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Agenda Item: 11.3

Source: ZTE，China Telecom, Ericsson

Title: TP to BL CR of 37.340 on QoE enhancement in NR-DC

Document for: Discussions & Approval

# Introduction

This paper provides the text proposals to the BL CR of 37.340.

# TP to BL CR of 37.340

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

10.5.2 MR-DC with 5GC

**MN initiated SN Change**

The MN initiated SN change procedure is used to transfer a UE context from the source SN to a target SN and to change the SCG configuration in UE from one SN to another. This procedure can also be used to support the continuity of QoE measurements and RAN visible QoE measurements configuration and reporting in NR-DC.

The Secondary Node Change procedure always involves signalling over MCG SRB towards the UE.

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**Figure 10.5.2-1: SN change procedure - MN initiated**

Figure 10.5.2-1 shows an example signalling flow for the SN Change initiated by the MN:

1/2. The MN initiates the SN change by requesting the target SN to allocate resources for the UE by means of the SN Addition procedure. The MN may include measurement results related to the target SN. If data forwarding is needed, the target SN provides data forwarding addresses to the MN. The target SN includes the indication of the full or delta RRC configuration..

NOTE 1: The MN may trigger the MN-initiated SN Modification procedure (to the source SN) to retrieve the current SCG configuration and Source SN to Target SN QMC Information, and to allow provision of data forwarding related information before step 1.

>>>>>>>>>>>>>>>>>>Unchanged parts are skipped<<<<<<<<<<<<<<<<<<

**SN initiated SN Change**

The SN initiated SN change procedure is used to transfer a UE context from the source SN to a target SN and to change the SCG configuration in UE from one SN to another. This procedure can also be used to support the continuity of QoE measurements and RAN visible QoE measurements configuration and reporting in NR-DC.

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**Figure 10.5.2-2: SN change procedure - SN initiated**

Figure 10.5.2-2 shows an example signalling flow for the SN Change initiated by the SN:

1. The source SN initiates the SN change procedure by sending the *SN Change Required* message, which contains a candidate target node ID and may include the SCG configuration (to support delta configuration) and measurement results related to the target SN. For supporting QMC continuity during mobility, it may contain the *Source SN to Target SN QMC Information* IE.

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

## **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. The MN-SN coordination described below uses the following procedures defined in TS 38.423 [5]:

* S-NG-RAN node Addition Preparation procedure.
* M-NG-RAN node initiated S-NG-RAN node Modification Preparation procedure.
* S-NG-RAN node initiated S-NG-RAN node Modification procedure.
* RRC Transfer procedure.

### **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, and indicates to SN if needed;

- Determines whether the MN or the SN sends the QoE configuration to the UE, in case SN enquires MN.

For management-based QoE measurement configuration 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, separately for the QoE reports and RAN visible QoE reports, the SN indicates whether it is going to receive the corresponding reports via the MN (using SRB4) or using SRB5. Upon receiving the request, the MN can decide and notify the SN whether the MN sends the QoE and RAN visible QoE configuration to the UE, or whether the SN should send the configuration(s) to the UE. The SN can send a QoE and a RAN visible QoE measurement 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 management-based QoE configurations received from the OAM and for the signalling based QoE configurations, the MN can only send the configuration to the UE via SRB1, and the UE can send the QoE reports via SRB4 or SRB5.

The network explicitly indicates to the UE whether to send QoE reports via SRB4 or SRB5, per QoE reference, separately for QoE reports and RAN visible QoE reports. 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 per QoE Reference. 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.

If the SN has released a QoE configuration towards a UE, the SN should inform the MN.

RRC Transfer message can be used to forward RAN visible QoE reports between MN and SN, e.g., MN can use RRC Transfer message to forward the RAN visible QoE reports received from UE via SRB4 to the SN.

RRC Transfer message can also be used to forward the QoE reports between MN and SN e.g, in case the MCE IP Address is not aware by the node that receives the QoE report.

#### 13.x.2.2 RAN Overload Handling

In NR-DC, when RAN overload happens in the node which receives QoE reports from the UE, the node may coordinate with its peer node to reconfigure the QoE reporting path, by sending the QoE Reporting Path Request in the QMC Coordination Request IE, via SN modification procedure.

When both MN and SN are not able to receive the QoE reports, e.g., both nodes are in RAN overload, the network can indicate the UE to pause QoE reporting, as specified in TS 38.300 [3].

### **13.x.3 QoE Measurement Continuity for Mobility**

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

For ongoing sessions, QoE measurement continuity needs to be ensured during mobility in NR-DC e.g., during inter-MN handover and SN change scenarios.

In order to ensure QoE measurement continuity during inter-MN handover, the source SN should provide the necessary SN-associated QMC configuration to the source MN. During the handover procedure, the target MN is then provided with all the information that the source MN has about the SN-associated QMC configuration, including the QoE reporting path and RVQoE reporting path.

In order to ensure QoE measurement continuity during SN change, the SN-initiated SN modification procedure and/or the MN-initiated SN modification procedure can be used by the source SN to provide the SN-associated QMC configuration to the MN. The MN can then transfer all the information that MN has about the SN-associated QMC configuration to the new SN during the SN Addition procedure.

At SN release, all the QoE measurements configured by the SN should be released.

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