**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?**

|  |  |  |
| --- | --- | --- |
| 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. |
| Qualcomm | Yes | MN should be the node responsible for configuring s-based QoE in NR-DC, no need to involve SN or configure UE with s-based QoE via SRB3.  **Area scope check should be only done at MN for s-based QoE** and QoE can be configured at the UE as in Rel-17 (via SRB1) if area scope check is satisfied. **Whether SN is in area scope or not need not be considered while configuring s-based QoE.**  If MN doesn’t support QoE, MN will not initiate a QMC session upon receiving a s-based QoE config from AMF and neither it should forward this s-based QoE configuration to SN. |
| Huawei | In general yes | Since the s-based request could only be received by MN, MN should be responsible for the next step. As the questions raised by E///, if MN doesn’t support, maybe MN just discard the request; if only SN is in the area scope, it may does no matter, since MN need to check if UE is in the scope or not. |
| ZTE | Yes | For the area scope issue raised by E///, as we know, similar concern has also been raised in R17 MDT but reached no consensus. We don’t think there is much requirement to cover all these cases in QoE WI either.  It is straightforward that MN receives the s-based QMC configuration from OAM and sends to UE, which aligns with R17 QoE mechanism. |

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. |
| Qualcomm | See comments | We can consider all three scenarios in Rel-18.   1. **m-based QoE only on MN**: MN can inform SN that it is configuring m-based QoE and configures UE via SRB1 2. **m-based QoE only on SN:** SN should forward the m-based QoE configuration to MN and MN should configure the UE via SRB1 (FFS whether MN can open SN’s configuration or it should be sent as container) 3. **“different” m-based QoE on both MN and SN:** MN can have the final say e.g., whether to reject m-based QoE config received on SN or configure both?   **“same” m-based QoE on both MN and SN:** Is this scenario possible where OAM configures the same QoE config (same QoE Reference) to both MN and SN? |
| Huawei | See comment | We think both nodes can receive the m-based QoE measurement from the OAM as in MDT, since on one hand as E/// mentioned above, OAM doesn’t recognize MN or SN, on the other hand, MN and SN doesn’t know if the other side received m-based request or not, so the only question here is, anyway there has to be some info exchange between SN and MN, and then the final outcome should be that the overwriting of QoE measurement should be avoided. |
| ZTE | See comments | If all these kinds of m-based QoE are allowed, agree with companies that MN should have the final say in who configures the UE and perform area checking. Coordination between MN and SN seems indispensable, which can be further discussed. As far as we know, XnAP coordination is unavoidable for quite some subtopics in NR-DC QoE. |

## 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. |
| Qualcomm | Partly agree | Agree with most comments above. Our views summarized below:  **QoE reports can be transmitted to MN or SN (FFS whether both) at a given time.**  **How the UE determines which node to send the QoE reports is FFS**  It is not clear whether we want to support split SRB4 for QoE reporting i.e., whether there is a benefit to send QoE reports to both MN and SN. This might add unnecessary complexity. |
| Huawei | See comment | We agree that “**QoE reporting can be transmitted over both MN and SN**”, we don’t understand the text “**reporting leg indication to UE is included in the QoE measurement configuration**”, does that mean that RAN node configures to UE which leg to report? In general we think RAN2/UE should be involved the discussion how to achieve the target that both MN leg and SN leg could be used as reporting channel. |
| ZTE | Partly agree | Reporting leg indication over RRC is needed, as also proposed in our paper.  How the reporting indication works at RAN side and UE can be further discussed, as well as other details about reporting. |

**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 |
| Qualcomm | 1) Question unclear  2) Option 1  3) RAN2 decision | 1) Question is not clear to us. But in general, we think MN can decide the leg to use for QoE reporting and can decide when/whether to switch to a different leg. Even in case of m-based QoE received on SN, if MN is the node which configures UE via SRB1, it can perhaps decide the leg to use?  @**Xiaomi**, don’t think we need to define a UE based criteria for which leg to use e.g., based on radio conditions and can be simply determined by MN or SN based on overload condition  2) Option 1 is simpler  3) SRB or SRB5 (new low priority SRB to SN) or split SRB4 are the options. But should be decided by RAN2. Also, not clear to us whether SRB4 can be both MN terminated, and SN terminated? |
| Huawei | See comment | For 1) As commented above, we think RAN2 should be involved in the detailed solution discussion. In our understanding, if SN configures the measurement to UE, UE should be able to report to SN directly, even there is no overload in MN side. Of course, overload should be one of the cases to trigger the reporting between SN and MN.  For 2) In our understanding, this question is about the QoE report when the QoE measurement is configured by the MN.  It depends on the SRB of the QoE report and the progress of RAN2.  If it is the MN terminated split/SCG SRB, the SN cannot read these reports. Option 2 is straightforward as the legacy split SRB.  If it is the SN terminated SRB, RAN3 needs to discuss which option is better. In this case, RAN3 need first discuss whether the SN can directly send the QoE report to the MCE only based on the MCE IP address. For example, in some cases, the SN and the MCE are in different IP subnet.  3) We think the priority of the SRB of QoE report should be lower than other SRBs. The SRB3 is defined as a direct SRB between the SN and the UE. If the QoE report is received by the SN directly from the UE, we are not sure whether it can be called as SRB4. It is RAN2 to decide which SRB can be used. |
| ZTE | See comments | 1. We would prefer to let MN make the final decision about reporting leg. With regard to overload scenario, the overload of both MN and SN should be considered, e.g., MN should have a view of the overload situation in both MN and SN. 2. Prefer option 1. SN should also be aware of the MCE IP address. 3. We believe this should be decided by RAN2. |

## 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?**

|  |  |  |
| --- | --- | --- |
| 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. |
| Qualcomm | 1. See comments   2) MN | 1) What do we mean by “generating” a configuration? Say if SN generates a RVQoE configuration and sends it to MN, can MN open it up and generate a common RVQoE configuration?  Our view is that both MN and SN can participate in generating RVQoE configuration, but UE should be provided with a common RVQoE configuration after MN-SN coordination. For example, SN can provide interested RVQoE metrics and periodicity to MN and MN can configure a common RVQoE configuration.  2) Only MN should be able to configure the UE with this common RVQoE configuration via SRB1. No need to use SRB3 to send RVQoE configuration. |
| Huawei | See comment | 1. Not sure what exactly this question means, we agree that either MN or SN is able to generate RAN visible QoE configuration, but we think visible configuration should better generated/configured together with legacy QoE configuration at the same node, otherwise if separated, there should be coordination between MN and SN which would introduce additional complexity. 2. We don’t think visible configuration could be generated independently. |
| ZTE | 1. Yes 2. depends | 1. Share the view with Qualcomm. By ‘Generating’ it means MN or SN can configure RVQoE based on the received available QoE metrics, according to its own requirement. Both MN and SN should have the ability to configure RVQoE for their own use, which is benefit for the network scheduling. XnAP coordination is obviously needed, and we can further discuss which info should be transmitted over Xn, as proposed by E///. 2. We would prefer to let MN send all the RVQoE configuration to UE.   But this depends on the decision about SN configuring m-based legacy QMC. If SN is allowed to configure the s-based QoE directly to UE, then it would be easy to allow SN also to configure RVQoE to UE technically —— only some enhancement on SRB is needed. |

## 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 |
| Qualcomm | Both | Both cases should be possible. |
| Huawei | See comment | We think the question is about the RAN visible QoE reporting when the RAN visible QoE is configured by the MN. We think visible report should not be reported independently from legacy report, we agree the second part of option 1, in addition, we think visible report could also be sent to SN. |
| ZTE | Option 2,  but | Transmitting separately is better to guarantee real-time transmission.  But transmitting RVQoE reports over Xn should also be supported, where we share the view with E///. In this manner, option 2 actually covers option 1 to some extent. |

## 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 |
| Qualcomm | Later is fine |  |
| Huawei | See comment | For 1), In general yes, since service could be transmitted as split bearer over both MN and SN legs. In order for the OAM to correlate, some information might be needed to be include in the report, as discussed in [10], we think R17 mechanism should be used as base line.  For 2), As commented above, in general we think R17 mechanism should be used as base line. |
| ZTE |  | Agree to discuss later. |

## 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 |
| Qualcomm | Later is fine | In general, QMC continuity during all DC mobility scenarios can be considered. We should also consider the SN release case. |
| Huawei | See comment | For 1), We think anyway the solution should consider the case of mobility or MN/SN node changing, in our understanding, the existing R17 mechanism (QoE measurement is just part of configuration) could be reused.  For 2), As commented above, we think existing R17 mechanism should be reused, we could discuss further on use case basis to see which procedure would be impacted, in our understanding, for most of the cases, there should be no direct spec impacts. |
| ZTE |  | OK to discuss later. |

## 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