**3GPP TSG-RAN WG3 Meeting #120R3-233395**

**Incheon, Republic of Korea, May 22nd – 26th 2023**

Agenda Item: 11.3

Source: Ericsson

Title: (TP for QoE BL CR for TS 38.300): QoE and RVQoE Measurements and Reporting in NR-DC Scenarios

Document for: Agreement

# Introduction

In this TP we capture the agreements related to QoE and RVQoE measurements and reporting in NR-DC scenarios.

# TP for QoE BL CR for TS 38.300

-------------------------------------------Start of changes-------------------------------------------

# 21 Application Layer Measurement Collection

## 21.1 Overview

The QoE Measurement Collection function enables collection of application layer measurements from the UE. The supported service types are:

- QoE Measurement Collection for DASH streaming services;

- QoE Measurement Collection for MTSI services;

- QoE Measurement Collection for VR services.

For DASH, MTSI, VR services, the QoE measurement collection is supported in RRC\_CONNECTED state only, unless the application data for DASH and VR is delivered via MBS.

QoE measurements for the application sessions for broadcast are supported in RRC\_CONNECTED, RRC\_INACTIVE, and RRC\_IDLE states. The QoE measurements for the application sessions for MBS multicast are supported in RRC\_CONNECTED state only. Both signalling based and management based QoE measurement collection are supported.

Description of further QMC functionality during MR-DC operation can be found in TS 37.340 [21].

NOTE: The naming QoE Measurement is used in NG, Xn, and interfaces between the OAM and the gNB. In the Uu interface, the naming application layer measurement is used and it is equal to QoE Measurement.

-------------------------------------------Next change-------------------------------------------

### 21.2.1 QoE Measurement Collection Activation and Reporting

The feature is activated in the gNB either by direct configuration from the OAM system (management-based activation), or by signalling from the OAM via the 5GC (signalling-based activation), containing UE-associated QoE configuration. One or more QoE measurement collection jobs can be activated at a UE per service type, and each QoE measurement configuration is uniquely identified by a QoE reference.

For signalling-based QoE measurements, the OAM initiates the QoE measurement activation for a specific UE via the 5GC, and the gNB receives one or more QoE measurement configurations by means of UE-associated signalling. The QoE measurement configuration for signalling-based activation includes an application layer measurement configuration list and the corresponding information for QoE measurement collection, e.g., QoE reference, service type, MCE IP address, slice scope, area scope, MDT alignment information and the indication of available RAN visible QoE metrics.

For management-based QoE measurement activation, the OAM sends one or more QoE measurement configurations directly to the gNB. The QoE measurement configuration for management-based activation also includes an application layer measurement configuration list and the corresponding information for QoE measurement collection. The gNB selects UE(s) that meet the required QoE measurement capability, area scope and slice scope.

Application layer measurement configuration received by the gNB from OAM or CN is encapsulated in a transparent container, which is forwarded to a UE as Application layer configuration in the *RRCReconfiguration* message (there can be multiple configurations in the same message). Application layer measurement reports received from UE's application layer are encapsulated in a transparent container and sent to the network in the *MeasurementReportAppLayer* message, as specified in TS 38.331 [12]. The UE can send multiple application layer measurement reports to the gNB in one *MeasurementReportAppLayer* message. In order to allow the transmission of application layer measurement reports which exceed the maximum PDCP SDU size, segmentation of the *MeasurementReportAppLayer* message may be enabled by the gNB. An RRC identifier conveyed in the RRC signalling is used to identify the application layer measurement configuration and report between the gNB and the UE. The RRC identifier is mapped to the QoE reference in the gNB, and the gNB forwards the application layer measurement report to MCE together with the QoE reference. The gNB can release one or multiple application layer measurement configurations from the UE in one *RRCReconfiguration* message at any time. The UE may additionally be configured by the gNB to report when a QoE measurement session starts or stops for a certain application layer measurement configuration.

-------------------------------------------Next change-------------------------------------------

## 21.3 QoE Measurement Continuity for Mobility

The QoE measurement collection continuity for intra-system intra-RAT handover is supported, with the Area Scope parameters configured by the OAM, where the network is responsible for keeping track of whether the UE is inside or outside the Area Scope. A UE continues an ongoing QoE measurement even if it leaves the Area Scope, unless the network indicates to the UE to release the QoE configuration.

For handover, the source gNB may transmit the QoE measurement configuration(s) and/or the information related to the configuration(s) of a specific UE to the target gNB via XnAP or NGAP. For signalling-based QoE, the service type, QoE reference, MCE IP address, measurement configuration application layer id, MDT alignment information, area scope, slice support list for QMC and measurement status are passed to the target gNB. For management-based QoE, the service type, measurement configuration application layer id, MCE IP address and QoE measurement status are passed to the target gNB. For RRC\_INACTIVE state mobility, QoE measurement configuration(s) of a specific UE can be retrieved from the gNB hosting the UE context when it resumes to the RRC\_CONNECTED state. Multiple sets of QoE measurement configurations should be supported during mobility.

For signalling based QoE, at handover to a target gNB that supports QoE, the target gNB decides which of the application layer measurement configurations should be kept or released, e.g. based on application layer measurement configuration information received from the source gNB in Xn/NG signalling.

For QoE measurements pertaining to application sessions for MBS broadcast, measurement collection may continue during RRC\_INACTIVE and RRC\_IDLE states, and the measurement results, if collected, are sent via QoE reports when the UE returns to the RRC\_CONNECTED state.

Upon UE’s transition from RRC\_IDLE to RRC\_CONNECTED state, the gNB serving the UE should ensure that it does not release an already configured signaling based QoE measurement configuration for the sake of configuring a new management-based QoE measurement configuration.

When the UE resumes the connection with a gNB that does not support QoE, the UE releases all application layer measurement configurations.

-------------------------------------------Next change-------------------------------------------

### 21.x Support for RAN visible QoE measurements and reporting in NR-DC

Either the MN or the SN can generate and send a RAN visible QoE configuration to the UE. The node that has initially configured a UE in NR-DC with an RVQoE configuration can modify and release the RVQoE configuration as long as this node serves the UE. Either the MN or the SN can receive the RAN visible QoE reports directly from the UE. In addition, the node that received a RAN visible QoE report can forward it to the peer node (the SN or the MN). RAN visible QoE reports can be sent over the same leg as the QoE reports pertaining to the same QoE reference. WA: QoE reports and RVQoE reports pertaining to the same QoE reference can be sent over different legs.

The MN or the SN can configure RAN visible QoE measurements at a UE without a priori knowledge about which gNB(s) that will provide the bearer(s) for a future application session. During the lifetime of an application session, to ensure that the RAN visible QoE reports are sent to the gNB(s) that provide the bearer(s) which carry the data flow(s) associated with the RAN visible QoE measurement result in a RAN visible QoE report, the gNB receiving the RAN visible QoE reports determines the bearer(s) used to deliver the application session data flow(s) and the associated node(s). The determination may be based on the PDU session ID(s) and the QoS flow ID(s) indicated in a received RAN visible QoE report. If a gNB receives a RAN visible QoE report from a UE in NR-DC and determines that the bearer(s) for the application session data flow(s) is(are) also, or only, provided by the peer gNB, this gNB can send the received RAN visible QoE report to the peer gNB. In this case, the RAN visible QoE configuration can be modified.

-------------------------------------------End of changes-------------------------------------------