3GPP TSG-RAN WG2 Meeting #114-e R2-210xxxx

Electronic, 19th May – 27th May 2021

Source: Qualcomm Incorporated

Title: Configuration Reporting General

Agenda Item: 8.14 NR QoE

Document for: Discussion and Decision

# 1 Introduction

This document aims at gathering and summarizing companies views for the following offline discussion:

* [AT114-e][026][QoE] Configuration Reporting General (Qualcomm)

Scope: Start from the baseline, the tdoc under 8.14.2.1, identify easy agreements, potential agreements, discussion points, open ponts.

Intended outcome: Report.

Deadline: In time for CB online May 24

# 2 Company contact details

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| --- | --- | --- |
| Company | Name | Email Address |
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| Ericsson | Cecilia Eklöf | cecilia.eklof@ericsson.com |
| Apple | Pavan Nuggehalli | pnuggehalli@apple.com |
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# 3 Discussion

### Issue 1: QoE measurement configuration-specific aspects

Issue 1-1: QoE measurement configuration release

Contributions [1][2][4][12] discuss QoE configuration release issue and contribution [1][2] propose to it is allowed for the gNB to release a list of QoE measurement configurations in one RRCReconfiguration message to provide gNB flexibility and save RRC signalling overhead.

Contributions [1] proposes if a QoE measurement configuration is released, RRC layer informs the concerned applications to release the QoE measurement configuration.

Contributions [1][4] propose if the UE enters IDLE state, UE should release all of the QoE measurement configurations.

Then the following questions 1-3 collect companies’ view on this issue.

**Question 1: Do companies agree that gNB can release a list of QoE measurement configurations in one RRCReconfiguration message?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC | Yes | gNB could have such flexibility. |
| Huawei, HiSilicon | Yes |  |
| Qualcomm | Yes | gNB could have such flexibility |
| Ericsson | Yes |  |
| Apple | Yes |  |
|  |  |  |

**Question 2: Do companies agree if a QoE measurement configuration is released, RRC layer informs the concerned applications to release the QoE measurement configuration?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC | Depends | It depends on what is the implication of informing applications to release the QoE configuration from end-to-end perspective. Does it mean that APP layer needs to discard all QoE report which is the result of the forced deactivation initiated by OAM? If so, the QoE measurement configuration release over uu can only be initiated by Deactivation of QMC job from OAM. Then such behaviour makes sense to us.  However, if QoE measurement configuration release can also be triggered by RAN overload other than deactivation from OAM, it is not necessary to release the QoE measurement configuration at APP layer during such temporary situation.  Note that last meeting we’ve agreed that other WGs are responsible to define the normal system procedures for release and which nodes are responsible. If we need to follow this agreement, we would like to propose a working assumption in RAN2 that the legacy QoE configuration release shall only be triggered by the forced deactivation from OAM. |
| Huawei, HiSilicon | Yes, but | We are generally fine with Q2. However, we think that the UE AS may also need to do something, e.g. in TS 36.331, UE behaviors are defined as below, and we think the highlighted parts should also be discussed as part of UE behaviours.  1> if the received *otherConfig* includes the *measConfigAppLayer*:  2> if *measConfigAppLayer* is set to setup:  3> forward *measConfigAppLayerContainer* to upper layers considering the *serviceType*;  3> consider itself to be configured to send application layer measurement report in accordance with 5.6.19;  2> else:  3> inform upper layers to clear the stored application layer measurement configuration;  3> discard received application layer measurement report information from upper layers;  3> consider itself not to be configured to send application layer measurement report. |
| Qualcomm | Yes | If the QoE context in AS layer is released, then the ID, service type or other corresponding configuration will be released. The AS layer cannot identify any related QoE report. |
| Ericsson | Yes, but | In general yes, but the behaviours related to pause/resume and mobility hasn’t been agreed yet, so there may be changes later. |
| Apple | Yes | If the AS layer has released QoE configuration, then upper layers should be informed. |
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**Question 3: Do companies agree if the UE enters IDLE state, UE should release all of the QoE measurement configurations?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC | Depends | NR QoE has introduced more service types including MBS, for which UE can get served even in IDLE state. In addition, the SI has concluded that the discussion on services like MBS could be deprioritized, it is at least premature to answer this question from MBS service perspective.  For those services that can only be served in CONNECTED state, there’s no need to keep the configuration for UE in IDLE mode, so the release of configuration in such condition seems OK. |
| Huawei, HiSilicon | Yes, but | We think that UE behaviours upon entering IDLE state are quite similar as release handling, so we think there could be uniform definitions. |
| Qualcomm | Yes | Since we do not support QoE measurements in IDLE state, then QoE configurations should be released. |
| Ericsson | Yes | For now they can be released. If MBS is added later, the behaviour can be changed related to that. |
| Apple | Yes |  |
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Issue 1-2: QoE measurement configuration modification

Contribution [2] proposes to discuss whether QoE measurement configuration modification should be supported from RAN2 signalling point of view, which is similar to what is already supported for RRM measurements (“AddModList”).

**Question 4: Do companies think QoE measurement configuration modification should be supported from RAN2 signalling point of view?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC |  | Our understanding is that the coordination with SA5 is needed if we would like to support modification. |
| Huawei, HiSilicon | No | From RAN2 point of view, the QoE configuration is just a container which is transparent in AS layer. We support using toAddMod and toRelease lists, but in the case of QoE configuration in case the QoE configuration with the existing entry in the list would be provided to the UE, then this would be equivalent to releasing a previous QoE configuration and providing a new one to the application layer. |
| Qualcomm | No | One QoE configuration is linked with one Reference ID in application layer and one RRC level ID in AS layer. The modification may only be needed the Reference ID or RRC level ID is unchanged but the corresponding configuration changed. We understand this will not happen considering Reference ID is globally unique and different QoE configuration should have different Reference ID. |
| Ericsson | Yes | We think it sounds OK to replace an old container by a new one, but only if there is no ongoing measurement. This requires the session start/stop indication from the UE, which we anyhow think is needed for many reasons. |
| Apple | No | Agree with Huawei and Qualcomm views. Not clear what modification means in this context. |
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### Issue 2: QoE measurement configuration and reporting common aspects

Issue 2-1: QoE configuration and report form and content

Contribution [6][11] discusses which form QoE configuration/report should be applied in RRC layer and proposes QoE configuration and report are encapsulated in a transparent container in the RRC messages.

Contributions [1][6][12] discuss what parameters should be included in *RRCReconfiguration* for each QoE configuration and what parameters should be included in*MeasReportAppLayer* message for each QoE report.

Companies please provide views on the following questions.

**Question 5: Do companies agree QoE configuration and report are encapsulated in a transparent container in the RRC messages?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC | Yes | Same as LTE. |
| Huawei, HiSilicon | Yes |  |
| Qualcomm | Yes |  |
| Ericsson | Yes |  |
| Apple | Yes |  |
|  |  |  |

**Question 6: Do companies think what parameters should be included in RRCReconfiguration for each QoE configuration?**

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| --- | --- | --- |
| **Company** | **Parameters** | **Additional explanations** |
| CMCC | At least service type, QoE ref/RRC level ID, QMC configuration container | FFS on slice ID (signalling explicitly or by other means) to support per-slice QoE measurement. It is still unclear now whether and how UE APP can be informed of slice information. |
| Huawei, HiSilicon | (1) Service type  (2) RRC level ID | In our paper [6], we provide technical analysis for (1) and (2). |
| Qualcomm | Service type, RRC level ID | It is FFS whether other parameters need to be added to link with RRC level ID. |
| Ericsson | At least QoE ref or RRC level ID, QMC config container, service type |  |
| Apple | Service type and some type of measurement ID |  |
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**Question 7: Do companies think what parameters should be included in MeasReportAppLayer message for each QoE report?**

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| --- | --- | --- |
| **Company** | **Parameters** | **Additional explanations** |
| CMCC | At least QoE ref/RRC level ID |  |
| Huawei, HiSilicon | RRC level ID | RRC level ID (or Local ID) is sufficient for the gNB to identify which QoE configuration the report refers to and to identify other parameters, e.g. service type or QoE reference ID. |
| Qualcomm | RRC level ID | Agree with Huawei RRC level ID is enough, other parameters can be linked with RRC level ID when configuration. |
| Ericsson | At least QoE ref or RRC level ID, QMC report container |  |
| Apple | Same ID as used in configuration |  |
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Issue 2-2: RRC level ID format

In last RAN2 meeting, it has been agreed an RRC level ID should be introduced, but FFS for the ID format.

* R2 assumes that for RRC an ID is required to identify a measurement, FFS whether this is the QoE reference ID or something else.

Contribution[4] [11] discusses whether multiple QoE measurement configurations can be configured for a certain service type, if yes, then need to introduce one RRC ID to identify one contribution; otherwise, using service type is enough.

Companies please provide views on this issue.

**Question 8: Do companies think it is possible multiple QoE measurement configurations can be configured for a certain service type?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC | Yes | It is possible that different slices are configured with the same service type. So using service type alone is not enough. |
| Huawei, HiSilicon | Yes, but | On one hand, we think it should be allowed to configure multiple QoE measurements for one service type. For example, for streaming service, QoE configurations may be different for different OTT providers.  On the other hand, we wonder whether we need to check with SA4 from feasibility point of view, e.g. if there are multiple QoE measurements for one service type, whether one measurement will override another or not. |
| Qualcomm | Yes | Based on SA5 and SA4 specification, there could be multiple QoE sessions initiated in application layer, and one Reference ID is introduced to identify one QoE collection task; and for these QoE collection tasks, there could be different QoE configurations.  Besides, we share with CMCC view that different QoE configurations can be provided for different slices.  Even only one QoE configuration is configured for a certain service type, it still requires reference ID for gNB to forward the QoE data to the right MCE as SA5 requires. |
| Ericsson | Yes | Better not to have any restrictions related to this. |
| Apple | No | How can RAN2 decide this? Need to check with SA groups. |
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It is understood that the purposes of RRC level ID is for gNB to manage QoE configurations and forward the QoE data to the right OAM server. Some contributions [1][3][5][6][7][9][12] discuss this issue and propose two alternative types of RRC level ID should be included in *RRCReconfiguration* message to identify one QoE measurement configuration and the corresponding measurement report.

Type 1: Re-use Reference ID included in application layer configuration and reporting container. Reference ID is 6-bytes length and globally unique, companies has concerns on the RRC signalling overhead.

Type 2: Use a shorten ID in RRC layer to link with one Reference ID in application layer. There are two types shorten ID are proposed: 1) use QMC ID (3 bytes) 2) RRC defined ID (4 or 5 bits). This method needs some standardization work for UE and gNB to link a shorten ID to a reference ID.

Companies please provide views on the following two questions.

**Question 9: Should Reference ID or shorten ID be used in RRC layer to identify one QoE measurement configuration? Should it be included in *RRCReconfiguration* or *MeasReportAppLayer* or both message?**

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| --- | --- | --- |
| **Company** | **Reference ID or shorten ID** | **Additional explanations** |
| CMCC | Slightly prefer shorten ID | We would like a unified method that can meet requirements for both legacy QoE case, and RAN visible QoE case. |
| Huawei, HiSilicon | Type2 | We think the overhead is the main motivation for Type2, and it is noted that the RRC level ID will be used in many places, e.g. setup/release/report of QoE. Considering that QoE reports can be periodical, we think the overhead needs to be taken into account. Also, the running CR in R2-2105895 contains the measConfigAppLayerID-r17 in the QoE configuration as it is needed for managing toAddMod/toRelease lists. This is sufficient already and no extra identifier is required in RRC. |
| Qualcomm | Type2-shorten ID | Reference ID is 6-bytes and globally unique, and the ID size is too large for AS layer. In AS layer, it is enough the ID is unique within gNB or even within the UE, similar with existing measureID with 5bits. |
| Ericsson |  | If a shorter ID is used, it should be the one that is anyhow needed in the add/mod and release lists. RAN3 needs to be informed to include the mapping to QoE reference in Xn signalling. Alternatively, the QoE ref could be used in the RRC configuration, we are fine with either of them. |
| Apple | No strong view | We think that QoE reference ID should work and is the simplest approach. We are not convinced that saving a few bits is going to make much difference but are OK to go with majority view. |
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**Question 10: If a shorten ID should be used in RRC layer, which type (QMC ID or RRC defined ID) of shorten ID should be used?**

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| --- | --- | --- |
| **Company** | **QMC ID or RRC defined ID** | **Additional explanations** |
| CMCC | RRC defined ID | We would like a unified method that can meet requirements for both legacy QoE case, and RAN visible QoE case. |
| Huawei, HiSilicon | RRC defined ID | RRC defined ID is simple and flexible and it is needed for managing toAddMod/toRelease lists anyway, as indicated above. |
| Qualcomm | RRC defined ID | RRC defined ID will be much shorter than QMC. |
| Ericsson | RRC ID | Use the same one that is anyhow needed in the add/mod and release lists. |
| Apple | RRC defined ID | If we are going towards shortening ID, then we migh as well pick the more efficient solution. |
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Issue 2-3: Container size for QoE measurements configuration and reporting

Contribution [2] discuss the maximum container size for QoE measurements configuration and reporting, and proposes to re-use the maximum container size of 1000 bytes for QoE measurements configuration and discuss whether to increase the maximum container size for QoE measurements reporting up to the maximum supported PDCP SDU size. Companies please to provide view on the following two questions.

Contribution [6] proposes to check with SA4 the maximum length of the container after compression.

**Question 11: Do companies agree to re-use the maximum container size of 1000 bytes for QoE measurements configuration?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC |  | Check with SA4 (maybe internally with SA4 colleagues). |
| Huawei, HiSilicon | Yes | We are OK to check with SA4 about this, but for now we can assume the same value applies as before. |
| Qualcomm | Yes but | Assumes so far, can be revisited based on the further discussion. |
| Ericsson | No | We can check with SA4 whether a maximum size is needed to be defined. |
| Apple | Yes | OK to check with SA4 |
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**Question 12: Do companies think the maximum container size for QoE measurements reporting up to the maximum supported PDCP SDU size should be increased?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC |  | Check with SA4 (maybe internally with SA4 colleagues). |
| Huawei, HiSilicon | No | The question is a bit unclear. Definitely, the maximum supported PDCP SDU size should not be increased. If the question asks whether QoE report can be bigger than this, then we think we can assume the current value as specified by SA4 for now, i.e. 8000 bytes. We are open to check with SA4 though. |
| Qualcomm | Depends | Depends on whether we introduce SRB4 segmentation. If no SRB4 segmentation, then no need to increase the container size; if yes, then can discuss the necessity. |
| Ericsson | Yes, increased or removed | We can check with SA4 whether a maximum size is needed to be defined. We would prefer having the option to send larger reports and use RRC segmentation. Certain applications, e.g. URLLC applications, may generate a lot of data. |
| Apple | No | We don’t think segmentation is needed since with distinct IDs, reports can sent individually if the maximum PDCP SDU size is exceeded. |
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**Question 13: Do companies think it is needed to check with SA4 the maximum length of the container after compression will exceed 8000 bytes?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC | Yes | Maybe check internally with SA4 colleagues. LS may not be needed. |
| Huawei, HiSilicon | Yes | In our paper [6], we indicate that some new services may lead to big QoE measurements (more than RAN2 limits), and then it may be a question how SA4 will handle it. We think it may be beneficial to check with SA4, but we do not have strong opinion, because perhaps it can be solved by implementation, e.g. APP guarantees that any QoE report should not exceed the limit. |
| Qualcomm | No | SA4 defined the maximum size to 8000byte already considering the PDCP PDU size limitation. Application layer should guarantee the QoE file is not beyond than 8000byte regardless of the file format.  And seems this issue has no impact on AS layer. |
| Ericsson | Yes | We can check with SA4 whether a maximum size is needed to be defined. We would prefer having the option to send larger reports and use RRC segmentation. |
| Apple | No | Same view as QC |
|  |  |  |

### Issue 3: QoE measurement report-specific aspects

Issue 2-1: Multiple QoE measurements in one *MeasReportAppLayer* message.

Contributions [1][4][6][9] discuss this issue and contributions [1][4] propose to support multiple QoE measurements in one *MeasReportAppLayer* message to save RRC header, while contribution [6] proposes only one multiple QoE measurement is included in one *MeasReportAppLayer* message and multiple QoE measurements should be included in multiple *MeasReportAppLayer* messages.

Companies please provide views on whether multiple QoE measurements or only one QoE measurement can be included in one *MeasReportAppLayer* message.

**Question 14: Do companies think whether multiple QoE measurements or only one QoE measurement can be included in one MeasReportAppLayer message?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Multiple or only one QoE measurements** | **Additional explanations** |
| CMCC | Slightly prefer multiple | UE could be provided with such flexibility. |
| Huawei, HiSilicon | Only one | As we analyzed in [6], we think that the applications for different QoE measurements are running independently, so it may not be likely that all QoE reports go to AS at the same time. In this case, we think it is sufficient to send only one QoE report in one UL message (follow LTE).  Allowing multiple measurements in a single message would complicate things, e.g. the maximum message size could be exceeded and we would need to discuss what happens in this case. We think having this needs some justifications and technical analysis on the complexities. |
| Qualcomm | Multiple | From specification point of view, it should allow multiple QoE report in one MeasReportAppLayer message to save RRC message header and UE power consumption. But it should leave UE implementation whether one or multiple QoE reports will be included in one MeasReportAppLayer message. |
| Ericsson | Multiple | Flexible for the UE to build the message in the best way. RRC segmentation may be used. |
| Apple | Multiple | UE implementation can decide whether single of multiple reports need to be sent; no need for RRC segmentation. |
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Issue 2-2: Unknown Report from Application Layer

Contribution [4] discusses what AS layer should do if receiving unknow QoE report from application layer. The scenario is that UE access layer receives from Application layer a QoE report that does not correspond to any of the QoE configuration in AS. It is proposed that UE forwards to Network the QoE report for which it has valid configuration.

Companies please provide views on this issue.

**Question 15: Do companies agree that UE forwards to Network the QoE report for which it has valid configuration?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC |  | It seems like a corner case in our understanding; but if it happens, the UE behaviour needs to be defined anyway. |
| Huawei, HiSilicon | Yes | For the problem “UE access layer receives from Application layer a QoE report that does not correspond to any of the QoE configuration in AS”, we think the UE could simply discard such reports. |
| Qualcomm | Should clarity the scenario | It is unclear for this scenario, why does the UE will have invalid configuration? We understand UE behaviour should follow network configuration and the network ensure the configuration is valid in UE side, that means the valid configuration should be understood consistently identically between UE and network. |
| Ericsson |  | It would probably fine to discard, but use case unclear. |
| Apple | Yes, but | This seems like an abnormal case for which we don’t need to specify anything. |
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### Issue 4: Others (framework, RAN3 led issues. Capability, out of scope issues)

Contribution [5][8] propose to reuse logged MDT framework for QoE measurement reporting. Rapporteur understands RAN2 has already agreed to reuse LTE QoE framework and has achieved some agreements in the last meeting based on this framework. Companies please provide views whether logged MDT framework is already ruled out based on the progress.

**Question 16: Do companies agree that logged MDT framework is already ruled out based on the current progress?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Additional explanations** |
| CMCC | Yes in this release | Logged MDT could be useful for alignment with QoE reports for MBS services, which can be discussed in future releases. |
| Huawei, HiSilicon | Suggestions | RAN2#113b-e agreed the following:   * RAN2 assumes that QoE support for NR includes (as the LTE framework): activation by Trace Function, both signalling and management-based configuration and RRC procedures supporting AppLayer config and report.   We think that RAN2 has agreed on re-using LTE QoE framework for NR QoE, and our understandings are as below:   * Other frameworks are not considered for the moment * If companies are interested in other frameworks, RAN2 may have discussions based on contributions * In addition, it was agreed that QoE measurements in RRC ILDE/INACTIVE are not part of Rel-17, so we should not optimize for these cases |
| Qualcomm | Yes in this release | Use LTE QoE framework in this release. Logged MDT framework could be considered in the future release for IDLE and Inactive state QoE measurement supporting. |
| Ericsson | Yes | RAN2 has already agreed what to reuse. |
| Apple | Yes |  |
|  |  |  |

Contribution[4][5][8][9] discuss some RAN3-led issues (e.g. RAN visible QoE, MDT and QoE correlation, Mobility area, UE context propagation between gNBs). According to the chairman agenda, RAN3-led issues will NOT be treated in this RAN2 meeting, therefore, these aspects are not listed in this email discussion.

Contribution [12] discusses QoE measurement in INACTIVE state for MBS service. It is understood QoE measurement in INACTIVE state is out of QoE WID scope, therefore, it is not listed in this email discussion.

Contribution [9] discusses UE capability for QoE, it is too premature to talk about UE capability at this stage.

# 4 Conclusion

The following is proposed based on the discussion in section 2 of the document:

# 5 References

[1] [R2-2104994](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2104994.zip) QoE confiugration and reporting Qualcomm Incorporated discussion NR\_QoE-Core

[2] [R2-2105214](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105214.zip) Further discussion on QoE measurement collection in NR standalone Lenovo, Motorola Mobility discussion Rel-17 NR\_QoE-Core

[3] [R2-2105336](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105336.zip) Discussion on QoE measurement configuration vivo discussion Rel-17

[4] [R2-2105479](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105479.zip) QoE configuration and general ascpects Nokia, Nokia Shanghai Bell discussion Rel-17

[5] [R2-2105526](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105526.zip) Discussion on QoE measurement collection in NR OPPO discussion Rel-17 FS\_NR\_QoE

[6] [R2-2105580](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105580.zip) Discussion on QoE measurement configuration and reporting Huawei, HiSilicon discussion Rel-17 NR\_QoE-Core

[7] [R2-2105893](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105893.zip) Configuration and reporting of QoE measurements Ericsson discussion

[8] [R2-2106061](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106061.zip) Harmonised general framework for QoE measurements Samsung Telecommunications discussion Rel-17

[9] [R2-2106167](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106167.zip) Discussion on NR QoE configuration CATT discussion NR\_QoE-Core

[10] [R2-2106220](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106220.zip) Further discussion on configuration and reporting CMCC discussion Rel-17

[11] [R2-2106348](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106348.zip) QoE measurement configuration LG Electronics Inc. discussion Rel-17

[12] [R2-2106402](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106402.zip) Issues for NR QoE measurement Samsung discussion Rel-17

[13] [R2-2106432](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106432.zip) Discussion on NR QoE configuration ZTE Corporation, Sanechips discussion Rel-17