mismatch will be higher in overload than in case SRB4 grants are a bit delayed. |
| **CATT** | **No** | During the pause/resume, the QoE measurement will not stop. The report is no difference from the normal one. The session start and end time will not change. Why we need know the elapsed time. |
| China Unicom | No | As UE session start/stop time is included in the QoE report, QoE pausing time would be no need for time alignment job. |
| Nokia | Probably yes, or any other option? | If UE time is used, the MCE must be able to determine the offset between the clocks in the UE and in the network in order to align MDT (not paused) with QMC (paused). E.g. the first QoE report could be unaffected by pause, so that the MCE could use it to determine the time offset? |
| CMCC | Probably no |  |

**Moderator summary**

No (5/9), Yes (4/9)

Most companies acknowledge that this timer is not limited to the pause/resume scenario but also might be needed in other scenarios e.g., when SRB4 grants are delayed. For correctness, we will use “QoE report correction time” instead of “Pausing time” henceforth.

There is no consensus on the need to include “QoE report correction time”.

To assist in further discussion, moderator proposes the following to see if there is a common understanding of the group:

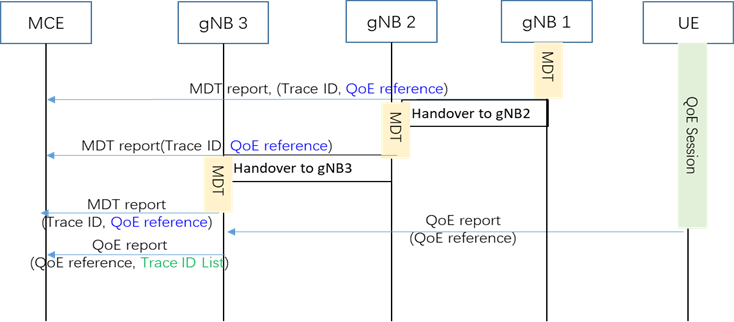
**Proposal 6:** Only session start and end timestamps are needed for MDT-QoE correlation. It is not necessary for NG-RAN to timestamp the QoE reports sent in the middle of an ongoing session. MCE can use the *reportTime* included in the QoE report to know the timestamps of those QoE reports.

**Proposal 7**: RAN3 should down select among the following 3 options on adding timestamp information in QoE report:

* **Option 1:** NG-RAN can add session start/end timestamp information in the QoE report sent to MCEautonomously without UE assistance(but this might be inaccurate)
* **Option 2:** NG-RAN can add session start/end timestamp information in the QoE report sent to MCEaccuratelyvia UE assistance of the exact time e.g., UE reports the time elapsed between actual session start/end and the time of reporting the session start/end via RRC.
* **Option 3:** *startTime* / *stopTime* already included by UE in the QoE report can be used for correlating MDT-QoE at MCE

Proposal 7 can discussed further in the next round.

## Case when QoE measurement session span across multiple gNBs with different Trace IDs



**[6], Samsung**

**Observation 1:** In case of m-based/s-based QoE and s-based MDT, one QoE report may be associated with multiple gNBs, if adding using trace ID for correlation, multiple NG-RAN Trace IDs and corresponding time duration should be transmitted over Xn and included in the QoE report at the gNB that receives the QoE report.

**Proposal 3:** To support the ID correlation in case of one QoE report associated with multiple MDT reports from different gNBs, RAN3 agrees to include QoE reference in MDT report for ID correlation.

**Q7:** Do companies acknowledge the scenario as shown in the above figure as described in [6]? If so, companies’ views are requested on their preference in the following 2 options.

* **Option 1:** Include QoE Reference in MDT report
* **Option 2:** Include “Trace ID **List**” in QoE report

|  |  |  |
| --- | --- | --- |
| Company | Option 1 or Option 2 | Comment |
| ZTE |  | We think the scenario considered by [6] is a corner case. There is no need to take any further actions for that case. |
| Qualcomm | Clarification needed | **Seek clarification on the scenario:**  So here each gNB is configured with a m-based MDT with a different Trace Reference and all those m-based MDTs are to be aligned with the QoE session? Also, why are we not having a single MDT session which is propagated even when there are handovers? Can’t the m-based MDT be propagated during handovers? |
| Samsung | Option 1 | Actually this is not a corner case, imaging you’re watching TV on the bus/train (one QoE session for the streaming service will across multiple gNBs) and it will happen in case of the alignment of m-based QMC and m-based MDT or in case of the alignment of s-based QMC and m-based MDT (the support of the latter is FFS, depend on 4.4), so we can talk about the former case.  As we know that even it’s a m-based QMC, the on-going measurement session will not stop even the UE moves to a new cell, and the m-based QMC information has already been agreed to be propagated during handover, so the scenario is possible. And to reply to QC, yes, our understanding is that each gNB is configured with m-based MDT with different Trace References during the QoE session, it means one QoE reference should be correlated to multiple Trace References from different gNBs. And currently, the m-based MDT is not propagated during handovers, so it would be easier for correlation if we include QoE reference in MDT report as well. |
| Huawei | Not sure | It seems the proponent assumes that each base station is configured with M-based MDT with different trace ID? If so, the main thing is not to include QoE Reference ID in MDT report or “Trace ID List” in QoE report, but to make sure the MCE understands the same UE? |
| **Ericsson** | Clarification needed | Similar view as Huawei |
| **CATT** | Not sure | Why so many different trace activated for one UE in the neighbour gnb |
| China Unicom | Not sure | Similar view as Huawei |
| Nokia | Ack the scenario | M-based (aka area-based) MDT is configured per NG-RAN node. And indeed an ongoing QMC session could very well span multiple nodes (very frequent case, as mentioned by Samsung). However, in legacy specification there is no requirement ensuring that an incoming UE is selected for m-based MDT. And companies seemed to prefer impact on legacy MDT from this WI. Probably it is better to postpone alignment of m-based MDT/m-based QMC to Rel-18. |
| CMCC | Ack the scenario | We share view with Nokia. |

**Moderator summary:**

* Clarification required (5/9), Ack the scenario (3/9), No (1/9)

Companies still seek clarification on the above scenario, specially:

**Proposal 8:** FFS whether to support the scenario where QoE measurement session span across multiple gNBs configured with m-based MDT with different Trace IDs. 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?

Moderator hence proposes to discuss this in the next round of discussion.

## Additional information in QoE report sent to MCE

**[CUC]:**

**Proposal 4:** In case of aligned MDT/QMC, NG-RAN includes Trace Reference and Trace Recording Session Reference and the **UE’s serving cell CGI** in the QoE report sent to MCE.

**[Huawei]:**

**Observation 4:** RAN3 needs to consider how the collection entity knows to which UE these reported information from NG-RAN belong.

**Observation 5**: Trace Reference/ trace recording session reference can globally identify a UE in case of signalling based measurement but cannot globally identify a UE in case of management based measurement.

**Proposal 2**: For m-based QoE and m-based MDT, the NG-RAN sends the MDT results and QoE results together with the **C-RNTI of the UE** to the collection entity.

**Proposal 3:** For m-based QoE and m-based MDT, when the QoE measurements is ended, the NG-RAN sends the **UE mobility history including the C-RNTI in each cell** to the collection entity.

**Q8:** Whether NG-RAN should include the following in the QoE report sent to MCE in addition to the already agreed Trace Reference and Trace Recording Session Reference?

1. UE’ serving cell CGI
2. C-RNTI of the UE
3. UE mobility history

|  |  |  |
| --- | --- | --- |
| Company | Yes/No for a), b), c) | Comment |
| ZTE | a: yes  b,c :no | The trace recording session reference in management based MDT is not globally unique among gNBs, so we think gNB can include UE's serving cell CGI in addition to the already agreed Trace Reference and Trace Recording Session Reference, to identify one trace recording session for the alignment of MDT and QoE measurements. |
| Qualcomm | a): Maybe  b, c: no | From TS 32.422,  NOTE: For management based Immediate MDT, TRSR may be duplicated among different gNBs when multiple cells are selected as the area scope for the same MDT job. In this case, the combination of TRSR and the UE’s serving cell CGI in the MDT report can uniquely identify one trace recording session.  UE’s serving cell CGI will already be included in the MDT report correlated with the QoE report. So, wouldn’t it be duplicate to include it in the QoE report as well?  b) – We should probably achieve anonymization; not include C-RNTI  c) - Unnecessary |
| Samsung | 1. Already in MDT report 2. Already in MDT report/QoE report 3. Maybe no | We think at least a) and another version of b) are already included in MDT report (including UE ID and serving cell ID), and another version of b) (e.g. UE ID) is also included in QoE report container. |
| Huawei | a) maybe  b) & c) yes | We think b) and c) would allow the MCE to correlate the report precisely, since C-RNTI and mobility history info would help identify each UE. |
| **Ericsson** | **a) see the comment**  **b) no**  **c) no** | Out of the 3 options, the NR CGI makes most sense, but we are not sure if any of the 3 is needed. The scenario in question pertains to alignment of m-based QoE and m-based MDT. The purpose of m-m alignment case is not to pinpoint individual UEs - for that we have the s-s scenario. The **discussed problem (collision of TRSRs) is a corner case.**  If it is really needed to uniquely identify the UE, the OAM can take care of it by properly assigning the QoE References and MDT TRs to configurations within an area. TRSR can do good enough the job of unique identification of UE that sent the m-based report. It is 2-bytes long, meaning that there is a rather small probability of collision, and collision is in fact relevant only if two or more TRSRs are assigned for different MDT sessions that overlap in time. Moreover, there can be only one m-based MDT session in each cell at a given time for a UE. |
| **CATT** | a): Maybe  b, c: no | Share with Qualcomm |
| China Unicom | a):Yes  b,c : No | For clarification to QC: it is true that UE’s serving cell CGI will already be included in the MDT report, but for alignment of QoE report, if only TR/TRSR is included in QoE report, MCE would be confused by the duplicate TR/TRSR in several MDT reports without uniquely identifying them. That is the reason we propose to add CGI as well in the QoE report as MDT did.  C):we are not sure about how mobility history can help with identifying UEs. |
| Nokia | a: yes  b,c :no |  |
| CMCC | a: yes  b,c: postpone |  |

**Moderator’s summary:**

a) – Yes (4/9), Maybe (3/9), No (2/9)

It is moderator’s view that this scenario of TRSR duplication across gNB would be a corner case and hence tries to propose this working assumption

**Proposal 9:** FFS whether the scenario that the Trace Recording Session Reference (TRSR) is duplicated among different gNBs when multiple cells are selected as the area scope for the same MDT job is a corner case and hence there is no need for NG-RAN to include the UE’s serving CGI in the QoE report to uniquely identify the TRSR of the correlated MDT.

b), c) - No (8/9), Yes (1/9)

**Proposal 10:** There is no need for the NG-RAN to include the UE’s C-RNTI and UE mobility history in the QoE report sent to MCE

# References

|  |  |  |
| --- | --- | --- |
| [1] | [R3-220173](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_114bis-e/Docs/R3-220173.zip) | (TP for QoE BL CR for TS 38.300) The Alignment of Radio-related Measurements and QoE Measurements (**Ericsson**) |
| [2] | [R3-220275](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_114bis-e/Docs/R3-220275.zip) | Alignment of Radio related measurements and QoE measurements (**Qualcomm** Incorporated) |
| [3] | [R3-220332](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_114bis-e/Docs/R3-220332.zip) | Alignment of MDT and QMC in Rel-17 (**Nokia**, Nokia Shanghai Bell) |
| [4] | [R3-220742](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_114bis-e/Docs/R3-220742.zip) | Further discussion on alignment of MDT and QoE Measurements (**China Unicom**) |
| [5] | [R3-220913](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_114bis-e/Docs/R3-220913.zip) | Further discussions on alignment between QoE measurement and MDT measurement (**Huawei**) |
| [6] | [R3-220924](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_114bis-e/Docs/R3-220924.zip) | Alignment of MDT and QoE (**Samsung**) |
| [7] | [R3-220938](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_114bis-e/Docs/R3-220938.zip) | Discussion on Alignment of MDT and QoE Measurements (**CATT**) |
| [8] | [R3-220966](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_114bis-e/Docs/R3-220966.zip) | Further discussion on alignment of MDT and QoE Measurements (**ZTE**) |