**3GPP TSG RAN meeting #98e RP-22xxxx**

**Electronic Meeting, December 12-16, 2022**

## Status Report to TSG

**Agenda item:** 9.3.3.2

|  |  |
| --- | --- |
| **WI / SI Name** | Enhancement on NR QoE management and optimizations for diverse services |
| included in this status report | Study Item: No | Core part: Yes | Performance part:No | Testing part:No |
| **Acronym** | NR\_QoE\_enh |
| **Unique ID** | 941008 |
| **TSG Tdoc of latest approved WI/SI description (if any)** | RP-221803 |
| **Target Completion Date****(indicate if changed)** | Study Item: N/A | Core part: 12/2023 | Performance part: N/A | Testing part: N/A |
| **Overall Completion level** | Study Item: N/A | Core part:30% | Performance Part: N/A | Testing part: N/A |

Note: Overall completion level percentage numbers should use one of the colors below:

* xx%: Normal progress, no RAN plenary action needed
* xx%: Progress behind schedule, may need RAN plenary intervention. If so, SR should clearly define requested action
* xx%: Progress critically behind, RAN plenary shall intervene. SR should define requested action

**Source:**

|  |  |
| --- | --- |
| **Leading WG** | RAN WG3 |
| **Rapporteur** | **Name** | Pei Li |
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| **Email** | lip104@chinaunicom.cn |

## 1 Work plan related evaluation

|  |  |
| --- | --- |
| **Do you want to modify the time budget for this WI/SI compared to what was endorsed at the last RAN meeting?** | No |

*If you answered No: Then please remove the Excel file from the zip file of this status report.*

*If you answered Yes: Then please fill out the attached Excel template to request a modification of the time budgets for your WI /SI. The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI. The basis are the endorsed time budgets of the last RAN meeting. Please highlight all changes of the values.
 One time unit (TU) corresponds to ~ 2 hours in the meeting.
 If this status report covers a WI with Core and Performance part, then please have one line for each in the attached Excel table.
 Note: If no Excel table is attached, then this means no time budget change.*

**Additional explanations/motivations for the time budget changes in the attached Excel table:**

## 2. Detailed progress in RAN WGs since last TSG meeting (for all involved WGs)

 NOTE: Agreements and Open issues impacted cross-TSG aspects shall be explicitly highlighted

## 2.1 RAN1

#### 2.1.1 Agreements

#### 2.1.2 Remaining Open issues

## 2.2 RAN2

#### 2.2.1 Agreements

**RAN2#119-e (Aug 2022)**

* **QoE measurements in RRC\_IDLE INACTIVE**

 - No need to send LS to SA4 since RAN3 is already sending an LS.

 - The gNB can send the QoE configuration for MBS broadcast service to UE by RRC message in RRC\_CONNECTED via dedicated signalling. The UE stores the configuration for QoE and performs the application layer measurement for MBS broadcast service.

 - The baseline principles for QoE measurement collection for MBS services in RRC\_INACTIVE and RRC\_IDLE states are:

1) The UE is configured with IDLE/INACTIVE QoE via RRC.

2) The UE buffers the QoE reports generated while in RRC IDLE/INACTIVE state.

- When the UE moves to RRC\_CONNECTED state, the UE sends the QoE measurements availability indication to the gNB.

- For buffering of QoE reports generated in RRC IDLE/INACTIVE state, RAN2 should discuss at least the minimal memory size requirement.

* **Left-over from R17**

 - Not treated in this meeting.

**RAN2#119b-e (Oct 2022)**

* **QoE measurements in RRC\_IDLE INACTIVE**

 - Not treated in this meeting.

* **Left-over from R17**

- From RAN2’s perspective, there is no further work for per-slice-based QoE measurement.

- The enhancement on UAI message to express the UE’s preference on QoE reporting configurations is not pursued.

- QoE reporting via unlicensed band is out of the WID scope.

- RAN2 can discuss event-based RVQoE, including possible options, benefits, spec impacts, and complexities based on company contributions.

- RAN2 can wait for RAN3 progress on enhancement to per-slice RAN visible QoE measurement.

- RAN2 needs to wait for the progress of RAN3 on RVQoE value.

- RAN2 to postpone the discussion of the QoE reporting enhancement for overload scenario to the next meeting (based on the progress of RAN3).

- To wait for RAN3 decision on granularity of priority.

- Add the QoS flow ID in the RVQoE report

* **Support of QoE measurements for NR-DC**

- Rel-18 QoE configuration may be created by MN or SN.

- Either SRB1 or SRB3 can be used for providing SN configuration to UE (at least for m-based QoE).

- In NR-DC scenario, both signalling-based and management-based QoE measurement collection shall be supported.

- RAN2 assumes that there is a unique ID for QoE configurations across MN and SN. This can be accomplished by MN-SN coordination (e.g. similar as was done with measIds for NR-DC)

- Use SRB4 as baseline for Rel-18 QoE.

**RAN2#120 (Nov 2022)**

* **QoE measurements in RRC\_IDLE INACTIVE**

- Ask SA4 if we can use application layer information for QoE measurements in IDLE/INACTIVE the Rel-18 area scope given that the needed information requires cell knowledge.

- For buffering of QoE reports generated in RRC IDLE/INACTIVE state, RAN2 will make some assumptions on the minimal memory size requirement and the buffering layer. We can indicate these to SA4/SA5 to see if they think those assumptions are realistic.

- Ask SA4/5 on how network would handle reports based on when they were collected, and whether it matters how “old” they are.

- UE can be configured to do QoE measurements for MBS broadcast in all RRC states.

- As a baseline, UE does not trigger RRC Resume – RRC Setup just for the sake of reporting QoE.

* **Left-over from R17**

 - Not treated in this meeting.

* **Support of QoE measurements for NR-DC**

 - Not treated in this meeting.

#### 2.2.2 Remaining Open issues

 - FFS how does gNB determine which UEs can be configured with MBS QoE measurements

 - FFS if there is a new explicit indicator or new service type used for MBS QoE configuration in RRC\_IDLE/RRC\_INACTIVE. Wait for RAN3 progress and SA4 LS reply to RAN3.

 - For buffering of QoE reports generated in RRC IDLE/INACTIVE state, FFS if AS layer is responsible for storing the QoE reports (as in Rel-17).

- FFS on whether to send the priority information 1) UE and gNB or 2) only to gNB.

- FFS whether to add the QoS flow ID in the RVQoE report. If RAN3 already agreed to this, RAN2 can progress this in the next meeting where we discuss Rel-17 leftovers.

- FFS on SRB selection for providing SN configurations requires additional MN-SN coordination.

- FFS how we can send QoE reports towards SN (e.g. only SRB4, define new SRB, reuse SRB3, split SRB). Discuss details in the next meeting.

- FFS whether there are cases where we deviate from the baseline that UE does not trigger RRC Resume – RRC Setup just for the sake of reporting QoE.

## 2.3 RAN3

#### 2.3.1 Agreements

**RAN3#117-e (Aug 2022)**

* **Support for New Service Type and RRC\_INACTIVE/RRC\_IDLE states**

 - Both signalling based and management based QoE measurements in RRC INACTIVE/IDLE mode shall be supported in Rel-18.

 - UE handles area scope checking for QoE measurements in RRC INACTIVE/IDLE mode.

 - Whether UE AS layer or UE APP layer handle the area scope is to be discussed based on RAN2 progress.

 - Support MBS broadcast service INACTIVE/IDLE QoE first.

 - UE shall keep the QoE configuration for MBS broadcast service configured in RRC\_CONNECTED even when UE switches to RRC\_IDLE and RRC\_INACTIVE.

 - No LS on INACTIVE/IDLE QoE will be sent from RAN3 to RAN2 in this meeting.

 - If the UE receives the configuration in RRC connected state, a common QoE configuration mechanism is used to support QoE measurement configuration pertaining to MBS broadcast service for all RRC states, where the Rel-17 QoE configuration mechanism is adopted as baseline.

* **Support QoE for NR-DC**

 - MN is responsible to configure the s-based QoE to UE.

 - For M-based QoE configuration in NR-DC, coordination between MN and SN is needed. Details are FFS.

 - If the M-based QoE configuration is received by the MN, the MN should make the decision on the UE selection and on which node sends the QoE configuration to the UE.

 - If the M-based QoE configuration is received only by the SN, whether the MN or the SN performs UE selection and sends the QoE configuration to the UE needs to be further discussed.

 - QoE reports can be transmitted to either MN or SN and the reporting leg (MCG or SCG) can be changed during the application session. Send LS to RAN2.

 - WA: If QoE reports are received by the SN, SN can forward the QoE reports to MCE directly.

 - RAN3 should discuss and clarify the scenarios for QoE reporting transmitted over SN. Which SRB can be used for QoE reporting in SN depend on RAN2.

 - WA: MN and SN can generate RVQoE configurations.

 - MN and SN should coordinate about configuring a dual-connected UE with RVQoE measurements. The details of the coordination are FFS.

 - WA: UE can send RVQoE report to MN, MN then forward the RVQoE report to SN if needed, and vice versa.

* **Left-over from R17**

 - Introduce the slice scope information in the configuration container, and send LS out to SA4.

 - Definition of RVQoE value needs cooperation with SA4.

 - UE should include QoS flow information in the RVQoE report to RAN.

 - QoS flow information should be introduced as an explicit IE in the RAN visible QoE report over F1.

* **QoE Measurement For Inter-RAT Handover**

 - None.

* **LS Out**

 - LS on new service types for NR QoE[49].

 - LS to RAN2 on RAN3 agreement of QoE reporting in NR-DC[50].

 - LS to SA4 on R18 enhancement of NR QoE[51].

**RAN3#117bis-e (Oct 2022)**

* **Support for New Service Type and RRC\_INACTIVE/RRC\_IDLE states**

 - Whether UE can only report the INACTIVE/IDLE QoE reports to gNB when the UE has entered to the RRC\_CONNECTED due to other reasons is pending to RAN2 discussion.

 - RAN3 discuss the alignment between logged MDT and MBS QoE when basic solution for MBS QoE has been defined first.

 - RAN3 continues to discuss how to handle the QoE reports sent at new gNB when UE was in RRC\_IDLE.

 - OAM should have the flexibility to collect QoE only in high mobility scenarios and/or in HSDN cells instead of collecting blindly.

* **Support QoE for NR-DC**

 - In DC, the UE switches the reporting leg based on indication from network, FFS on implicit or explicit way.

 - RAN3 should discuss which node can command the UE to switch the reporting leg.

 - Turn into an agreement the WA stating that, if QoE reports are received by the SN, the SN can forward the QoE reports to MCE directly.

 - If a node has configured the UE with QoE measurements, and the other node is receiving the QoE reports from the UE and forwarding them directly to the MCE, then: The node that has configured the UE with QoE measurements should indicate the QoE reference to the node that receives the reports and forwards them directly to MCE.

 - The MN can generate an RVQoE configuration for a UE.

 - The SN can generate an RVQoE configuration for a UE.

 - The MN can send an RVQoE configuration to the UE.

 - The MN can receive RVQoE reports directly from the UE.

 - The SN can receive RVQoE reports directly from the UE.

 - Turn the following WA into an agreement: “UE can send RVQoE report to the MN, the MN then forward the RVQoE report to the SN if needed, and vice versa”.

 - Agree to ensure that the RVQoE report is sent to the node(s) that provide the bearer(s) associated to the corresponding RVQoE measurement result in the RVQoE report.

 - The coordination between the MN and the SN should support at least the following (details to be further discussed):

* Coordination for configuring the UE.
* Coordination for establishing the SRB for receiving QoE/RVQoE reports.
* Indication about switching the reporting leg.
* **Left-over from R17**

 - QoS flow ID(s) should be included in the RAN visible QoE report collected at the UE.

 - DRB ID(s) should be transmitted over F1 as the QoS flow information in the RVQoE report.

 - RAN3 checks with SA4 on whether RVQoE value can reflect the overall situation of the experience of an ongoing service, with multiple QoE metrics taken into account, not limited to only RVQoE metrics.

 - RVQoE value is used by the RAN node for radio resource optimization, and can save on uplink RRC signaling, compared with transferring multiple QoE metrics (not only RAN visible QoE metrics).

 - In this release, slice information (e.g. S-NSSAI) is not included in RVQoE report.

 - WA: Introduce buffer level as a threshold-based trigger for RVQoE reporting.

* **QoE Measurement For Inter-RAT Handover**

 - None.

* **LS Out**

 - LS on RAN visible QoE value[104].

 - LS on including QoS flow information in the RAN visible QoE report over Uu[109].

**RAN3#118 (Nov 2022)**

* **Support for New Service Type and RRC\_INACTIVE/RRC\_IDLE states**

 - No enhancements on paging for the purpose of configuring UE with legacy QoE measurement for the RRC\_IDLE/INACTIVE UEs. Legacy paging only for legacy QoE purpose is up to implementation.

 - Use the same set of parameters in QMC configuration for all RRC states.

 - RAN3 assumes that there is no need to request QoE measurements per UE RRC state.

 - WA: MBS service area can be expressed by QoE area scope IE, FFS on whether any enhancements of this IE are needed.

* **Support QoE for NR-DC**

 - In case of management-based QoE, the MN decides which node to perform the QoE measurement configuration, FFS which node (MN or SN) performs UE selection.

 - When MN configures a UE with m-based QoE, it may indicate to SN: the QoE Reference, the MCE IP address. FFS for other information (e.g., RRC ID) .

 - WA: SN can send an RVQoE configuration to the UE. FFS whether SN can send RVQoE configuration directly to UE via SRB3 or via split SRB1 or explicit over Xn (if MN can modify RVQoE).

* **Left-over from R17**

 - Turn the WA to agreement: Introduce buffer level as a threshold-based trigger for RVQoE reporting.

 - Do not introduce the threshold-based trigger for reporting playout delay for media startup.

 - The final list of topics that are to be discussed in Rel-18:

* RVQoE value (pending SA4 reply).
* Assistance information for handling of QoE reporting upon RAN overload.
* DU activation/deactivation/pause/resume of RVQoE reporting over F1.
* DU participation in assembling the RVQoE configuration.
* Event-based RVQoE reporting trigger.
* **QoE Measurement For Inter-RAT Handover**

 - None.

* **LS Out**

 - LS to SA4 on ID of MBS session in MBS QoE configuration[158].

#### 2.3.2 Remaining Open issues

 - The following aspects shall be discussed by RAN2:

which layer(e.g. app, as layer) is responsible to keep configured QoE configuration for MBS broadcast service at ue side when ue is in rrc\_idle.

how long UE shall keep the QoE configuration for MBS broadcast service.

 - The use case and advantages of specifying a new QoE configuration mechanism for QoE measurements in INACTIVE/IDLE RRC states should be further clarified.​

 - RAN3 waits for SA4 reply to further discuss any MBS service type.

 - Whether UE or CN stores the network instance of QoE configuration when UE in the RRC\_IDLE state needs further discussion.

* Option 1 (CN-based solution): Old gNB stores the entire network instance QoE configuration at AMF before going to RRC\_IDLE and new gNB retrieves the stored QoE configuration from AMF during reconnection.
* Option 2 (UE-based solution): New gNB doesn’t need to know the QoE configuration of old gNB upon reconnection. It is sufficient if new gNB is informed by UE via QoE report.

 - FFS on whether parameters, e.g. MBS session ID, MBS service area, etc. need to be included in MBS QoE configuration over NGAP.

 - FFS whether RAN add QoE reference as an explicit IE in QoE report from gNB to MCE.

 - Whether the UE can indicate the RRC state in the QoE report?

 - Confirm the following issues and further discuss the solution for these issues within?UE-based solution and CN-based solution: How the MBS broadcast QoE measurements can proceed after the UE switches from RRC\_IDLE to RRC\_CONNECTED.

 - Whether/how to handle the potential overriding issue for MBS broadcast QoE configurations after UE switches from RRC\_IDLE to RRC\_CONNECTED.

 - After UE switches from RRC\_IDLE to RRC\_CONNECTED, how does network retrieve the configured MBS broadcast QoE configuration related information.

 - Whether the UE can be instructed to indicate the RRC state in the QoE report will be discussed in next RAN3 meeting.

 - The following aspects on high speed scenario shall be discussed in next meeting:

* Whether a “HSDN wide indication” can be included in the Area Scope of QoE configuration (from OAM to gNB), instead of OAM being required to provide the whole list of HSDN cells.
* Whether the ‘high UE velocity’ indication can be added into the QoE configuration.

 - FFS on how to control which leg is used for transmission of QoE reports in NR-DC.

 - FFS on whether QoE reports can be transmitted over MCG and SCG simultaneously, i.e., whether split SRB can be used to transmit QoE reports in NR-DC?

 - FFS whether a common or independent RVQoE configuration for MN and SN is sent to the UE.

 - With respect to configuring the UE with RVQoE measurements, discuss how to address the fact that it is unknown in advance which of the two nodes carries the application session.

 - Discuss how the MN/SN can learn which of them carries the data for an application session subject to RVQoE measurements.

 - If SN selects the UE for m-based QMC, it shall notify MN. If MN selects the UE for m-based QMC, it shall notify SN. The content to be transferred is FFS.

 - FFS on the SN should notify the MN about an m-based QoE configuration received.

 - FFS on the content of the m-based QoE configuration.

 - FFS on whether it is UE associated or non-UE associated signalling or by OAM configuration. FFS whether the MN should notify the SN whether or not the UE is configured for m-based QMC.

 - If both MN and SN receive an m-based QoE configuration, the MN should decide on the UE selection and on which node sends the QoE configuration to the UE.

 - The issue is acked, and continue the discussion on how to enable that node that provide(s) bearers associated to the RVQoE report(s) participate in RVQoE configuration.

 - The node that received the QoE configuration from the AMF/OAM can send to the other node the list of available RVQoE metrics.

- FFS on how to ensure that the RVQoE report is sent to the node(s) that provide the bearer(s) associated to the corresponding RVQoE measurement result in the RVQoE report.

 - The coordination between the MN and the SN should support at least the following (details to be further discussed): Initiation by either the MN or the SN for m-QoE, by the MN for s-QoE.

 - When SN receives an m-based QoE measurement configuration, MN should be aware that SN has received an m-based QoE measurement configuration? Ensure that the MN is always notified that SN would like to configure an m-based QoE measurement?

 - Whether SN can send RVQoE configuration directly to UE via SRB3 or via split SRB1 or explicit over Xn (if MN can modify RVQoE).

 - The node which sends the initial RVQoE configuration to UE and the node which sends the legacy QoE configuration to UE should be the same?

 - FFS whether MN can modify the SN generated RVQoE configuration

 - In case of management-based QoE, the MN decides which node to perform the QoE measurement configuration, FFS which node (MN or SN) performs UE selection.

 - When MN configures a UE with m-based QoE, it may indicate to SN: the QoE Reference, the MCE IP address. FFS for other information (e.g., RRC ID) .

 - RAN3 to further discuss whether RAN visible QoE value should be generated directly by UE App layer, and/or with other involvement, e.g., UE AS layer.

 - RAN3 to further discuss what RAN3 wants as a RAN visible QoE value, and the following aspects can be considered:

 - whether RAN visible QoE value is similar or different from MOS value defined in TS 26.909

 - other alternatives to define the RAN visible QoE value.

 - RAN3 to further discuss threshold-based triggers and event-based triggers for RAN visible QoE report, where the discussion should include but not limited to the clarification of the benefit of such triggers.

 - Further discuss whether the DU can activate/deactivate receiving the RAN visible QoE reports? Whether the DU can participate in assembling of RAN visible QoE configuration.

 - Further discuss whether OAM can send the priorities to NG-RAN for legacy QoE report.

 - RVQoE value is an objective/qualitative number, e.g., a number which ranges on 0-10, poor/medium/good.

 - Event-triggers is not considered for RVQoE values at current stage, which could be pending the discussion on RVQoE event-triggers.

 - FFS the benefit and necessity of introducing threshold-based triggers for reporting playout delay for media startup in RVQoE report.

 - FFS the benefit and necessity of event-based triggers of RVQoE.

 - Further discuss OAM sends priorities of QoE measurements to RAN as a reference.

 - Further discuss DU participation in assembling RVQoE configuration.

 - Further discuss DU (de)activates the receiving of the RVQoE reports.

## 2.4 RAN4

#### 2.4.1 Agreements

#### 2.4.2 Remaining Open issues

## 2.5 RAN5

#### 2.5.1 Agreements

#### 2.5.2 Remaining Open issues

#### 2.5.3 Remaining Open issues with cross-WG dependencies

## 2.6 RAN6

#### 2.6.1 Agreements

#### 2.6.2 Remaining Open issues

## 3. Detailed progress in SA/CT WGs since last TSG meeting (for all involved WGs)

NOTE: This section only needs to be filled in for WI/SIs where there is a corresponding relevant WI/SI in SA/CT.

## 3.1 SAx/CTs

#### 3.1.1 Agreements with cross-TSG impacts

#### 3.1.2 Remaining Open issues with cross-TSG impacts

NOTE: This section should also flag any critical dependencies that need TSG attention.

## 4. References

NOTE: This can be e.g. a list of all related Tdocs in the affected WGs since last TSG, references to LSs, produced TRs/TSs, the work/study item description or status reports of previous TSGs.

**RAN2#119-e**

1. R2-2208619 Work Plan for Rel-18 NR QoE Enhancement China Unicom Work Plan Rel-18 NR\_QoE\_enh
2. R2-2207026 QoE measurement collection for IDLE and Inactive state Qualcomm Incorporated discussion NR\_QoE\_enh-Core
3. R2-2207427 IDLE/INACTIVE Mode QoE Measurements and Reporting Apple discussion Rel-18 NR\_QoE\_enh-Core
4. R2-2207532 Considerations on QoE measurements in RRC\_IDLE and RRC\_INACTIVE Lenovo discussion Rel-18 NR\_QoE\_enh-Core
5. R2-2207725 Discussion on QoE for MBS Ericsson discussion Rel-17 NR\_QoE\_enh-Core
6. R2-2207822 Discussion on MBS broadcast services CATT discussion Rel-18 NR\_QoE\_enh-Core
7. R2-2207992 QoE measurements for MBS broadcast services Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core
8. R2-2208248 QMC enhancements for NR MBS Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core
9. R2-2208391 QoE measurement in RRC\_IDLE and RRC\_INACTIVE Samsung discussion Rel-18
10. R2-2208423 Discussion on QoE measurement in RRC\_IDLE and RRC\_INACTIVE CMCC discussion Rel-18 NR\_QoE\_enh-Core
11. R2-2208615 Discussion on Rel-18 QoE measurement ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core
12. R2-2208622 Discussion on MBS configuration and reporting for NR QoE in Rel-18 China Unicom discussion Rel-18 NR\_QoE\_enh
13. R2-2207027 Discussion on Rel-17 leftover issues Qualcomm Incorporated discussion NR\_QoE\_enh-Core
14. R2-2207428 Views on Potential Enhancements of Existing QoE Features Apple discussion Rel-18 NR\_QoE\_enh-Core
15. R2-2207533 Discussion on Rel-17 leftover features for QoE Lenovo discussion Rel-18 NR\_QoE\_enh-Core
16. R2-2207724 Discussion on rel-17 leftovers Ericsson discussion Rel-17 NR\_QoE\_enh-Core
17. R2-2207823 Discussion on Rel-17 leftover issues for QoE CATT discussion Rel-18 NR\_QoE\_enh-Core
18. R2-2207993 Support of left-over features from Rel-17 Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core
19. R2-2208249 QMC enhancements for RAN overload Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core
20. R2-2208392 Timing information of measured samples Samsung discussion Rel-18
21. R2-2208616 Discussion on Rel-17 leftover issues for QoE ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core
22. R2-2208613 Recommended bitrate for XR services MediaTek Beijing Inc. discussion Rel-18
23. R2-2208629 On RAN visible QoE parameters for new services China Telecom discussion

**RAN2#119b-e**

1. R2-2209323 LS to SA4 on Rel-18 enhancement of NR QoE (R3-225227; contact: Huawei) RAN3 LS in Rel-18 NR\_QoE\_enh To:SA4 Cc:RAN2
2. R2-2209330 LS to RAN2 on RAN3 agreement of QoE reporting in NR-DC (R3-225256; contact: China Unicom) RAN3 LS in Rel-18 NR\_QoE\_enh-Core To:RAN2
3. R2-2210748 Revised work plan for Rel-18 NR QoE Enhancement China Unicom Work Plan Rel-18 NR\_QoE-Core
4. R2-2210754 Discussion on QoE measurements in RRC\_IDLE and INACTIVE states China Unicom discussion Rel-18 NR\_QoE-Core
5. R2-2209784 Views on QoE Reporting for Overload Scenarios Apple discussion Rel-18 NR\_QoE\_enh-Core
6. R2-2209830 Discussion on Rel-17 leftover features for QoE Lenovo discussion Rel-18 NR\_QoE\_enh-Core
7. R2-2209833 Discussion on Rel-17 leftover issues for QoE ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core
8. R2-2209837 Event-based RAN visible QoE report Samsung discussion Rel-18
9. R2-2209845 Discussion on RAN visible QoE trigger event Qualcomm Incorporated discussion NR\_QoE\_enh-Core
10. R2-2210015 Discussion on Rel-17 leftover issues for QoE CATT discussion Rel-18 NR\_QoE\_enh-Core
11. R2-2210204 Support of R17 left-over features Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core
12. R2-2210275 QMC enhancements for RAN overload Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core
13. R2-2210306 Discussion on rel-17 leftovers Ericsson discussion Rel-18 NR\_QoE\_enh-Core
14. R2-2210573 Discussion on QoE Rel-17 leftover issues China Telecom Corporation Ltd. Discussion
15. R2-2209785 Support of QoE in NR-DC Apple discussion Rel-18 NR\_QoE\_enh-Core
16. R2-2209831 Discussion on support of QoE measurements for NR-DC Lenovo discussion Rel-18 NR\_QoE\_enh-Core
17. R2-2209832 Discussion on Rel-18 QoE measurement for NR-DC ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core
18. R2-2209838 Support of QoE measurements for NR-DC Samsung discussion Rel-18
19. R2-2209844 RAN2 issues to support QoE collection in NR-DC Qualcomm Incorporated discussion NR\_QoE\_enh-Core
20. R2-2210016 Discussion on QoE measurement in NR-DC CATT discussion Rel-18 NR\_QoE\_enh-Core
21. R2-2210205 Discussion on QoE measurements in NR-DC Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core
22. R2-2210274 QMC support on NR-DC Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core Late
23. R2-2210307 Support of QoE in NR-DC Ericsson discussion Rel-18 NR\_QoE\_enh-Core
24. R2-2210752 Discussion on QoE configuration and reporting for NR-DC China Unicom discussion Rel-18 NR\_QoE-Core
25. R2-2210813 Report of [AT119bis-e][204][QoE] Summary of Rel-17 leftovers for QoE (China Telecom) China Telecom report

**RAN2#120**

1. R2-2211162 LS on RAN visible QoE value (R3-226014; contact: Huawei) RAN3 LS in Rel-18 NR\_QoE\_enh-Core To:SA4 Cc:RAN2
2. R2-2211166 LS on including QoS flow information in the RAN visible QoE report over Uu (R3-226062; contact: Huawei) RAN3 LS in Rel-18 NR\_QoE\_enh-Core To:RAN2 Cc:SA4, CT1
3. R2-2212932 Revised Work plan for Rel-18 NR QoE Enhancement China Unicom Work Plan Rel-18 NR\_QoE-Core
4. R2-2211450 Discussion on QoE measurement in RRC\_IDLE and RRC\_INACTIVE Samsung discussion Rel-18
5. R2-2211713 Discussions on QoE Measurements in IDLE/INACTIVE States Apple discussion NR\_QoE\_enh-Core
6. R2-2211800 QoE collection for IDLE and Inactive state Qualcomm Incorporated discussion NR\_QoE\_enh
7. R2-2212008 Discussion on QoE measurement in IDLE and INACTIVE state CATT discussion Rel-18 NR\_QoE\_enh-Core
8. R2-2212192 Discussion on QoE measurements for MBS broadcast services Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core
9. R2-2212288 Discussion on QoE measurement in IDLE and INACTIVE ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core
10. R2-2212457 QMC enhancements for NR MBS Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core Late
11. R2-2212458 Discussion on support of QoE measurements in RRC\_IDLE and RRC\_INACTIVE Lenovo discussion Rel-18 NR\_QoE\_enh-Core
12. R2-2212466 QoE measurements in NR-DC Ericsson discussion Rel-18 NR\_QoE\_enh-Core
13. R2-2212635 Consideration on QoE measurement in RRC\_IDLE and RRC\_INATIVE CMCC discussion Rel-18 NR\_QoE\_enh-Core
14. R2-2212795 Disucssion on QoE measurements in RRC\_IDLE and RRC\_INACTIVE China Telecom discussion
15. R2-2212938 Discussion on QoE measurements in RRC\_IDLE and INACTIVE states China Unicom discussion Rel-18 NR\_QoE-Core R2-2210754
16. R2-2211451 Discussion on QoE measurement for NR-DC Samsung discussion Rel-18
17. R2-2211714 QoE Reporting in NR-DC Apple discussion NR\_QoE\_enh-Core
18. R2-2211805 RAN2 issues to support QoE collection in NR-DC Qualcomm Incorporated discussion NR\_QoE\_enh
19. R2-2212009 Discussion on QoE measurement in NR-DC CATT discussion Rel-18 NR\_QoE\_enh-Core
20. R2-2212193 Discussion on QoE measurements in NR-DC Huawei, HiSilicon discussion Rel-18 NR\_QoE\_enh-Core
21. R2-2212289 Discussion on QoE measurement for NR-DC ZTE Corporation, Sanechips discussion Rel-18 NR\_QoE\_enh-Core
22. R2-2212456 QMC support on NR-DC Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_QoE\_enh-Core Late
23. R2-2212459 Discussion on support of QoE measurements for NR-DC Lenovo discussion Rel-18 NR\_QoE\_enh-Core Late
24. R2-2212465 QoE configuration and reporting for RRC\_INACTIVE and RRC\_IDLE states Ericsson discussion Rel-18 NR\_QoE\_enh-Core
25. R2-2212754 QoE reporting continuity in NR-DC LG Electronics Inc. discussion Rel-18
26. R2-2212940 Discussion on QoE configuration and reporting for NR-DC China Unicom discussion Rel-18 NR\_QoE-Core

**RAN3#117-e**

1. R3-224360 QMC Support for New Services and High-Mobility Scenarios Ericsson
2. R3-224361 QoE and RVQoE Measurement Support for MBS Ericsson
3. R3-224362 The Support for QoE and RVQoE Measurement and Reporting in NR-DC Scenarios Ericsson
4. R3-224363 The Enhancements of RAN Visible QoE Measurements and Reporting Ericsson
5. R3-224364 The Enhancements of QMC Rel-17 Features Ericsson
6. R3-224416 Discussion on the objectives of QoE enhancements Lenovo
7. R3-224417 QoE measurement configuration and collection in RRC\_INACTIVE and RRC\_IDLE Lenovo
8. R3-224418 (TP to 38.423 & 38.420) Support of QoE measurement in RRC\_INACTIVE Lenovo
9. R3-224419 QoE measurement in NR-DC Lenovo
10. R3-224420 (TP to TS 38.420) Support of QoE measurement in NR-DC Lenovo
11. R3-224457 On support of QMC for MBS and other service types surviving idle mode Nokia, Nokia Shanghai Bell
12. R3-224458 On support for QMC in NR-DC Nokia, Nokia Shanghai Bell
13. R3-224459 Initial observations on QMC support for Augmented Reality Nokia, Nokia Shanghai Bell
14. R3-224460 QMC enhancements for RAN overload Nokia, Nokia Shanghai Bell
15. R3-224589 Discussion on the support of R17 left-over features Huawei
16. R3-224610 QoE for new service types and high mobility scenarios Qualcomm Incorporated
17. R3-224611 QoE in RRC\_IDLE and RRC\_INACTIVE for MBS broadcast service Qualcomm Incorporated
18. R3-224612 Support for QoE in NR-DC Qualcomm Incorporated
19. R3-224613 Enhancements to RAN visible QoE Qualcomm Incorporated
20. R3-224758 Discussion on QMC in RRC\_INACTIVE RRC\_IDLE states Xiaomi
21. R3-224759 Discussion on QoE in NR-DC Xiaomi
22. R3-224760 Discussion on RVQoE value Xiaomi
23. R3-224761 Discussion on event-triggered RVQoE Xiaomi
24. R3-224788 Discussion on NR QoE for new service type CATT
25. R3-224789 Discussion on NR QoE in RRC\_INACTIVE/ RRC\_IDLE states CATT
26. R3-224790 Discussion on Support for legacy QoE in NR-DC CATT
27. R3-224791 Discussion on Support for RAN visible QoE in NR-DC CATT
28. R3-224792 Discussion on Left-over issues CATT
29. R3-224839 NR QoE Discussion on left over from R17 Samsung
30. R3-224840 NR QoE Discussion on support for new service type and RRC inactive-idle state Samsung
31. R3-224841 NR QoE Discussion on support for NR-DC Samsung
32. R3-224842 Workplan for Rel-18 NR QoE Enhancement China Unicom
33. R3-224864 Discussion on QoE measurement in RRC\_INACTIVE and RRC\_IDLE states China Unicom
34. R3-224865 Discussion on QoE measurement in NR-DC China Unicom
35. R3-224866 Further discussion on R17 leftover issues China Unicom
36. R3-224869 Draft LS for R17 leftover issues China Unicom
37. R3-224875 Discussion on INACTIVE/IDLE QoE ZTE Corporation
38. R3-224876 Discussion on new service types and high mobility scenario ZTE Corporation
39. R3-224886 General considerations on R18 QoE enhancements Huawei
40. R3-224887 [Draft] LS to SA4 on R18 enhancement of NR QoE management and optimizations for diverse services Huawei
41. R3-224888 Initial discussions on the support of QoE measurement in RRC\_INACTIVE and RRC\_IDLE states for MBS service Huawei
42. R3-224889 Discussions on the support for QoE in NR-DC Huawei
43. R3-224936 Discussion on the configuration and reporting of QoE and RVQoE in NR-DC ZTE
44. R3-224937 Discussion on MDT alignment and continuity in NR-DC ZTE
45. R3-224938 Discussion on R17 QoE left-over issues ZTE
46. R3-225010 CB: # QoE1\_Inactive\_Idle - Summary of email discussion ZTE - moderator
47. R3-225011 CB: # QoE2\_NRDC - Summary of email discussion China Unicom - moderator
48. R3-225012 CB: # QoE3\_Others - Summary of email discussion Huawei - moderator
49. R3-225255 LS on new service types for NR QoE
50. R3-225256 LS to RAN2 on RAN3 agreement of QoE reporting in NR-DC
51. R3-225227 LS to SA4 on R18 enhancement of NR QoE

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1. R3-225331 QMC Support for High-Speed Mobility Scenarios Ericsson
2. R3-225334 Enhancements of Rel-17 QMC Ericsson
3. R3-225410 QMC in RRC\_INACTIVE and RRC\_IDLE for MBS Qualcomm Incorporated
4. R3-225411 QoE enhancements for high mobility scenarios Qualcomm Incorporated
5. R3-225412 Support for QoE in NR-DC Qualcomm Incorporated
6. R3-225413 MDT-QoE alignment and QoE measurement continuity in mobility scenarios in NR-DC Qualcomm Incorporated
7. R3-225414 Enhancements to RAN visible QoE Qualcomm Incorporated
8. R3-225430 NR QoE Discussion on support for new service type and RRC inactive-idle state Samsung
9. R3-225431 NR QoE Discussion on support for NR-DC Samsung
10. R3-225432 Discussion on QoE enhancement of R17 left-over features Samsung
11. R3-225478 QoE for RRC\_INACTIVE/RRC\_IDLE states Lenovo
12. R3-225479 (TP to 38.423 & 38.420) Support of QoE measurement in RRC\_INACTIVE Lenovo
13. R3-225480 QoE measurement in NR-DC Lenovo
14. R3-225481 (TP to TS 38.420) Support of QoE measurement in NR-DC Lenovo
15. R3-225557 QoE and RVQoE Measurement Support for MBS Ericsson
16. R3-225558 The Support for QoE and RVQoE Measurement and Reporting in NR-DC Scenarios Ericsson
17. R3-225559 Enhancements of RAN Visible QoE Measurements and Reporting Ericsson
18. R3-225589 Enhancements to legacy framework for support of QMC for MBS Nokia, Nokia Shanghai Bell
19. R3-225590 Handling of QMC configuration for NR-DC Nokia, Nokia Shanghai Bell
20. R3-225591 QMC enhancements for RAN overload Nokia, Nokia Shanghai Bell
21. R3-225689 Further discussion on the support of R17 left-over features Huawei
22. R3-225690 [DRAFT] LS on RAN visible QoE value Huawei
23. R3-225746 Discussion on QoE configuration in RRC\_INACTIVE RRC\_IDLE states Xiaomi
24. R3-225747 Discussion on QoE in NR-DC Xiaomi
25. R3-225748 Discussion on RVQoE value Xiaomi
26. R3-225749 Discussion onRVQoE Reporting Xiaomi
27. R3-225763 Discussion on NR QoE for new service type CATT
28. R3-225764 Discussion on NR QoE in RRC\_INACTIVE/RRC\_IDLE states CATT
29. R3-225765 Discussion on Support for legacy QoE in NR-DC CATT
30. R3-225766 Discussion on Support for RV-QoE in NR-DC CATT
31. R3-225767 Discussion on Left-over issues CATT
32. R3-225819 Discussion on QoE configuration and reporting in NR-DC ZTE, China Telecom
33. R3-225820 Diccussion on RVQoE configuration and reporting in NR-DC ZTE, China Telecom
34. R3-225821 stage-2 TP to BL CR of 37.340 on QoE in NR-DC ZTE, China Telecom
35. R3-225822 Discussion on R17 QoE left issues ZTE, China Telecom, China Unicom
36. R3-225823 TP to BL CR of 38.473 on RAN visible QoE ZTE, China Telecom, China Unicom
37. R3-225824 TP to BL CR of 38.401 on RAN visible QoE ZTE, China Telecom, China Unicom
38. R3-225836 Update Workplan for Rel-18 NR QoE Enhancement China Unicom
39. R3-225837 Discussion on QoE measurement in NR-DC China Unicom
40. R3-225838 Discussion on QoE measurement in RRC\_INACTIVE and RRC\_IDLE states China Unicom
41. R3-225840 Further discussion on R17 leftover issues China Unicom
42. R3-225841 Further discussions on the support of QoE measurement in RRC\_INACTIVE and RRC\_IDLE states for MBS service Huawei
43. R3-225842 CR on the support of QoE measurement enhancements to 38.413 Huawei
44. R3-225843 Further discussions on the support for QoE in NR-DC Huawei
45. R3-225871 discussion on QoE high speed scenario ZTE, China Telecom
46. R3-225872 discussion on MBS broadcast QoE config and reporting ZTE, China Telecom
47. R3-225913 CB: # QoE1\_Inactive\_Idle - Summary of email discussion China Unicom - moderator
48. R3-225914 CB: # QoE2\_NRDC - Summary of email discussion Ericsson - moderator
49. R3-225915 CB: # QoE3\_Others - Summary of email discussion ZTE - moderator
50. R3-225960 CB: # QoE1\_Inactive\_Idle - Summary of email discussion China Unicom - moderator
51. R3-225961 CB: # QoE2\_NRDC - Summary of email discussion Ericsson - moderator
52. R3-225962 CB: # QoE3\_Others - Summary of email discussion ZTE - moderator
53. R3-226014 LS on RAN visible QoE value Huawei
54. R3-226015 LS on including QoS flow information in the RAN visible QoE report over Uu Huawei
55. R3-226027 TP to BL CR of 38.473 on RAN visible QoE ZTE, China Telecom, China Unicom, Samsung
56. R3-226028 TP to BL CR of 38.401 on RAN visible QoE ZTE, China Telecom, China Unicom, Samsung
57. R3-226051 TP to BL CR of 38.473 on RAN visible QoE ZTE, China Telecom, China Unicom, Samsung, Ericsson
58. R3-226062 LS on including QoS flow information in the RAN visible QoE report over Uu Huawei
59. R3-226087 (BLCR to 38.401) Enhancement on NR QoE Samsung
60. R3-226088 (BLCR to 38.473) Enhancement on NR QoE ZTE

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1. R3-226109 (BLCR to 38.401) Enhancement on NR QoE Samsung
2. R3-226110 (BLCR to 38.473) Enhancement on NR QoE ZTE
3. R3-226208 Handling of MBS QMC context in idle mode Nokia, Nokia Shanghai Bell
4. R3-226209 Discussion on high mobility scenarios Nokia, Nokia Shanghai Bell
5. R3-226210 Cost/benefit of m-based QMC configuration in the SN Nokia, Nokia Shanghai Bell
6. R3-226211 Discussion on RVQoE reports for DC Nokia, Nokia Shanghai Bell
7. R3-226425 QoE for RRC\_INACTIVE/RRC\_IDLE states Lenovo
8. R3-226426 (TP to 38.423 & 38.420) Support of QoE measurement in RRC\_INACTIVE Lenovo
9. R3-226427 QoE measurement in NR-DC Lenovo
10. R3-226428 (TP to TS 38.420&423) Support of QoE measurement in NR-DC Lenovo
11. R3-226463 QoE and RVQoE Measurement Support for MBS Ericsson
12. R3-226464 QMC Support for High Mobility Scenarios Ericsson
13. R3-226465 The Support for QoE and RVQoE Measurements and Reporting in NR-DC Scenarios Ericsson
14. R3-226466 Enhancements of RAN Visible QoE Measurements and Reporting Ericsson
15. R3-226467 On the OAM-set Priorities for QoE Reporting Ericsson
16. R3-226518 QMC in RRC\_INACTIVE and RRC\_IDLE for MBS Qualcomm Incorporated
17. R3-226519 QoE enhancements for high mobility scenarios Qualcomm Incorporated
18. R3-226520 Support for QoE in NR-DC Qualcomm Incorporated
19. R3-226521 MDT-QoE alignment and QoE measurement continuity in mobility scenarios in NR-DC Qualcomm Incorporated
20. R3-226522 Enhancements to RAN visible QoE Qualcomm Incorporated
21. R3-226554 Discussion on NR QoE in RRC\_INACTIVE/RRC\_IDLE states CATT
22. R3-226555 Discussion on Support for legacy QoE in NR-DC CATT
23. R3-226556 (TP to BLCR for TS38.423) Support for legacy QoE in NR-DC CATT
24. R3-226557 Discussion on Support for RV-QoE in NR-DC CATT
25. R3-226558 Discussion on Left-over issues CATT
26. R3-226592 Further discussion on QMC for MBS and RRC state Samsung
27. R3-226593 Further discussion on support of NR-DC Samsung
28. R3-226606 Further discussions on the support of MBS QoE Huawei
29. R3-226607 Further discussions on the support for QoE in NR-DC Huawei
30. R3-226608 (TP for NR\_QoE BLCR for 38.300) on QoE measurement enhancements Huawei
31. R3-226609 (TP for NR\_QoE BLCR for 37.340) on QoE measurement in NR-DC Huawei
32. R3-226626 Further discussion on the support of R17 left-over features Huawei
33. R3-226702 Consideration for QMC in RRC\_IDLE and RRC\_INACTIVE CMCC
34. R3-226719 Discussion on QoE configuration and reporting in NR-DC ZTE
35. R3-226720 Discussion on MDT alignment and Mobility in NR-DC ZTE
36. R3-226721 Discussion on R17 QoE left-over issues ZTE
37. R3-226725 Discussion on QoE configuration in RRC\_INACTIVE RRC\_IDLE states Xiaomi
38. R3-226726 Discussion on QoE in NR-DC Xiaomi
39. R3-226727 (Draft CR for TS 38.300) Introduction of QoE configuration in NR-DC Xiaomi
40. R3-226728 Discussion on RVQoE Xiaomi
41. R3-226747 [Draft] LS to RAN2 on MBS QoE ZTE
42. R3-226748 Discussion on INACTIVE IDLE QoE and high speed scenario ZTE
43. R3-226760 Update Workplan for Rel-18 NR QoE Enhancement China Unicom
44. R3-226761 Discussion on QoE measurement in RRC\_INACTIVE and RRC\_IDLE states China Unicom
45. R3-226762 Discussion on QoE measurement in NR-DC China Unicom
46. R3-226763 Further discussion on R17 leftover issues China Unicom
47. R3-226916 LS to SA4 on ID of MBS session in MBS QoE configuration RAN3