**3GPP TSG-RAN WG3 Meeting #121 *R3-234617***

**Toulouse, France, 21st – 25th Aug, 2023**

**Title:** Further discussion on the support for QoE in NR-DC

**Source:** Huawei

**Agenda item:** 11.3

**Document Type:** discussion and decision

# 1. Introduction

This paper provides TP to 37.340 based on the discussion on NR-DC

# 2. TP to 37.340

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1], TS 36.300 [2] and TS 38.300 [3].

BFD Beam Failure Detection

CHO Conditional Handover

CLI Cross Link Interference

CPA Conditional PSCell Addition

CPAC Conditional PSCell Addition or Change

CPC Conditional PSCell Change

DAPS Dual Active Protocol Stack

DC Intra-E-UTRA Dual Connectivity

DCP DCI with CRC scrambled by PS-RNTI

EN-DC E-UTRA-NR Dual Connectivity

IAB Integrated Access and Backhaul

MCG Master Cell Group

MN Master Node

MR-DC Multi-Radio Dual Connectivity

NE-DC NR-E-UTRA Dual Connectivity

NGEN-DC NG-RAN E-UTRA-NR Dual Connectivity

NR-DC NR-NR Dual Connectivity

QMC QoE Measurement Collection

QoE Quality of Experience

RLM Radio Link Monitoring

SCG Secondary Cell Group

SMTC SS/PBCH block Measurement Timing Configuration

SN Secondary Node

V2X Vehicle-to-Everything

13 Other aspects

13.1 Interference avoidance for in-device coexistence

In-Device Coexistence (IDC) solution as described in TS 36.300 [2] is extended to address EN-DC operation. Only FDM solution, where the list of NR carriers suffering from IDC problems is signalled in IDC indication, is supported in this version of the specifications. The requirement on RRM/RLM/CSI measurements in different phases of IDC interference defined in TS 36.300 [2] is applicable except that for NR serving cell, the requirements in TS 38.133 [8] and TS 38.101-1 [12], TS 38.101-2 [13], TS 38.101-3 [14] apply.

13.2 Sidelink

NR Sidelink Communication, V2X Sidelink Communication and NR Sidelink Discovery cannot be configured in MR-DC in this release.

13.3 SCG UE history information

The MN stores and correlates the UE History Information from MN and SN(s) as long as the UE stays in MR-DC, forwards UE History Information and optional UE History Information from the UE to its connected SNs. The resulting information is then used by SN for dual-connectivity operation. The SN is in charge of collecting SCG UE history information and providing the collected information to the MN.

If the UE stays in a PSCell for a duration exceeding the maximum value of the Time Stay parameter, the SN may store the PSCell information with consecutive entries using the same PSCell identity. The total stay time in this PSCell is the sum of stay time for all consecutive PSCell with the same identity.

The SN shall provide the collected SCG UE history information, if available, to the MN in the following procedures:

- the SN Release, and SN initiated SN Change procedures

- the MN initiated SN Modification procedure if requested by the MN in this procedure

- the SN initiated SN modification procedure upon PSCell change if subscribed in the SN Addition procedure

When the target NG-RAN node receives the SCG UHI from the source NG-RAN node via Handover Request message for CHO, the target NG-RAN node updates the time UE stayed in cell of the latest PSCell entry (i.e. the source PSCell) when the UE successfully accesses to a candidate cell of the target NG-RAN node. The updated value of the time UE stayed in the source PSCell is equal to the value received from the source NG-RAN node during the Handover Preparation plus the time from receiving Handover Request message from the source NG-RAN node to receiving RRC Reconfiguration Complete message from the UE.

13.x Application Layer Measurement Collection

13.x.1 Overview

The QoE Measurement Collection function as described in TS 38.300 [3] is extended to address NR-DC operation. The requirements on the gNB provided in TS 38.300 [3] apply to the MN, together with additional requirements on MN and SN provided in following sub-clauses.

13.x.2 QoE Measurement Configuration

13.x.2.1 QoE Measurement Collection Activation and Reporting in NR-DC

For a UE in NR-DC, the MN and the SN may coordinate QoE measurement collection activation and reporting as follows:

For management-based QoE activation, the MN:

- Allocates the measurement configuration application layer ID;

- Determines whether the MN or the SN sends the QoE configuration to the UE;

- Notifies the SN accordingly.

For management-based QoE activation received directly by the SN from the OAM, the SN may perform UE selection. For a selected UE, the SN indicates to the MN the QoE reference of the management-based QoE session and whether it is going to receive the corresponding reports via the MN (using SRB4) or using SRB5. The SN can send a RAN visible QoE configuration directly to the UE via SRB3, or in a transparent container to the MN, which then sends it to the UE via SRB1.

For QoE configuration activation, it is the MN to indicate the allocated measurement configuration application layer ID to the SN.

The network explicitly indicates to the UE whether to send QoE reports via SRB4 or SRB5, per QoE reference. The SRB for QoE reporting can be changed during the application session. The command for changing the SRB used for reporting may be sent to the UE by the node that configured that specific QoE configuration. The node that currently receives the QoE reports via the Uu can request from the peer node that the QoE reporting leg is switched to the peer node. The leg switch for QoE reporting needs to be approved by both nodes serving the UE. RAN visible QoE reports can be sent over the same leg, as the QoE reports pertaining to the same QoE reference, or over the other leg.

The MN should inform the SN that a UE is configured with a management-based QoE/RAN visible QoE measurement configuration.

If the MN has configured the UE with QoE measurements, and if the UE is configured to send the QoE reports to the SN, then, if the MN decides that the SN forwards the reports directly to the MCE, the MN should indicate to the SN the QoE reference, the MCE IP address and the measConfigAppLayerId.

If the SN has configured the UE with QoE measurements, and if the UE is configured to send the QoE reports to the MN, then, if the SN decides that the MN forwards the reports directly to the MCE, the SN should indicate to the MN the QoE reference and the MCE IP address.

RAN visible QoE reports can be sent to the SN directly via the SRB5, or via the SRB4 from the UE via the MN to the SN.

13.x.3 QoE Measurement Continuity for Mobility

Editor’s note: Content for this clause is FFS. QMC continuity during mobility in NR-DC should be discussed after the baseline solution for QMC in NR-DC is in place.

If the MN configured the UE with QoE measurements, every subsequent MN serving the UE can configure and release the RAN visible QoE measurements.

At SN change without MN change, the QoE configuration information is passed from the old/source SN to the new/target SN via the MN.

If the SN configured a UE with QoE measurements, at SN release, the QoE/RAN visible QoE configuration can be released.