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# 1 Introduction

This document summarizes proposals related to QoE configuration and reporting from contributions submitted to agenda item 8.14.2.1, except for Mobility. The contributions are listed in chapter 4.

# 2 Summary discussion

## 2.1 QoE Reference ID vs. RRC ID

In [R2-2107099](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107099.zip), [R2-2107380](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107380.zip), [R2-2107396](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107396.zip), [R2-2108109](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108109.zip), [R2-2107816](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107816.zip), [R2-2108206](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108206.zip), [R2-2108227](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108227.zip) and [R2-2108514](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108514.zip) the ID to be included in RRC signalling is discussed. The following proposals are available:

* Rather than Reference ID, shorten ID (RRC level) is included in RRCReconfiguration and MeasReportAppLayer.[1]
* Use QoE reference as the ID for RRC to identify a QoE measurement[2]
* a shorten ID which is locally identifiable at gNB is needed to be introduced for reducing the air-interface resource bunder for transmission of the QoE report towards the 5GC. FFS the encoding format of the shorten IDs.[3]
* It is proposed to adopt RRC defined ID included in RRC configuration and *MeasReportAppLayer* message to identify one QoE configuration and related report.
* gNB receives QoE configuration with reference ID from OAM server (or via CN), the gNB allocates one RRC defined ID to this QoE configuration, and the gNB maintains the relationship between the RRC defined ID and the reference ID.
* If there can be multiple QoE configurations provided to one application layer at the same time, then the RRC layer provides RRC defined ID together with QoE configuration to application layer.
* Application layer forwards the RRC defined ID together with QoE measurement report to RRC layer, and RRC layer includes the RRC defined ID in MeaReportAppLayer message.
* measConfigAppLayerId is used in the measConfigAppLayerToReleaseList to identify the QoE configuration to be released.[6]
* Use the local ID to identify a QoE configuration within RRC signalling. The size of local ID can be FFS, but 4 bits seems sufficient.[8]
* Source RAN node sends the relationship between QoE reference IDs and local RRC IDs to the target RAN node.[8]
* It is proposed that NR QoE container should only contain 1 service type.
* RAN2 shall assume that one QoE container can only contain data for one QoE session.
* It is proposed that QoE reference ID can be used to identify QoE measurement between UE and NW.[10]
* the RRC signalling for configuration should provide QoE reference ID and the mapping between QoE reference and the shortened ID, and the ID indicated in QoE report is the shortened ID.[11]

It is the understanding of the rapporteur that a QoE container can only contain one service type as in LTE. A QoE report corresponds to a specific QoE configuration. There may be multiple reports related to a specific configuration, but only one configuration related to a specific report.

In the running RRC CR for QoE, R2-2108108, an RRC ID *MeasConfigAppLayerId* is used in the configuration of QoE (*measConfigAppLayerAddModList)* and in the reporting of QoE.

#### – *MeasConfigAppLayerId*

The *MeasConfigAppLayerId* identifies the identity of the application layer measurement.

*MeasConfigAppLayerId* information element

-- ASN1START

-- TAG-MEASCONFIGAPPLAYERID-START

MeasConfigAppLayerId-r17 ::= INTEGER (1..maxNrofQoE-r17)

-- TAG-MEASCONFIGAPPLAYERID-STOP

-- ASN1STOP

OtherConfig-v17xy ::= SEQUENCE {

measConfigAppLayerToAddModList-r17 SEQUENCE (SIZE (1..maxNrofQoE-r17)) OF MeasConfigAppLayer-r17 OPTIONAL, -- Need N

measConfigAppLayerToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofQoE-r17)) OF TBD OPTIONAL -- Need N

}

MeasConfigAppLayer-r17 ::= SEQUENCE {

measConfigAppLayerId-r17 MeasConfigAppLayerId-r17,

measConfigAppLayerContainer-r17 OCTET STRING,

serviceType-r17 ENUMERATED {streaming, mtsi, spare6, spare5, spare4, spare3, spare2, spare1} OPTIONAL, -- Need N

...

}

MeasurementReportAppLayer-IEs-r17 ::= SEQUENCE {

measReportAppLayerContainer-r17 OCTET STRING,

measConfigAppLayerId-r17 MeasConfigAppLayerId-r17,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

Most companies propose that it is sufficient if an RRC ID is used in RRC QoE configuration and reporting. The gNB can keep the mapping of the RRC ID and the QoE Reference ID and transfer the mapping to the next gNB at handover. The RRC ID may also be used to release the QoE measurements, as normally done in RRC *ReleaseList*. Based on this the following is proposed:

1. The QoE Reference does not need to be sent to or from the UE in RRC signalling. The RRC ID, *MeasConfigAppLayerId*, is sufficient to identify the QoE configuration.
2. The RRC layer forwards the *MeasConfigAppLayerId* together with the QoE configuration to the application layer.
3. gNB keeps the mapping between *MeasConfigAppLayerId* and QoE Reference. The mapping is sent to the target gNB as part of QoE configuration and information at handover.
4. *MeasConfigAppLayerId* is used in the *measConfigAppLayerToReleaseList* to identify the QoE configuration to be released

## 2.2 QoE measurements in RRC\_INACTIVE

The following proposals related to RRC\_INACTIVE were submitted in [R2-2107099](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107099.zip), [R2-2108514](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108514.zip) and [R2-2108227](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108227.zip):

* Confirm that RAN2 deprioritizes QoE measurement in RRC\_IDLE/RRC\_INACTIVE in Rel-17.[1]
* For INACTIVE QoE, RAN2 shall discuss the following aspects:
  + Whether MBMS services need the QoE result for data transportation optimization.
  + Whether RAN2 need to use QoE to evaluate the delay caused by UE status switching between RRC\_INACTIVE and RRC\_CONNECTED.
* RAN2 is kindly asked to discuss whether partial suspend/recovery mechanisms could be supported for QoE configuration handling in RRC\_INACTIVE.[11]

The following is stated in the WID, RP-210913, regarding RRC\_INACTIVE:

* Specify QoE measurement handling in RRC\_INACTIVE, i.e. keeping the QoE measurement configuration without measuring and reusing the same configuration upon transition from RRC\_INACTIVE to RRC\_CONNECTED.

It is proposed to follow the objective in the WID and only specify keeping of QoE configuration without measuring in RRC\_INACTIVE and reusing the same configuration upon transition from RRC\_INACTIVE to RRC\_CONNECTED. This is already included in RRC running CR.

1. Confirm that RAN2 deprioritizes QoE measurement in RRC\_IDLE/RRC\_INACTIVE in Rel-17.

## 2.3 Multiple reports and RRC segmentation

The following proposals from [R2-2107099](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107099.zip), [R2-2107380](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107380.zip), [R2-2107816](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107816.zip), [R2-2108109](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108109.zip) and [R2-2108197](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108197.zip) relate to multiple reports and RRC segmentation:

* If SA4 confirms the necessity of larger container size of QoE measurement report, RAN2 supports RRC segmentation for QoE measurement report.[1]
* Add the report of QoE measurements by means of list to enable report of multiple simultaneous measurements.[2]
* Multiple QoE measurement reports can be included in one SRB 4 message.
* RAN2 wait for SA4 feedback to discuss whether to apply RRC segmentation to SRB 4.
* Support UL RRC segmentation for transmission of QoE reports.[6]
* Multiple QoE reports can be transmitted by a single uplink RRC message MeasReportAppLayer.[7]

Several companies propose that multiple QoE reports can be transmitted in a single RRC message. One company proposes to use RRC segmentation for transmission of QoE reports and some companies want to wait for SA4 feedback before deciding on RRC segmentation. The following is proposed:

1. Multiple QoE reports can be transmitted by means of a list in a single uplink RRC message *MeasurementReportAppLayer*.
2. The use of RRC segmentation for transmission of QoE reports is FFS.

## 2.4 Number of QoE configurations

The following proposals in [R2-2107513](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107513.zip) and [R2-2108109](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108109.zip) are related to number of QoE configurations:

* There are at most 8 simultaneous QoE configurations over RRC (maxNrofQoE-r17). Maximum value will be confirmed after SA4 reply on multiple configurations.[4]
* Send an LS to SA5 and ask about preferred maximum number of simultaneous QoE configurations.[6]

It is unclear whether RAN2 can decide on the maximum number of simultaneous QoE configurations. Therefore, the following is proposed:

1. RAN2 assumes the maximum number of simultaneous QoE configurations is 8. Send an LS to SA5 for confirmation.

## 2.5 RVQoE, MDT/QoE alignment, service types and slices

The following proposals from [R2-2107380](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107380.zip), [R2-2107396](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107396.zip), [R2-2107513](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107513.zip), [R2-2108206](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs/R2-2108206.zip) and [R2-2108594](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs/R2-2108594.zip) are related to RAN Visible QoE, MDT/QoE alignment, service types and slices.

* Use QoE reference as the ID to identify a RAN-visible QoE measurement[2]
* RAN2 design the format of RAN-visible QoE configuration[2]
* RAN2 design the format of the RAN-visible report with RRC IEs format.[2]
* RAN2 to agree that the alignment of immediate MDT measurements and QoE measurements is left to network implementation by investigation of the correlation between the timestamps of reception of the respective measurement reports at network side.[3]
* RAN-visible QoE is limited to the indication of separate parameters in QoE configuration (e.g. service type).[4]
* RAN2 does not specify extracting of the entire XML-report.[4]
* QoE per slice is deprioritized until the WI for RAN Slicing progresses on slice assistance information format to be used in RRC for RAN purposes.[4]
* QoE correlation with MDT / Trace PM data collection is handled in networks side.[4]
* NR supports QoE collection at least for streaming (TS 26.247), MTSI (TS 26.114) and VR (TS 26.118). Send an LS to SA4 to ask which (if any) specifications can be referenced for the support of QoE collection in NR for 5G MBS and XR.[8]
* Include the VR as one of the service types of QoE measurement.[12]
* Include the MBS as one of the service types of QoE measurement when available.[12]
* RAN2 to further discuss per slice QoE, RAN-visible QoE and alignment of MDT report after RAN3 make the corresponding conclusion.[12]

According to the WID, RAN3 is the leading group of these items and it is the understanding of the rapporteur that RAN2 should wait for input from RAN3 before discussing this in RAN2.

## 2.6 Other issues

The following unsorted proposals were included in [R2-2107380](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2107380.zip), [R2-2108197](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108197.zip) and [R2-2108206](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108206.zip):

* Add the information of the UE supports QoE Measurement Collection for service type in UE-NR-Capability in UECapabilityInformation[2]
* Signalling based QoE configuration can override the management based QoE configurations.[7]
* It should be possible for RAN to pause/resume reporting for all or only a subset of QoE measurement configurations of a UE.[8]

UE capabilities are normally proposed towards the end of work items and it is assumed that it will be the case for QoE also.

Pause/resume is handled under AI 8.14.2.2 which is not the scope of this e-mail discussion.

The following proposal remains:

1. Signalling based QoE configuration can override the management based QoE configurations

# Conclusion

Based on the above, the following is proposed:

[Proposal 1 The QoE Reference does not need to be sent to or from the UE in RRC signalling. The RRC ID, *MeasConfigAppLayerId*, is sufficient to identify the QoE configuration.](#_Toc79951241)

[Proposal 2 The RRC layer forwards the *MeasConfigAppLayerId* together with the QoE configuration to the application layer.](#_Toc79951242)

[Proposal 3 gNB keeps the mapping between *MeasConfigAppLayerId* and QoE Reference. The mapping is sent to the target gNB as part of QoE configuration and information at handover.](#_Toc79951243)

[Proposal 4 *MeasConfigAppLayerId* is used in the *measConfigAppLayerToReleaseList* to identify the QoE configuration to be released](#_Toc79951244)

[Proposal 5 Confirm that RAN2 deprioritizes QoE measurement in RRC\_IDLE/RRC\_INACTIVE in Rel-17.](#_Toc79951245)

[Proposal 6 Multiple QoE reports can be transmitted by means of a list in a single uplink RRC message *MeasurementReportAppLayer*.](#_Toc79951246)

[Proposal 7 The use of RRC segmentation for transmission of QoE reports is FFS.](#_Toc79951247)

[Proposal 8 RAN2 assumes the maximum number of simultaneous QoE configurations is 8. Send an LS to SA5 for confirmation.](#_Toc79951248)

[Proposal 9 Signalling based QoE configuration can override the management based QoE configurations](#_Toc79951249)

# 4 References

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1. [R2-2108109](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108109.zip), [Configuration and reporting of QoE measurements](file:///c:\3GPP_RAN1\RAN2_115_Electronic\8.14.2\R2-2108109%20Ericsson%20Configuration%20and%20reporting%20of%20QoE%20measurements.docx), Ericsson, RAN2#115, Electronic, August 2021

1. [R2-2108197](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108197.zip), [Discussion on QoE measurement and configuration](file:///c:\3GPP_RAN1\RAN2_115_Electronic\8.14.2\R2-2108197%20China%20Discussion%20on%20QoE%20measurement%20and%20configuration.docx), China Unicom, China Southern Power Grid, RAN2#115, Electronic, August 2021

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