**3GPP TSG RAN3 meeting #117-e R3-22xxxx**

15th Aug – 24 Aug 2022 Online

Agenda Item: 11.3

Source: China Unicom (moderator)

Title: Summary of Offline Discussion on CB # QoE2\_NRDC

Document for: Approval

# Introduction

**CB: # QoE2\_NRDC**

**- How to support QoE and RVQoE measurement and reporting for UEs in NR-DC scenarios:**

**Discuss the configuration of QoE on different cases, e.g. whether MN to configure the s-based QoE to UE, whether SN can trigger the activation of m-based QoE, which node to send the configuration to UE, which node to perform the UE selection?**

**QoE reporting can be done to both MN and SN? How to decide which leg is used for reporting? Which node to decide, e.g., MN? Overload handling? Which SRB to use for QoE reporting? Any XnAP coordination? Leave it to RAN2 decision? LS to RAN2?**

**Both MN and SN are allowed to configure RVQoE for UE? Whether MN and SN can configure the RVQoE to UE separately?**

**Whether RVQoE reporting over SN is allowed? UE only report to MN/SN or report to MN and SN independently? Whether it is necessary to share the RVQoE metrics between MN and SN via XnAP?**

**- Discuss on the MDT alignment of QoE and/or RVQoE. Both of the MDT results in MN and SN can be used for alignment with QoE/RVQoE? How to achieve the time alignment QoE and MDT in SN? QoE start indication should be sent to SN?**

**- Study on different mobility scenarios? e.g., MN initiated SN change, SN initiated SN change, etc. Signaling enhancement to support the QMC continuity in mobility scenario?**

**- Capture agreements and open issues**

(CU - moderator)

Summary of offline disc [R3-225011](file:///C:\Users\unicom\Desktop\Inbox\R3-225011.zip)

# For the Chairman’s Notes

# Discussion

The discussion will try to discuss the further details on the following topics for QoE in NR-DC: QoE configuration and reporting in NR-DC, RAN visible QoE configuration and reporting in NR-DC, QoE and MDT alignment in NR-DC, QoE measurement continuity in NR-DC and other miscellaneous points, the discussion will take the papers from [1] to [12] into account.

## Encapsulated QoE configuration in NR-DC

For QoE configuration in NR-DC, companies point out that s-based QoE and m-based QoE configuration should be discussed separately, the question is derived based on proposals in papers [2, 4, 5, 6, 8, 9, 10, 11].

**Q1: Whether MN is responsible to configure the s-based QoE to UE?**

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| Company | Yes/No | Comment |
| **Ericsson** | **Some issues need to be solved** | What if the OAM wants to configure the UE for QMC, but:   * Only SN is in area scope? OR * The MN does not support QoE?   Moreover, the OAM does not know whether the UE is in NR-DC. |
| Lenovo | Yes | Our view is that OAM does not need to know whether UE is in NR-DC for s-based QoE measurement.  For S-based QoE configuration, we think it is the same with R17 from OAM point of view. when MN receives the QoE configuration from CN, the MN decides whether QoE reporting can be provided by SN. |
| Xiaomi | Yes | For the case raised by E///, we think if the MN doesn’t support QoE, it will not do anything just the same as legacy way. |
| CATT | Yes | To be simple, the S-based configuration received from CN should be transferred from MN to UE. |
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For m-based QoE, three scenarios need to be considered:

1. M-based QoE configuration is only received by MN;
2. M-based QoE configuration is only received by SN;
3. M-based QoE configuration is received by both MN and SN;

**Q2: Which node should be responsible for the UE selection for the above cases, and which node should send the QoE configuration to UE for the above cases, why?**

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| Company | MN/SN | Comment |
| **Ericsson** | **See comment** | In our understanding, the **OAM does not know if a node is an MN or SN**. In any case the MN and SN should **inform each other** about their intention to configure the UE with an m-based QoE. In case both the MN and SN support QMC, the MN should have the final say in who configures the UE and where the SRB4 is set up. If SN is the only one supporting QMC, then it does not need a “permission” from the MN. |
| Lenovo | See comments | If (2) and (3) are allowed, some coordination between MN and SN seems needed e.g. for setting some RRC parameters. We would prefer to focus on (1) firstly. If time allowed in R18, we can work on (2) and (3) later.  We believe MN and SN should have the same capability on supporting QMC. |
| Xiaomi | See comment | The question is about UE selection, if it’s for UE selection, we think the MN or SN can be responsible for its own configuration, but the final decision should be done by MN, this can avoid overlapping issue in scenario 3. |
| CATT | See comments | If the MN and SN are managed by same OAM, typically, as E/// said, both MN and SN should receive the configuration except area scope reason. So the (3) is reasonable with one OAM.  If the SN and MN are managed by two OAM, (1), (2), (3) are possible. In (1), (2) cases, just treat separately, in case (3), maybe need coordination for the conflict. |
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## Encapsulated QoE reporting in NR-DC

If the node that configures the QoE measurement is overloaded, the network can configure the UE to report via another node. In [1, 2, 4, 5, 6, 9, 10, 11, 12], companies think it is necessary to send the QoE report either by MN or SN.

**Proposal: QoE reporting can be transmitted over both MN and SN, reporting leg indication to UE is included in the QoE measurement configuration sent from gNB to UE. The configuration can be changed during the application session.**

**Q3: Do you agree the above proposal?**

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| Company | Yes/No | Comment |
| **Ericsson** | **Partly agree** | The part that is **not agreeable** is the following: *“reporting leg indication to UE is included in the QoE measurement configuration*”. The reason is that the OAM, that assembles the QoE measurement configuration, does not know whether the UE is in DC. The decision about the reporting leg is taken by the RAN node configuring the UE for the measurements, which is for sure aware of NR-DC. |
| Lenovo | **Partly agree** | *“reporting leg indication to UE is included in the QoE measurement configuration*”: the reporting leg indication should be in RRC QoE measurement configuration. The reporting leg indication would be implicitly indicated by SRB type, e.g. split SRB, SRB4 or SRB3. We would suggest:  **QoE reporting can be transmitted over both MN and SN, reporting leg indication to UE may be included in the RRC QoE measurement configuration. The configuration can be changed during the application session.**  We also need to discuss whether the reporting leg indication is per application measurement ID or not. But we can discuss it later. |
| Xiaomi | Partly agree | Similar concerns as above. We think at least companies agrees that the reporting configuration (i.e. QoE reporting over MN and/or MN) should be decided by MN/SN, based on the Lenovo’s revision, we suggest rewording as below  **QoE reports can be transmitted over both MN and SN, the NG-RAN node may send the reporting configuration (i.e. QoE reporting over MN and/or MN) to UE . The reporting configuration can be changed during the application measurement session.** |
| CATT | Partly agree | Clearly, we all agree the report can be sent from MN or SN. But for the “reporting leg indication to UE is included in the QoE measurement configuration sent from gNB to UE” we should have more discussion. We don’t think the network should indicate UE which leg shall be used.  As discuss in our paper [6], Proposal 4: Study the trigger of the UE sending the report via SN: Network control or UE control with network enabled. We should open the discussion.  We may just tell UE it can use SN and UE decide which leg is used. |
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**Q4: QoE reporting via SN**

**(1) If QoE reporting can be transmitted over SN, which node is responsible to decide reporting from SN? e.g. overload handling case.**

**(2) If QoE report is received by the SN, which option do you support?**

**Option 1: SN can forward the QoE reports to MCE directly, the QoE Reference, MCE IP address, alignment information should be transferred to SN via XnAP.**

**Option 2: SN forwards the QoE reports to MN and MN then sends them to MCE.**

**(3) If QoE report is received by the SN, which SRB can be used for QoE report in SN?**

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| Company | Yes/No | Comment |
| **Ericsson** | 1. **See comment** 2. **Option 1** 3. **SRB4** | 1. Does the question assume an overload scenario where reports are sent to MN, but the MN goes into overload and the reporting is moved to SN? Under that assumption, the MN instructs the UE to report to SN. 2. No reason for the QoE reports to go to MN if the SN receives them from the UE. The MN cannot read these reports anyway. 3. We should support setting up the SRB4 as an MCG, SCG or split bearer. |
| Lenovo | See comments | (1) For signalling based QoE activation and management based QoE activation in MN: the MN decides the reporting leg.  For management QoE activation in SN: the SN decides the reporting leg.  The principle should be the node providing the QoE configuration decides the reporting leg.   1. For signalling based QoE activation and management based QoE activation in MN: Option 2   For management QoE activation in SN: Option 1  It is also depending on the SRB type used for QoE reporting. If MN terminated split SRB4 is used for QoE reporting via SN, the SN needs to forward all received RRC PDCP PDU to MN.   1. SRB3 or SRB3-like (e.g. SRB5 which is terminated between UE and SN for QoE measurement reporting and has lower priority than SRB3) or split SRB4   We are not sure SRB4 can be terminated between UE and SN. |
| Xiaomi | See comments | (1) We think this depends on the scenarios.  If the QMC is initiated by MN, MN should be responsible for the reporting configuration and update.  If the QMC is initiated by SN, SN should be responsible for the reporting configuration and update.  For both cases, one additional option is both MN or SN can send some criteria to UE, and let the UE to decide whether to report to MN/SN based on the e.g. radio situations, which is similar to split SRB.  (2)  We think both s-based and m-based can apply option 1, no need to send QoE reports to MN, which increase signaling overhead.  (3) This new SRB (e.g. SRB5) is similar to SRB4 in MN, just with low priority compare to SRB3.  And we think this should be decided by RAN2, RAN3 can give some suggestions. |
| CATT | See comments | 1. This is related Q3, the UE will send the report in uplink. So we should discuss the method network control or UE control for the leg used. 2. Prefer option1. even though the option2 is workable 3. SRBx in SN like SRB4 in MN. We need check with RAN2 whether SRB3 is ok |
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## RAN Visible QoE Configuration in NR-DC

The question is derived based on proposals in papers [1, 2, 3, 4, 5, 7, 9, 10, 11].

**Q5: RAN Visible QoE Configuration in NR-DC**

1. **Do you agree that both MN and SN can generate the RAN visible QoE configuration separately? Do you agree that QoE reference ID and available RAN visible QoE metrics should be send from MN to SN?**
2. **If SN can generate an independent RVQoE configuration, which node should send the configuration to UE?**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| **Ericsson** | 1. **Agree to first part only** 2. **SN** | 1. Let’s leave the second question aside for now, **the info exchanged during the MN-SN coordination needs more discussion**. 2. However, the **MN should be informed about this**. |
| Lenovo | 1. No | 1. No need to generate separate RVQoE configuration:   For signalling based QoE activation and management based QoE activation in MN: the MN provides the RVQoE configuration  For management QoE activation in SN: the SN provides the RVQoE configuration  MN or SN forwards the received RAN visible QoE measurement results and corresponding PDU session ID to the peer node according to the bearer type of the PDU session. We do not see why QoE reference ID is needed. |
| Xiaomi | 1. YES 2. Depends | (1)  There may be two scenarios.  One scenario is the QMC is configured separately in MN and SN, then the RVQoE can be configured separately according to the QMC configuration.  Another scenario is the MN is configured QMC, and MN don’t need RVQoE collection, but the RVQoE collection may be useful for SN, so in this case, the second question can support the SN get the RVQoE info which is based on the QMC received in MN  (2)  If the RVQoE configuration is activated by the QMC received by SN itself, SN should send the configuration.  If the RVQoE configuration is activated by the QMC received by MN, MN should send the configuration. |
| CATT | 1. Yes 2. Both MN and SN could be | 1. We support RVQOE can be configured separately. For the RV QoE based on one QoE, The MN should provide some information for the SN RV QoE configure. The details can be discuss later 2. The SN configuration can be sent to UE from SN directly or via MN. So then if the SN RV QOE report received by MN, the MN can forward to SN. |
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## RAN Visible QoE Reporting in NR-DC

The question is derived based on proposals in papers [2, 4, 5, 6, 8, 9, 10, 11].

**There are two options for RVQoE reporting in NR-DC:**

**Option 1: UE reports RVQoE to only MN. MN can forward the RVQoE reports to SN if needed.**

**Option 2: UE can report RVQoE to MN and SN independently.**

**Q6: Which option do you prefer? Whether it is necessary to share the RVQoE report between MN and SN via XnAP?**

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| --- | --- | --- |
| Company | Option1/2 | Comment |
| **Ericsson** | **Option 2,** but see comment | Option 2 should be supported, but it should also be possible that the node receiving the RVQoE report forwards the report to the other node via XnAP. |
| Lenovo | See comments | It does also depend on the use cases:  For signalling based QoE activation and management based QoE activation in MN: Option 1  For management QoE activation in SN: Option 2 |
| Xiaomi | Both | Similar view as E///, option 2 can be for normal case, the RVQoE report should be sent to the corresponding node that needs the RVQoE information. But for some cases, e.g. overload case or bad radio condition, it is possible to use option 1. |
| CATT | Both | UE may send the report of two nodes at same time; it is benefit to send to network in one message. Also send to two nodes independently should be supported |
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## QoE and MDT alignment in NR-DC

The question is derived based on proposals in papers [1, 5, 6, 8, 9, 10, 12].

**Q7: QoE and MDT alignment in NR-DC**

1. **Whether both of the MDT results in MN and SN can be used for alignment with QoE/RVQoE? Whether the correlation information should be included in the QoE configuration and QoE report?**
2. **How to achieve the time alignment of QoE and MDT in SN? Whether QoE start indication should be sent to SN?**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| **Ericsson** | **Later** | Given that **we have exceeded the max of 8 questions** (i.e., max number of questions in a CB per TU), and that **we do not even have the baseline** for QMC in NR-DC, we prefer leave this discussion for later. |
| Lenovo | 1. Later | (1）We would prefer focus on the basic QoE function in NR-DC firstly. After the basic function is settled, we can discuss this issue later. |
| Xiaomi | Yes | Discussing this later would be fine. |
| CATT |  | Agree with above, discuss it later |
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## QoE measurement continuity in NR-DC

The question is derived based on proposals in papers [2, 6, 8, 10, 12].

**Q8: NR-DC mobility scenarios**

1. **Do you agree the following cases need to be considered for the QoE measurement continuity in NR-DC?**
2. **Secondary Node Change (MN/SN initiated)**
3. **Inter-Master Node handover with/without Secondary Node change**
4. **Master Node to gNB Change**
5. **gNB to Master Node change**
6. **Whether the following procedures should be used to transmit QoE related information for QoE measurement continuity for NR-DC? Any other procedures?**
7. **S-NG-RAN node Addition Preparation**
8. **Handover Preparation**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| **Ericsson** | **Later** | Given that **we have exceeded the max of 8 questions** (i.e., max number of questions in a CB per TU), and that **we do not even have the baseline** for QMC in NR-DC, we prefer leave this discussion for later. |
| Lenovo | 1. See comments 2. Partial Yes | 1. We don’t see much difference from solution point of view so support all above cases. 2. Yes, the detailed info is FFS. We think:   for the signalling based QoE activation and management based QoE activation in MN, the MN only needs to indicate the requested SRB type (e.g. MN terminated split SRB4 or SRB3 or SRB3-like) for a QoE measurement reporting in Xn-AP S-Node Addition Request message for inter-SN change.  for Management based QoE activation in SN, the source SN needs to transmit the QoE measurement configuration(s) and/or the information related to the configuration(s) of a specific UE to the target SN via MN.  b）what’s the difference with R17 handover? |
| Xiaomi | Later | We think the continuity aspects should be discussed when the basic procedure is clear. |
| CATT |  | We may identified the issue first and discuss the solution later |
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## Miscellaneous

Anything missing, companies are invited to list below.

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| Company | Yes/No | Comment |
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# Conclusion, Recommendations

If needed

# References

1. R3-224362 The Support for QoE and RVQoE Measurement and Reporting in NR-DC Scenarios Ericsson
2. R3-224419 QoE measurement in NR-DC Lenovo
3. R3-224458 On support for QMC in NR-DC Nokia, Nokia Shanghai Bell
4. R3-224612 Support for QoE in NR-DC Qualcomm Incorporated
5. R3-224759 Discussion on QoE in NR-DC Xiaomi
6. R3-224790 Discussion on Support for legacy QoE in NR-DC CATT
7. R3-224791 Discussion on Support for RAN visible QoE in NR-DC CATT
8. R3-224841 NR QoE Discussion on support for NR-DC Samsung
9. R3-224865 Discussion on QoE measurement in NR-DC China Unicom
10. R3-224889 Discussions on the support for QoE in NR-DC Huawei
11. R3-224936 Discussion on the configuration and reporting of QoE and RVQoE in NR-DC ZTE
12. R3-224937 Discussion on MDT alignment and continuity in NR-DC ZTE