**3GPP TSG-RAN WG3 Meeting #114bis-eR3-221038**

**Online, January 17th - 26th 2022**

Agenda Item: 15.2.2

Source: Ericsson (moderator)

Title: CB: # QoE4\_Mobility - Summary of email discussion

Document for: Approval

# Introduction

The deadline for providing replies to Phase 1 is **Friday, January 21st at 23.59 UTC.**

**Relevant papers:**

**[Eri0169]** Mobility Support for NR QoE Management (Ericsson)

**[Eri0170]** (TP for QoE BL CR for TS 38.423) Mobility Support for NR QoE Measurement Collection (Ericsson)

**[QC0273]** QoE measurement collection and reporting continuity in mobility scenarios (Qualcomm Incorporated)

**[Nok0330]** Globally unique reference for m-based QMC session for mobility (Nokia, Nokia Shanghai Bell)

**[Hua0911]** Further discussions on mobility support of QoE measurement (Huawei)

**[Sam0922]** (TP for BL CR TS 38.423) Mobility support of NR QoE (Samsung)

**[CATT0936]** Discussion on Measurement Collection and Continuity in Intra-System Intra-RAT Mobility (CATT)

**[CT0953]** Discussion on Mobility Support for Signalling Based QOE (China Telecom Corporation Ltd.)

**[ZTE0963]** Discussion on Measurement Collection in Intra-System Intra-RAT Mobility (ZTE)

**[ZTE0962]** (TP to TS 38.423) NR QoE Configuration (ZTE, China Telecom)

# For the Chairman’s Notes

**TBW**

# Discussion

## *QoE Measurement Type* IE

**[Eri0169]** proposes that the presence of *QoE Measurement Type* IE in the *UE Application Layer Measurement Information* IE, to enable the target to properly handle QoE configuration overriding, i.e., to be able to select which configuration to override if the maximum number of configurations is reached:

* Is mandatory in TS 38.423.
* Is optional in TS 38.413 – the optionality is because the IE is not needed at initial configuration, but is needed at HO.

**[Sam0922]** claims that there is no need to introduce measurement type in NGAP and XnAP handover messages – it is claimed that the presence of the configuration container in XML format indicates the measurement type.

**[QC0273]** also argues that there is no need for the IE because target node can determine the QoE measurement type implicitly by the absence/presence of certain IEs.

**Q1-1: Should the *QoE Measurement Type* IE be included in the *UE Application Layer Measurement Information* IE? Please motivate.**

**Q1-2: If you answered “yes” in Q1-1, should the IE be mandatory or optional on XnAP and NGAP?**

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| **Company** | **Answer** | **Comment** |
| **Ericsson** | **Q1-1: Yes**  **Q1-2: M on XnAP, O on NGAP** | Q1-1: Regarding Samsung’s comment: the s-based XML file should be passed to the target only if the UE has not yet been configured (e.g., UE was out of Area Scope while being served by source node). In other cases, the s-based configuration need not be passed to the target. This means that the presence of XML container **cannot always indicate the measurement type**.  We are not sure we understand QC’s argumentation, can it be clarified? |
| Qualcomm | **Q1-1: Depends on section 3.3**  **Q1-2 (if yes): M on XnAP, O on NGAP** | **To clarify E///:** Our proposal was the same as Samsung i.e., the presence of the XML container can indicate the QoE Measurement Type.  Considering E///’s clarification, we think there are two options:   * **Option 1:** XML container is mandatorily propagated over Xn and there is no need of QoE Measurement Type * **Option 2:** XML container is conditionally propagated (only when QoE Measurement Status = “not configured”) over Xn. In this case, we need QoE Measurement Type to identify the QoE type.   Either option is fine with us, but this depends on section 3.3. |
| Huawei | **Q1-1: No** | We also think the presence of the XML container can indicate the QoE Measurement Type. The source node will send the configuration to the target nod regardless whether the configuration has sent to the UE. |
| Nokia |  | An optional indicator can be used to indicate m-based configuration. |
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## *QoE Measurement Status* IE

**[Eri0169]** proposes that the presence of *QoE Measurement Status* IE in the *UE Application Layer Measurement Information* IE in the QoE BL CR for TS 38.423 is **mandatory**, to indicate that a QoE measurement is ongoing. In addition, it is proposed to **i**ntroduce an additional codepoint “not-configured” in the *QoE Measurement Status* IE, to indicate that UE has not yet been configured for QoE measurements for a certain service type.

**[Sam0922]** argues that measurement status **can be included** in NGAP and XnAP handover messages as an optional IE and the NG-RAN node can use it for MDT alignment.

**Q1-3: Should the presence of *QoE Measurement Status* IE in the *UE Application Layer Measurement Information* IE in XnAP and NGAP be mandatory or optional?**

**Q1-4: Should an additional codepoint, “not-configured”, be introduced in the *QoE Measurement Status* IE, to indicate that UE has not yet been configured for QoE measurements for a certain service type?**

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| **Company** | **Answer** | **Comment** |
| **Ericsson** | **Q1-3:**   * **XnAP: M** * **NGAP: O**   **Q1-4: Yes** | Q1-3: XnAP: M since proper handling of “overwriting” should always be ensured. NGAP: O because it is not needed in initial configuration.  Q1-4: all possible meas statuses should be supported by codepoints. |
| Qualcomm | **Q1-3:**   * **XnAP: M** * **NGAP: O**   **Q1-4: Yes** | Q1-3: Same view as E///  Q1-4: **Only “configured” and “not-configured” codepoints to be considered.** “ongoing” codepoint depends on whether UE indicates session start (this is pending discussion in CB # QoE6) |
| Huawei | **Q1-3: No**  **Q1-4: No** | We think the target node can know whether /which/how many QoE configurations have been sent to the UE based on the RRC container in the handover request. We does not see the reasons to include the QoE measurement status.  Also we are not sure the meaning of the “on going ”. Does it mean the network have sent the configuration to the UE or the UE have start the QoE measurement? |
| Nokia |  | target needs to know about paused status (if agreed by RAN2), but it is better that the UE sends that info directly to the target (avoiding risk of crossing messages). 'Not configured' not needed (in that case the XML file will be included. |
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## The presence of configuration container (XML file)

**[Eri0169]** proposes that, for s-based QoE, the container is **conditionally** present in the XnAP and NGAP handover messages – only if the UE has not yet been configured for QoE measurements.

**[QC0273]** proposes that, for s-based QoE, the QoE configuration container is explicitly forwarded from source node to target node, although passing the container is not useful only in case the UE has not been configured under the source node. Meanwhile **[Sam0922]** and **[CT0953]** propose that the presence is **optional**.

**[ZTE0963]** proposes **not to include** the container in NGAP and XnAP handover messages.

**[CATT0936]** proposes **mandatory** presence, to reactivate QoE when UE move within the area scope.

**[Hua0911]** argues that there is no **need to send the XML file in the HANDOVER REQUIRED** message, but that it should be sent in the NGAP HANDOVER REQUEST.

**[ZTE0963]** proposes that **gNB shall not store the QoE configuration container.**

**Q1-5: What should be the presence (if any) of QoE configuration container (XML file) in XnAP HANDOVER REQUEST and RETRIEVE UE CONTEXT RESPONSE messages?**

**Q1-6: What should be the presence (if any) of QoE configuration container (XML file) in NGAP HANDOVER REQUEST and NGAP HANDOVER REQUIRED messages?**

**Q1-7: Shall the gNB store the QoE configuration container?**

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| **Company** | **Answer** | **Comment** |
| **Ericsson** | **Q1-5 and Q1-6: Conditional**  **Q1-7: Not sure if this should be specified** | Q1-5 and Q1-6: Only if the UE is not already configured shall the XML file be passed. There is no need to pass the XML file if the UE has already been configured. Not sure why QC proposes to always pass it.  Q1-7: We are sympathetic with the reasoning of the proponents, but we are not sure if such statements should be specified. Is the intention to not pass the configuration at HO in any scenario? |
| Qualcomm | Q1-5 and Q1-6: Conditional or Mandatory  Q1-7: Yes | **Q1-5 and Q1-6: Clarification to E///:** Same reason as provided in section 3.1. Our reasoning behind always passing the XML file for s-based QoE is to make the handling at NG-RAN simpler e.g., it need not check whether **QoE measurement status** = “not-configured” and we also won’t need to define the **QoE Measurement Type** IE either. However, we are OK with the conditional passing as well  **Q1-7:** gNB should store the XML container even though it was not able to configure the UE either due to it being in RRC\_IDLE/RRC\_INACTIVE, insufficient resources or any other reason. Similar storage mechanism exists for MDT/Trace.  *Tracing starts immediately at NG-RAN node upon reception of the trace control and configuration parameters Trace Activation IE). The NG-RAN node may not start a Trace Recording Session if there are insufficient resources available for the recording, however, the NG-RAN node shall store the trace control and configuration parameters and forward these parameters when the UE handovers to other NG-RAN nodes over Xn or when other NG-RAN node retrieves the UE Context over Xn.* |
| Huawei | Q1-5: Mandatory only for S-QoE.  Not need for M-QoE  Q1-6:  HANDOVER REQUEST:  Mandatory only for S-QoE.  Not need for M-QoE  HANDOVER REQUIRED: Not need for S-QoE and M-QoE  Q1-7: Yes | Q1-5: The source node sends all the S-QoE configurations to the target node.  The target node will receive the M-QoE configuration from the OAM  Q1-6: The CN knows all the S-QoE configurations. Therefore the CN can send the S-QoE configuration to the target node directly. The source node does not need to send the S-QoE configuration to the CN.  The target node will receive the M-QoE configuration from the OAM |
| Nokia | Q1-5/6: optional  Q1-7: Yes | The XML file will be included if the UE is not configured. |
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## *QMC Activation* IE in NGAP HANDOVER REQUIRED

**[Hua0911]** proposes to move the *QMC Activation* IE into the *Source to Target Transparent Container* IE within the HANDOVER REQUIRED message. No need to introduce the signalling based QoE measurement configuration (including XML file) in the HANDOVER REQUIRED message.

**[CATT0936]** proposes not to include s-based QoE configuration in NGAP HANDOVER REQUIRED message.

The Moderator’s understanding is that “s-based QoE configuration” in the [CATT0936] proposal refers to placing the NGAP *QMC Activation* IE into the *Source to Target Transparent Container* IE within the HANDOVER REQUIRED message.

**[CATT0936]** proposes to include following m-based QoE configuration in NGAP HANDOVER REQUIRED message explicitly.

* MDT Alignment info.
* MCE IP address.

The Moderator’s understanding is that the above has already been agreed, so the issue is whether this information, together with the rest of the information, should be passed inside a container or explicitly in NGAP HO.

**Q1-8: Which of the following options do you support:**

1. **QMC Activation IE is an explicit IE in the HANDOVER REQUIRED message (this is the case right now).**
2. **The *QMC Activation* IE is placed into the *Source to Target Transparent Container* IE within the HANDOVER REQUIRED message (rather than sent as an explicit IE).**

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| **Company** | **Answer** | **Comment** |
| **Ericsson** | **a),** but we **can discuss b)** |  |
| Qualcomm | No strong opinion | The reasoning provided in [Hua0911] to move the QMC Activation IE inside the *Source to Target Transparent Container* IE within the HANDOVER REQUIRED (rather than sent as an explicit IE) is because the QMC Activation IE is used by the target NG-RAN and not by the AMF.  Hence b) seems reasonable. But either option is fine with us. |
| Huawei | b | The CN does not need to know the contents of these information |
| Nokia | b | avoid CN impact |
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## The support for alignment

**[QC0273]** proposes that NG-RAN nodes are responsible for passing the alignment information between QoE and MDT during mobility i.e., **a source NG-RAN should inform the MDT alignment information to its target node during handover and UE context retrieval**.

In Moderator’s understanding, this has de facto been agreed. The proponents are invited to clarify what is missing.

**[Eri0169]** proposes to **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 receiving NG-RAN node to **align the s-based QoE measurement with any available MDT** measurement.

**Q1-9: Do you agree to 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 receiving NG-RAN node to align the s-based QoE measurement with any available MDT measurement?**

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| **Company** | **Answer** | **Comment** |
| **Ericsson** | **Yes** | We think that this is beneficial because it makes it easier for the RAN to find an MDT meas. to be aligned with QoE, for example when QoE and MDT are running independently. Based on this indication, the RAN can select for alignment any available MDT, for example:   * RAN can configure an m-based MDT meas. at the same time as the present QoE. * RAN can enable alignment with an ongoing MDT meas. at the UE by exploiting the mechanism agreed at RAN3#114-e. |
| Qualcomm | Discuss in CB #QoE6? | Similar proposal is up for discussion in CB #QoE6, perhaps we could discuss it there?  But we seek clarification on this: What does it mean to align with any available MDT? By setting this indicator, does it mean any existing MDT will 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. |
| Huawei | No | RAN3 has agreed to add the trace ID/reference in the QoE configuration. The motivation is to let the RAN know which MDT results are needed and then to reduce the processing load of MCE. If any available MDT measurement can be used, we think it will increase the processing load of MCE. |
| Nokia | Discuss in CB #QoE6 |  |
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## RVQoE configuration information

**[Eri0169]** proposes to **introduce the *RAN Visible QoE Configuration Information* IE** in both the NGAP and XnAP *UE Application Layer Measurement Information* IE, with the following content (and liaise RAN2 for RRC support):

* Reporting Interval.
* Configured RAN Visible QoE Metrics (i.e., Buffer Level and/or Playout Delay).
* An indication of whether the target should forward to the source the first RVQoE report it receives from the UE.

**[QC0273**] proposes that**, for s-based QoE**, the **list of available RVQoE metrics is explicitly forwarded** from source node to target node during mobility and UE context retrieval.

**[QC0273]** proposes that**, for** **m-based QoE**, the **list of available RVQoE metrics need not be forwarded** from source node to target node during mobility and UE context retrieval. The **OAM can indicate the list** of available RVQoE metrics **directly to the target node.**

**Q1-10: Do you agree that an IE with the following content should be introduced in both the NGAP and XnAP *UE Application Layer Measurement Information* IE:**

1. **Reporting Interval.**
2. **Configured RAN Visible QoE Metrics (i.e., Buffer Level and/or Playout Delay).**
3. **An indication of whether the target should forward to the source the first RVQoE report it receives from the UE.**

**Q1-11: Should the above IE be sent in XnAP and NGAP HO messages:**

1. **Only for s-based, OR**
2. **For both m- and s-based QoE?**

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| **Company** | **Answer** | **Comment** |
| **Ericsson** | **Q1-10: we agree to a), b), c)**  **Q1-11: b)** | Q1-10: a) RVQoE should have a separate reporting interval from legacy QoE; c) is motivated by the following FFS from RAN3#114-e: *FFS whether the RAN visible QoE configuration can be propagated from the source to target node upon mobility and during context retrieval.*  Q1-11: We do not understand why the OAM should pass the available metrics to target in m-based QoE. Why is the information about available RVQoE metrics that the source received from the OAM obsolete? |
| Qualcomm | Q1-10:   1. Depends on CB # QoE5 2. OK 3. Not clear   Q1-11: Prefer a) | Q1-10: a) Reporting interval should be discussed in CB #QoE5. This can be discussed post agreement on that.   1. Not clear why the source gNB should send only propagate the 1st RVQoE report post-handover; should the subsequent RVQoE reports be consumed at the target node or the source node or both?   Also, is the source RVQoE configuration relevant at target node if it doesn’t configure its own RVQoE configuration?  Q1-11: RVQoE is a UE specific configuration whereas m-based QoE is selected for a group of UEs. It could be possible that a UE configured with m-based QoE doesn’t have a RVQoE configuration, then what is the point of propagating the list of available RVQoE metrics during a handover?  Also, our understanding was that the intention is to limit the propagation of QoE related information during m-based QoE and limit it to only useful information (e.g., MCE IP address, QoE Reference). That is the reason we proposed that the list of available RVQoE metrics can be signaled by the OAM along with a new m-based QoE configuration if configured. |
| Huawei | Q1-10:   1. No 2. No 3. Not clear   Q1-11: No | Q1-10: a) and b): the target node can know the configured RAN visible QoE according to the RRC container in the handover request  c) in our understanding, the motivation is to optimize the handover as in SON. But the RAN visible QoE has relations with many factors(e.g. the load in the target node and quality of the signal ). We do not think the RAN visible QoE can be used to optimize the handover. |
| Nokia | Q1-10: no for all  Q1-11: No | for Q1-10 c) we believe network signalling will not be so straight-forward, and this was not analysed in the study item |
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## Handover to a gNB not supporting QoE

**[CATT0936]** proposes to propagate the s-based QoE measurement configuration in the form of encoded container. it is argued that a non-supporting target node may decide to release the QoE configuration, but still needs to propagate QoE configuration to the next target node. If the next target node supports QoE configuration, the QMC should be activated again. To prevent QoE configuration from being discarded by a non-supporting node, the QoE measurement configuration may be transferred in a container to keep it from being lost.

**Q1-12: To prevent QoE configuration from being discarded by a non-supporting node, should the QoE measurement configuration may be transferred in a container to keep it from being lost?**

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| **Company** | **Answer** | **Comment** |
| **Ericsson** | **No** | In our understanding, the discussion on non-supporting target node was concluded by agreeing the following:   * Upon the reception of QoE configuration on a non-supporting node, the target node should not set up any QoE session with MCE and should not initiate any QoE measurement collection. * In case of mobility to a target node not supporting QoE, the target node can release the QoE configuration. |
| Qualcomm | No | Same view as E/// |
| Huawei | No |  |
| Nokia | No |  |
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## Recording Session Reference

**[Nok0330]** proposes to confirm action taken in target NG-RAN node for incoming m-based QMC configuration and add QRSR for Xn and NG mobility if associated QoE reports need to be forwarded to the MCE.

**Q1-13: Please state your view on the above**

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| **Company** | **Answer** |
| **Ericsson** | The UE sends the **Recording Session ID** to MCE via RAN (so far transparently to RAN), which is, according to TS 28.405, clause 5.7, “*used in the measurement collection centre to identify which session within a UE has collected information in the application.*”.  So, to account for the case where target does not want to release the measurement session, to enable the target to uniquely distinguish the session, the **straightforward solution** is that the **UE provides the Recording Session ID to the RAN, and RAN can then pass it to the target at HO**. This is a much simpler solution than specifying a brand-new identifier, the QRSR.  So, we propose the following:  **Proposal x: Liaise RAN2 asking them to support in RRC signalling the UE to send to the RAN the Recording Session ID together with the Session Start Indication, as an explicit RRC SIE visible to the RAN.**  We invite other companies to comment on the proposal. |
| Qualcomm | It is not clear why we need to distinguish at a session level for m-based QMC via a new identifier. Can’t we use the globally unique QoE Reference to activate/deactivate the m-based QoE (as also confirmed by SA5)?  *5.2 QoE reference (M)*  *The QoE reference parameter specify the network request session. The QoE reference shall be globally unique therefore it is composed as follows:*  *MCC+MNC+QMC ID, where the MCC and MNC are coming with the QMC activation request from the management system to identify one PLMN containing the management system, and QMC ID is a 3 byte Octet String.*  *The QMC ID is generated by the management system or the operator.*  E///’s proposal to use Recording Session ID (2 byte overhead) is also an unnecessary overhead on top of RRC ID (measConfigAppLayerID) over Uu and should be avoided. |
| Huawei | We think the motivation of QRSR is to perform the alignment between M-QoE and M-MDT because the QoE/MDT reference cannot be used to identity the unique UE. We can discuss it in the CB# QoE6\_MDTAligment |
| Nokia | The problem is to uniquely identify the QMC session in the MCE, both before and after the HO. The RAN node will allocate multiple QMC sessions for a given QMC job in case of m-based activation. The Recording Session ID can't solve this problem because it is allocated by the UE and not by the node. That's why we propose QRSR. The RAN3 stage 3 impact of QRSR is to ensure this unique identification after the HO, hence our paper under this CB. |
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## LS to SA5 and RAN2

**[ZTE0963]** proposes to send the agreement on mobility support for management based QoE to SA5 and RAN2. A draft is provided in Annex B of the paper.

**Q1-14: Do you agree to send and LS to SA5 and RAN2, informing then about the agreement on mobility support for management based QoE to SA5 and RAN2?**

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| **Company** | **Answer** | **Comment** |
| **Ericsson** | **Yes** | Let us draft the LS during the meeting, after we have agreed the full list of information that is propagated. |
| Qualcomm | Yes |  |
| Huawei | Yes if needed |  |
| Nokia | Yes |  |
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