**3GPP TSG-SA5 Meeting #138-e *S5-214288***

**e-meeting, 23 - 31 August 2021**

**Source: Huawei**

**Title:** Discussion on the LSs of QoE measurements from other WGs

**Document for: Approval**

**Agenda Item: 6.4.5**

# 1 Decision/action requested

***In this box give a very clear / short /concise statement of what is wanted.***

# 2 References

1. R2-2106775, LS on QoE report handling at QoE pause
2. R2-2106776, QoE configuration and reporting related issues
3. R3-212904, LS on the mapping between service types and slice at application
4. R3-212975, LS on (de)activation and failure handling of NR QMC
5. S5-205347, LS on QoE Measurement Collection

# 3 Rationale

## 3.1 QoE measurement configuration

### 3.1.1 Activation and deactivation procedure

According to the LS [4], one question from RAN3 is whether the trace mechanism can be enhanced to support QMC.

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| Q1: Whether and how the Trace mechanism can handle, or be enhanced to handle, the scenario that QMC is triggered after legacy trace for one UE, while the legacy trace and/or MDT still need to be kept? In this case, will the TR/TRSR for the QMC session be different from the TR/TRSR used for legacy trace and/or MDT session? If yes, will the TR/TRSR for the QMC session and the TR/TRSR used for legacy trace and/or MDT session exist simultaneously for one UE?  Q2: Whether and how the Trace mechanism can be enhanced to support multiple QMC activation/deactivation towards one UE at same or different time? Will the triggered QMC sessions use different TR/TRSR? Can the Trace mechanism be enhanced to support multiple QMC sessions for one UE with different TR/TRSR? |

According to the TS 32.422 and TS 28.405, the trace mechanisms defined in TS 32.422 are not reused for QMC. The mechanisms of QMC control and configuration are defined in TS 28.405. The mechanisms of QMC defined in TS 28.405 supports multiple QMC sessions for one UE.











1. The trace mechanisms defined in TS 32.422 are not reused for QMC. The mechanisms of QMC control and configuration are defined in TS 28.405. The mechanisms of QMC defined in TS 28.405 supports multiple QMC sessions for one UE.

According to the LS [2] from RAN2, RAN2 wants to know how to modify the QoE measurement configuration.

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| Issue 1: Modify the QoE measurement configuration to UE  RAN2 is discussing QoE configuration signalling support, and RAN2 agreed QoE configuration are encapsulated in a transparent container in the RRC messages. RAN2 does not see the scenario that a QoE measurement configuration already configured in the UE will be modified for e.g., a certain service type or a QoE Reference, and assumes modification is not supported in RRC signalling. RAN2 would like SA5/RAN3 to confirm this assumption. |

In our understanding, SA5 does not specify the modification procedure for trace or LTE QoE measurement. Also we do not see the scenario that need to modify the QoE measurement. Even if there are scenarios, we think SA5 can use the deactivation and activation procedure to modify the QMC.

1. **SA5 does not specify the modification procedure so far, deactivation and activation procedures could be used to modify the QMC “. Whether modification of QMC is needed or not may require further study.**

### 3.1.2 Multiple QoE measurement

RAN3 and RAN2 has agreed to support the multiple QoE measurements for different service types. RAN2 has one question in LS [2] on the multiple QoE measurement for one certain service type.

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| Issue 2: Provide multiple QoE measurement configurations for one certain service type  RAN2 is discussing QoE configuration and reporting signalling support, and some companies mention it is possible that multiple QoE measurement configurations can be provided to UE for one certain service type, e.g. different QoE measurement configurations for different slices may be applied to one service type, or different QoE measurement configurations may be applied for different application providers. RAN2 would like to check with SA5/RAN3 whether it is possible to provide multiple QoE measurement configurations for one certain service type? |

In our understanding, we think the above scenarios are possible. In order to provide the flexibility for the operators, we think SA5 should support it.

1. **SA5 think it is possible to provide multiple QoE measurement configurations for one certain service type, and how to support multiple QoE measurement configurations for one certain service type will be considered in NR.**

RAN3 has agreed to introduce the QoE reference for the NR QoE based on the TS 32.422 of LTE and the LS [5] from SA5. The motivation of introducing the QoE reference is to enable multiple simultaneous measurements and the temporary stop/restart QMCs.

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| The LS [5] from SA5  As there will be assurance and other automated functions using the QMC mechanism in 5G in Rel-17, the functionality to provide QoE Reference both inside and outside the container to enable multiple simultaneous measurements and the temporary stop/restart QMCs are needed:   * As multiple assurance and automation functions may need to have different QoE data from the same UE, multiple simultaneous QMCs from each UE is needed. * When multiple QMCs are ordered by different consumers, the reported data needs to be sent to different consumers. The base station needs to have a mapping of the QoE Reference and the consumer address. The base station should not need to open the report container and decode the data to find the QoE Reference. * It is considered vital that QoE data is captured during time periods of RAN overload. However, there can be many consumers that frequently collects QoE data from many UEs. To not contribute to the RAN overload, the QMC reporting should be able to be temporarily stopped and restarted. |

RAN3 also agreed to introduce the slice scope for the QoE measurement. It means the OAM can configure the slice scope for the QMC. The UE will only perform the QoE measurement for the slices within the slice scope.

RAN3 has the following questions in LS [4]:

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| Q3: In case Multiple QMC is supported, whether one QMC job identified by QoE Reference is per service type or per slice for NR QoE? RAN3 assume below possibilities can be considered (both options involve multiple QMC jobs per UE):   * One QMC job includes one QoE reference, slice(s), and multiple service types. * One QMC job includes one QoE reference, one service type, and slice(s).   Q4: Whether the Measurement Collection Entity IP Address will be configured per service type or per QoE Reference?  Q5: Is there a mechanism to ensure uniqueness of the QoE Reference for area-based QMC, where UE selection is performed by the NG-RAN? |

According to the TS 28.405, the activateAreaQMCJob from NM to DM/EM includes the parameters: serviceType, areaScope, qoECollectionEntityAddress, pLMNTarget, qoETarget, qoEReference and QMC configuration file. It can be seen that one QMC job is identified by QoE reference is per service type. For the MCE IP address, we think the operators may configure different MCEs for different QoE measurements. Therefore the MCE IP address can also be configured per QoE reference, i.e. per QMC job.

1. One QMC job identified by QoE Reference is per service type defined in currently TS 28.405.
2. Measurement collection entity IP addresses are configured per QoE reference

According to the TS 28.405, the QoE reference is a globally unique ID. In our understanding, it means the QMC job is globally unique ID in OAM.

1. QoE reference is a globally unique ID defined in currently TS 28.405.

### 3.1.3 Slice QoE measurement

RAN3 also is discussing the per-slice QoE measurement. RAN3 has one question in LS [3].

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| RAN3 is discussing how to support per-slice QoE i.e. QoE measurement collection and reporting separately for a given slice.  While discussing solutions for per-slice QoE, RAN3 noticed that the application is aware of established 5GS PDU sessions including slice information via AT command +CGDCONT defined in TS 27.007.  However, RAN3 is not sure whether the application is aware of the **mapping** between service types and slice. For example, in scenarios where an application can run on multiple slices, the mapping information might be needed in order to determine whether to perform QoE measurement collection on the configured slice.  **2. Actions:**  **To SA4**  **ACTION:** RAN3 respectfully asks SA4 to feedback on whether the application is aware of the mapping between service types and slice.  **To CT1, SA5**  **ACTION:** RAN3 respectfully asks CT1 and SA5 to feedback if there is any relevant information. |

In our understanding, the operators may only want to know the QoE measurement results of specific slices. Therefore the OAM can configure the QoE measurement per slice. But it is up to other WGs to decide whether the application is aware of the mapping between service types and slice.

1. **Support the slice QoE measurement. It is up to other WGs to decide whether the application is aware of the mapping between service types and slice**

## 3.2 Pause/Resume of QoE measurement

RAN2 has agreed to support to pause the QoE measurement when the overload of NG-RAN is high. In the LS [1], RAN2 identified three options and has list the pros/cons for each options.

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| * Option 1: Application layer is responsible for storing QoE reports when the UE receives QoE pause indication. * Option 2: AS layer is responsible for storing QoE reports when the UE receives QoE pause indication. * Option 3: The QoE container received from application layer is discarded during pause. |

From SA5’s point of view, the operators want to collect as many measurement results as possible. Therefore option3 is not good. According to the comparison in the LS [1], the AS has buffer size limitation, e.g. 64KB. Therefore the UE can only store parts of QoE measurement results during the pause in option 2. In option 1, the UE can use more storage, e.g. 256G. Therefore UE can store more QoE measurement results in option 1. From SA5’s point of view, we think option 1 is better.

Also according to the TS 28.404, SA5 has specified that the UE stores the QoE measurement results in the application layer during the pause.

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| Use case stage | Evolution/Specification | <<Uses>> Related use |
| Goal | At RAN overload RAN may stop or delay the QoE information reporting from the UEs that has started it. |  |
| Actors and roles | The RAN node which is the requester of delaying the QoE information reporting. |  |
| Telecom resources | The RAN node and the UE. |  |
| Assumptions | - |  |
| Pre-conditions | Selected UEs have started QoE information collection. |  |
| Begins when | The RAN node detects that it is overloaded. |  |
| Step 1 (M) | The RAN node sends a request to temporarily stop the reporting to the UEs that has started the QoE information collection. An indication about the temporary stop is sent to the management system. |  |
| Step 2 (M) | When the UE receives the request from the RAN node to temporarily stop reporting, the UE access stratum informs the application that reporting has temporarily been stopped. The application continues any ongoing recording and stores the recorded information until a restart request is received. |  |
| Step 3 (M) | When the RAN overload situation is ended, the RAN node sends a request to restart the reporting to the UEs that has temporarily stopped the QoE information reporting. An indication about the restart is sent to the management system. |  |
| Step 4 (M) | When the UE receives the request from the RAN node, the UE access stratum informs the application to restart the QoE information reporting. |  |
| Ends when | The management system has received the indication that a recording session has been restarted. |  |
| Exceptions | The recording time expires before the RAN overload is ended. |  |
| Post-conditions | The QoE information collection is active. |  |
| Traceability | **REQ-EUSPC-CON-9, REQ-EUSPC-CON-10** |  |
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1. **From SA5 perspective either of option 1 and Option 2 are equivalent and we leave the choice to RAN groups and SA4 to decide while noting some benefits of using option 1.**

# 4 Detailed proposal

Based on the discussion in this paper, we have the following observations and proposal.

1. The trace mechanisms defined in TS 32.422 are not reused for QMC. The mechanisms of QMC control and configuration are defined in TS 28.405. The mechanisms of QMC defined in TS 28.405 supports multiple QMC sessions for one UE.
2. One QMC job identified by QoE Reference is per service type defined in currently TS 28.405.
3. Measurement collection entity IP addresses are configured per QoE reference
4. QoE reference is a globally unique ID defined in currently TS 28.405.
5. **SA5 does not specify the modification procedure so far, deactivation and activation procedures could be used to modify the QMC “. Whether modification of QMC is needed or not may require further study.**
6. **SA5 think it is possible to provide multiple QoE measurement configurations for one certain service type, and how to support multiple QoE measurement configurations for one certain service type will be considered in NR.**
7. **Support the slice QoE measurement. It is up to other WGs to decide whether the application is aware of the mapping between service types and slice**
8. **From SA5 perspective either of option 1 and Option 2 are equivalent and we leave the choice to RAN groups and SA4 to decide while noting some benefits of using option 1.**