**3GPP TSG-RAN WG3 Meeting #116-e R3-223685**

**E-meeting, 09 May – 19 May 2022**

Agenda Item: 9.1.4.1

Source: Huawei (moderator)

Title: Summary of Offline Discussion on CB: # QoE2\_Stage3

Document for: Discussion and Decision

# Introduction

**CB: # QoE2\_Stage3**

**- TS38.413: Discussion on QMC capability IE, e.g., whether to include explicitly over NG, whether RVQoE capability is needed, whether segmentation IE is needed, add text about how AMF use the QMC capability information? Align the IE name and wording between NG and Xn? Align the IE name of RVQoE metrics with 38.331? Update some semantic descriptions, e.g., QoE Reference, QMC configuration information? Add references for some specifications, e.g, 26.114, 26.118? Correction on the IE type and reference of Measurement Configuration Application Layer ID? Separate the NGAP QMC Configuration Information IE into two separate IEs, respectively for s-based activation (QMC Activation IE) and NG mobility (QMC context IE)? The Cell ID List for QMC IE within the Area Scope of QMC IE should only include the NR CGI? Other?**

**- TS38.423: Align the IE name and description with NGAP? Correction on the IE type and reference of Measurement Configuration Application Layer ID? Add references for some specifications, e.g, 28.405, 26.114, 26.118? Align the IE name of RVQoE metrics with 38.331? Change the presence of Measurement Configuration Application Layer ID into Optional? Other?**

**- TS38.473: Add definition for RVQoE measurements? Change the F1AP procedure name? Identify RVQoE report information over F1 using QoE Reference or short RRC id (measConfigAppLayerId)? Convey RVQoE report information over F1 using the RRC RAN-VisibleMeasurements-r17 IE? Other?**

**- Capture agreements and provide CRs if agreeable**

**(HW - moderator)**

Summary of offline disc

# For the Chairman’s Notes

**For chairlady to copy:**

* **Remove the whole QMC configuration capability IE.**

**Agree the following changes to each spec:**

* **NG:**
  + “UE Application Layer Measurement Information” => “UE Application Layer Measurement Configuration Information”, to alignment with Xn over NG;
  + “Buffer Level Indication” => “Application Layer Buffer Level List”, “Playout Delay Indication” => “Playout Delay for Media Startup”, over NG
  + To replace Trace with QMC in the semantic descriptions of some tabular, over NG
  + To update the range of “measConfigAppLayerID” to (0..15, …), to align with RAN2
  + To clarify that “QMC Configuration Information” and “QoE Measurement Status” apply to both s-based and m-based QoE measurement over NG;
  + To update the semantics of “NG-RAN CGI” to “This IE only can indicate the NR CGI”, over NG
  + Add references, including 26.114, 26.118, over NG
* **F1:**
  + “QoE Procedures” => “QMC Procedures”, with the addition of QMC, over F1
  + “Buffer Level” => “Application Layer Buffer Level List”, “Playout Delay” => “Playout Delay for Media Startup”, over F1;
* **Xn:**
  + Add references, including 26.114, 26.118 and 28.405, in NG and Xn
  + Update the IE “Measurement Configuration Application Layer ID” from Mandatory to Optional, over Xn
  + To update the range of “measConfigAppLayerID” to (0..15, …), to align with RAN2

[R3-223635](file:///D:\会议硬盘\TSGR3_116-e\Docs\R3-223635.zip) revised in Rev in R3-223737

[R3-223636](file:///D:\会议硬盘\TSGR3_116-e\Docs\R3-223636.zip) revised in Rev in R3-223738

[R3-223052](file:///D:\会议硬盘\TSGR3_116-e\Docs\R3-223052.zip) revised in Rev in R3-223781

Further issues:

1. Missing info for RAN visible QoE metric report over F1. Any info missing, if yes, which info, RRC ID/PDU session ID/QoE reference ID;
2. Term OAM-QoE

Detailed discussions

First round

**Capability info transfer over NG**

8 companies participated discussion.

For RRC segmentation of the QoE measurement report over NG, 1 company preferred to include this capability of RRC segmentation of the QoE measurement report over NG, 7 companies preferred not to. The majority shared similar view that this capability is radio related, which is not necessary to core network.

For the removal of capability of RAN visible QoE measurement over NG, 1 company slightly preferred to keep it, 7 companies shared similar view to remove it, the main motivation is similar as above that there seems no obvious benefit for the AMF to be aware of this radio level capability.

Taking the majority’s view into account, the moderator suggest to go for the following agreement:

1. Agree to not include the capability of RRC segmentation of the QoE measurement report over NG
2. Agree to remove the capability of RAN visible QoE measurement over NG

It seems that there is a further issue that whether there is a need to remove all UE QMC capability IE in 9.2.13.1 UE RADIO CAPABILITY INFO INDICATION, at least two companies suggest to remove this whole QMC capability, since on one hand this is available as part of UE radio capability info sent to CN, on the other hand anyway it is radio level capability which is not needed by AMF, some companies don’t take a strong opinion on this.

**Missing info for RAN visible QoE metric report over F1**

8 companies participated discussion.

5 companies shared similar view that some information is missing, the motivation is that gNB-DU needs to know the to which DRB the visible QoE measurement report corresponds; among 5 companies, one companies preferred to use QoE reference ID to indicate such relationship, one company preferred to use the short RRC ID, three companies preferred to use PDU session ID.

3 companies didn’t see the benefit to introduce additional info.

Obviously, there is no consensus or common understanding on this issue, moderator would suggest to continue this discussion on contribution basis.

**Whether to introduce QMC context IE over Xn to differentiate from QMC configuration IE over NG**

8 companies participated discussion.

1 company preferred to use separate IE for initial QMC session activation and context transfer during HO; 3 companies didn’t take a strong opinion, since current spec could work, the suggestion of using separated IE could give clearer description but benefit is limit; 4 companies preferred the way of current spec, since the way of using separated IE also introduced quite a lot of overlapping info in the two IEs, thus didn’t see obvious benefit and neither the necessity.

Obviously, there is no consensus, moderator’s suggestion is to keep the current design.

**IE naming**

7 companies participated the discussion.

There are 6 proposals on the table, moderator could see that the comments were diverged, and some companies didn’t comment on every proposal, but still there are some common understanding on some of the proposals, moderator tried to summarize as follows:

* “QoE Procedures” => “QMC Procedures”, with the addition of QMC, over F1
* “Buffer Level” => “Application Layer Buffer Level List”, “Playout Delay” => “Playout Delay for Media Startup”, over F1;
* “UE Application Layer Measurement Information” => “UE Application Layer Measurement Configuration Information”, to alignment with Xn over NG;
* “Buffer Level Indication” => “Application Layer Buffer Level List”, “Playout Delay Indication” => “Playout Delay for Media Startup”, over NG

**Miscellaneous corrections**

8 companies participated the discussion.

From the discussion, we could see that companies shared similar view on most of the proposals, moderator tried to summarize as follows:

* To replace Trace with QMC in the semantic descriptions of some tabular, over NG
* Add references, including 26.114, 26.118 and 28.405, in NG and Xn
* Update the IE “Measurement Configuration Application Layer ID” from Mandatory to Optional, over Xn
* To update the range of “measConfigAppLayerID” to (1..16, …) in NG
* To clarify that “QMC Configuration Information” and “QoE Measurement Status” apply to both s-based and m-based QoE measurement over NG;
* To update the semantics of “NG-RAN CGI” to “This IE only can indicate the NR CGI”, over NG

Second round

* Missing info for RAN visible QoE metric report over F1. Any info missing, if yes, which info, RRC ID/PDU session ID/QoE reference ID;
* Any further questions or comments to OAB-QoE

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| Company | Comment |
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# Discussion

The discussion will try to cover all the proposals listed in the contributions, as indicated in guidance from chairlady for this CB, there are mainly the following issues: capability info transfer over NG, IE naming alignment, missing info for RAN visible QoE metric report over F1, to introduce QMC context IE to differentiate from QMC configuration IE over NG and Xn and miscellaneous corrections including mandatory or optional, range correction, reference addition, etc..

## Capability info transfer over NG

As could be seen in [6] [8] [11], there are mainly two issues here, one is remaining open issue which is about whether there is a need to include capability of RRC segmentation of the QoE measurement reporting over NG, the other is whether to remove capability of RAN visible QoE measurement over NG which was agreed in last meeting

### Whether to include capability of RRC segmentation of the QoE measurement report over NG

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| --- | --- | --- |
| Company | Yes/No | Comment |
| CATT | Yes( if AMF is responsible for the capability match.)  No(if RAN is responsible for the capability match) | If the AMF is responsible for the capability match, the capability of the ul-MeasurementReportAppLayer-Seg, should be provided to AMF together with legacy QoE capability. So the AMF can match the QMC consider all capability features. Otherwise the RAN should further match the QMC according the UL seg capability.  If the RAN is responsible for the capability match as specified as SA5, all the capability information don’t need to be explicitly transferred to AMF. It is already included in RAN2 specified NR radio capability information. |
| Nokia | No | So far it seems that stage 2 indicates capability checking to be done by the RAN, and we also believe this is the case for MDT (signalling-based logged MDT configuration). |
| ZTE | No | Segmentation is only related to RAN (reassemble is done at RAN node) and AMF is even not aware of the size of QoE reports. There is no need to indicate to AMF about the UE segmentation capability. |
| **Ericsson** | **No** | It seems that both the segmentation capability and all the info in the 9.3.1.226 *UE QMC Capability* NGAP IE is already present in the 9.3.1.74 *UE Radio Capability* NGAP IE, which is contained in the 9.2.13.1 UE RADIO CAPABILITY INFO INDICATION NGAP message. So, **the entire 9.3.1.226 *UE QMC Capability NGAP* IE should be removed from the TS 38.413.** |
| China Unicom | No | It is the capability of UE for how to transmit the long report via Uu interface, the CN will not know the detailed size of QoE report, so it is meaningless to report the RRC segmentation capability to CN. |
| Huawei | No | As indicated in our discussion paper, we think this is not necessary, since this would require the CN or the application layer (if forwarded to application layer) to know that if the size of the corresponding QoE results would exceed the size limitation of one RRC message or not, which would further require the CN/application layer to evaluate the size, this make things complicated and breaks the design rule. |
| Samsung | No | No need for RAN to report the radio level capability to CN |
| Qualcomm | No | Agree with the above comments.  Regarding Ericsson’s comment to remove UE QMC Capability IE entirely (as this is duplicated), we understand the intention. But wonder why **UE Application Layer Measurement Capability** was added in S1AP UE CAPABILITY INFO INDICATION; perhaps we missed this in LTE? |
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### Whether to remove capability of RAN visible QoE measurement from the 9.3.1.226 UE QMC Capability NGAP IE

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| --- | --- | --- |
| Company | Yes/No | Comment |
| CATT | Yes |  |
| Nokia | Yes | see our comment above |
| ZTE | Yes |  |
| **Ericsson** | **Yes, and…** | It seems that both the segmentation capability and all the info in the 9.3.1.226 *UE QMC Capability* NGAP IE is already present in the 9.3.1.74 *UE Radio Capability* NGAP IE, which is contained in the 9.2.13.1 UE RADIO CAPABILITY INFO INDICATION NGAP message.  So, **the entire 9.3.1.226 *UE QMC Capability NGAP* IE should be removed from the TS 38.413.** |
| China Unicom | Yes | There is no need to introduce RAN visible QoE measurement in UE RADIO CAPABILITY INFO INDICATION message. NG-RAN node can decide the final RAN visible QoE configuration according to UE capability. |
| Huawei | Maybe not | If it is known by the CN, CN would just simply decide whether to continue or stop the QoE measurement request from application layer, yet we also see that if this capability is not known, RAN will manage to handle, nothing breaks, so we don’t take a very strong opinion here. |
| Samsung | Yes | Agree to remove the capability of RV QoE over NG. |
| Qualcomm | Yes | No strong reason for AMF to be aware of RVQoE capabilities. |
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## Missing info for RAN visible QoE measurement report over F1

As discussed in [2] and changes in [5], here the main issue is, if the current info over F1 is enough for gNB-DU to associate the received RAN visible QoE measurement report with a specific DRB, so that gNB-DU could take corresponding actions accordingly. It was proposed in [2] that “RAN3 to discuss and agree on identifying RVQoE report information over F1 using QoE Reference or short RRC id (*measConfigAppLayerId*).”, companies are welcome to share views on the following issue:

* **Whether there is any info missing? If yes, what kind of info, QoE Reference, short RRC id (measConfigAppLayerId), or other info?**

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| --- | --- | --- |
| Company | Yes or No  If yes, what info needed | Comment |
| CATT | No | We don’t think there is any benefit from introducing these information. |
| Nokia | Yes | There is benefit if more than one QoE session is running in the UE (and these QoE sessions may very well use the same PDU session). If there is no ID (as today), the gNB-DU will not be able to distinguish between the QoE reports reported by different application clients. Our preference is the QoE reference, which would avoid confusion if QoE sessions are deleted and added (same RRC id for different sessions could then happen). |
| ZTE | No | No necessary. QoE reference can be used by MCE to distinguish which application the measurement belongs to. But we don’t think DU is in need of this kind of this information. |
| **Ericsson** | Yes | The RRC ID is shorter than the QoE reference, so it would be a better choice. |
| China Unicom | No | We share similar view as ZTE. |
| Huawei | Yes, PDU session ID | We think gNB-CU just needs to include PDU session ID which was already included in the RAN QoE visible measurement report. |
| Samsung | Yes | DU needs more information to associate the received RV QoE report with a specific DRB and then to optimize the DRB scheduling to improve the QoE if needed.  But both of the RRC ID and QoE reference could not provide such kind of useful information to DU. PDU session ID is a little helpful for DU to reduce the possible DRBs scope. It’s the prefer one in R17.  QoS Flow Identifier or DRB ID is the best choice for DU. But it seems it’s not possible to agree it in R17. |
| Qualcomm | Perhaps PDU session ID | Don’t think it’s much useful for gNB-DU to be aware of RRC ID (which is a RRC identifier) or QoE Reference (which is an application identifier) if the intention is to scheduler level optimization.  Perhaps PDU session ID as indicated by Huawei is more useful. |

## Whether to introduce QMC context IE over Xn to differentiate from QMC configuration IE over NG

As discussed in [2] and CRs in [3] and [4], the main intention is to differentiate the configuration from CN and the configuration over Xn interface, since there are not exact the same, since the former contains parameters for activation of QMC sessions while the latter carries QMC context information during handover. Note that this change also impacts both NG and Xn.

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| Company | Yes/No | Comment |
| CATT | No strong view | No strong view for the specification optimization from the readable perspective. |
| Nokia | Yes | We believe that the maintainability and future evolution of the QMC feature will clearly benefit from using separate IEs for initial QMC session activation and context transfer during HO. In particular, context transfer during HO should be done using a IE not visible to the CN. |
| ZTE | Maybe not | We don’t see much necessity. Current specification can also work. |
| **Ericsson** | **No** | There is quite a lot of overlapping info in the two IEs in Nokia’s CR. We do not see the benefit. Perhaps we could consider reorganizing the current IE in so that it consists of the: 1) common part; 2) ‘Activation’ part, and 3) ‘Context’ part. |
| China Unicom | No | The current specification is clearly indicated each specific IE is used in initial configuration and/or during handover, so there may be no need to introduce other IEs. |
| Huawei | Maybe not | We understand the intention, but we think to reuse the QoE configuration with some clarifications in semantics is simpler. |
| Samsung | No Strong View | Current spec could work. The change could give clearer description and more readable. But the benefit is limit. |
| Qualcomm | No strong view |  |
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## IE naming

There are a few proposals to update the IE name in [1] [2] [3] [7] [16]. Moderator tried to list all the proposals below:

1. “QMC Configuration Information” => “QMC Activation” over NG;
2. “QoE Procedures” => “QMC Procedures”, to add “RAN Visible” in the beginning for each QoE related procedure name and IE name, over F1
3. “Buffer Level” => “Application Layer Buffer Level List”, “Playout Delay” => “Playout Delay for Media Startup”, over F1
4. “UE Application Layer Measurement Information” => “UE Application Layer Measurement Configuration Information”, to alignment with Xn over NG
5. “Buffer Level Indication” => “Buffer Level”, “Playout Delay Indication” => “Playout Delay for Media Startup”, over NG
6. “Measurement Collection Entity IP Address” => “MCE IP Address”

Moderator would like each company to share view to each proposal and make comments if needed.

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| Company | Yes/No to each item, and comments if any |
| CATT | In general, we agree the wording change for the readability. For 2), I don’t agree to add “RAN visible” for all F1, we may leave it as is for future proof. For 3)and 5), we support this change, we should more clear wording for Playout Delay as proposed. |
| Nokia | 1) our proposal, see discussion in section 3.3. Also this naming aligns with current RAN3 naming like Trace Activation and MDT Activation.  2) no strong view on QoE procedures vs QMC procedures over F1 (see also our comment in the stage 2 CB - we believe that RAN3 made a conscious choice for QoE procedures).  3) ok  4) not ok. In our papers ([2-5]) we propose to avoid the RRC-inspired naming ("UE Application Layer Measurement Information") and replace with naming that is closer to e.g. SA5 spec. Also, we believe that RAN2's initial motivation for the "UE application layer" naming was to be generic i.e. also support application layer measurements not necessarily related to QoE. However the current work in SA4/SA5/RAN3 is strictly focusing on QoE, and the RAN3 IE naming should therefore reflect this aspect. Also, a difference between the UE and the RAN is that there is no application layer in the RAN, so IE naming using "UE application layer" is not needed.  5) OK  6) we prefer to keep current wording, which is aligned with MDT (Trace Collection Entity) |
| ZTE | 1. No 2. No strong view 3. Yes 4. Yes 5. Yes 6. No strong view |
| **Ericsson** | **1) No** – if we reorganize the QoE IE, we should do it as proposed in our answer to the question in 3.3.  **2) Yes** – our proposal.  **3) Yes, to both**. The intention is to align the buffer level metric name with RRC, and the playout delay metric name with SA4 specifications.  **4) Yes.**  **5)** We propose “Application Layer Buffer Level List” and “Playout Delay for Media Startup”. We also propose to change the ENUMERATED codepoints from “(true, …)” to “(available, …)”.  **6) Yes** – more compact notation, beneficial for asn.1 as well. |
| China Unicom | For 1),2),6): No strong views.  For 3), 5), Yes, the change should be “Playout Delay for Media Startup” according to previous agreement.  For 4):Yes |
| Huawei | 1. Maybe not, since we discussed a lot to reach this consensus. 2. Could be ok with QMC Procedures, but no need to add RAN visible, since the existing name is more general and future proof. 3. Ok 4. Ok 5. Ok 6. Maybe not needed |
| Samsung | 1. No 2. Yes to QMC Procedures, No strong view about add “RAN visible” 3. Yes 4. Yes 5. Agree with E///, codepoints “available” is better 6. Maybe not needed |
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## Miscellaneous correction

There are a few proposals to update the IE name in [9] [10] [11] [12] [13] [14] [15] [17]. Moderator tried to list all the proposals below:

1. To replace Trace with QMC in the semantic descriptions of some tabular, over NG
2. Add references, including 26.114, 26.118 and 28.405, in NG and Xn
3. Update the IE “Measurement Configuration Application Layer ID” from Mandatory to Optional, over Xn
4. To update the range of “measConfigAppLayerID”, (1..16, …) or (0..16, …) or (0..15, …) over NG, similar update to Xn?
5. To clarify that “QMC Configuration Information” and “QoE Measurement Status” apply to both s-based and m-based QoE measurement over NG;
6. To add more definitions, including OAM-QoE measurements/OAM-QoE report/ RAN visible QoE measurements/ RAN visible QoE report, and abbreviations including QMC/MCE/RVQoE/QoE, over NG and Xn
7. NG-RAN CGI => NR CGI or “In this release, this IE only can indicate the NR CGI.”

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| --- | --- |
| Company | Yes/No to each item, and comments if any |
| **CATT** | Yes 1), 2), 3)  Yes to 4), we need align it with RAN2 i.e (0..15,…) in both NG and Xn  Yes to 5), 7)  For 6), we need further discuss the naming |
| Nokia | 2), 3), 4): yes  6): no  7) NR-CGI is fine |
| ZTE | 1. Yes 2. Yes 3. Yes 4. Yes. Share the view with CATT 5. Yes 6. No for OAM-QoE measurements/OAM-QoE report. When we talk about QoE, not emphasizing RAN visible things, it should mean the QoE measurement which is required by OAM. 7. Yes |
| Nokia2 | 1) OK (semantics clause 9.3.1.224 "are coming with the ~~trace~~QMC activation")  5) the current semantics for *QMC Configuration Information* IE in the *Source NG-RAN Node to Target NG-RAN Node Transparent Container* IE can be completely removed (as per our proposal in 3129), or at least remove the part "from the source NG-RAN node to the target NG-RAN node in NG-based handover" which is obvious for this IE (transparent container used for HO). |
| **Ericsson** | **1) Yes.**  **2) Yes.**  **3) Yes.**  **4) No.** It does not make sense to hard-code the RRC ID range because the range is 1:1 tied to the maxnoofUEAppLayerMeas, it can never exceed the maxnoofUEAppLayerMeas. So, we propose **INTEGER (1.. maxnoofUEAppLayerMeas).**  **5) Yes.**  **6) Yes.** We cannot use the term “legacy QoE”. In August, everything we did in this release will become legacy. We need a better name for the QoE that is reported to the OAM. We are open to suggestions. The term “QoE” is an umbrella term, comprising the RVQoE and QoE reported to OAM.  **7) Partly agree** – “in this release” should be removed. |
| China Unicom | For 1),2),3),5),7): Yes  For 4): Yes to (0..15,…) to align with RAN2  For 6): it should be further discussed and need to be aligned with RAN2 |
| **Huawei** | 1. Yes 2. Yes 3. Yes 4. Should be (1..16,…) 5. Yes 6. Not needed, the conception is already clear with current spec texts; 7. Yes, we prefer clarification text, since it is future proof. |
| Samsung | Yes to 1) 2) 3) 5) 7)  4) update the range of “measConfigAppLayerID” (1..16, …) over NG and Xn  No to 6) |
| Qualcomm | Regarding 6), we are OK to rename it to OAM-QoE. We should definitely not have “legacy” QoE anywhere in the specs. |

# Conclusion, Recommendations [if needed]

If needed

# References

1. R3-223052, (CR TS 38.473): QoE Rel-17 Corrections (Ericsson) CR0862r, TS 38.473 v17.0.0, Rel-17, Cat. F
2. R3-223128, QMC corrections (Nokia, Nokia Shanghai Bell) discussion
3. R3-223129, Correction on QMC (Nokia, Nokia Shanghai Bell) CR0778r, TS 38.413 v17.0.0, Rel-17, Cat. F
4. R3-223130, Correction on QMC (Nokia, Nokia Shanghai Bell) CR0778r, TS 38.423 v17.0.0, Rel-17, Cat. F
5. R3-223131, Correction on QMC (Nokia, Nokia Shanghai Bell) CR0872r, TS 38.473 v17.0.0, Rel-17, Cat. F
6. R3-223133, Discussion of potential corrections on R17 QoE measurement (China Unicom) discussion
7. R3-223134, CR to TS 38.413 on corrections of QoE configuration (China Unicom, Huawei) CR0779r, TS 38.413 v17.0.0, Rel-17, Cat. F
8. R3-223509, CR to 38.413 for Corrections on NR QoE Capability (CATT) CR0821r, TS 38.413 v17.0.0, Rel-17, Cat. F
9. R3-223510, CR to 38.413 for Corrections on measConfigAppLayerID (CATT) CR0822r, TS 38.413 v17.0.0, Rel-17, Cat. F
10. R3-223511, CR to 38.423 for Corrections on NR QoE (CATT) CR0823r, TS 38.423 v17.0.0, Rel-17, Cat. F
11. R3-223634, Discussion on remaining open issues on R17 QoE measurement (Huawei) discussion
12. R3-223635, CR to 38.413 on corrections to configuration details (Huawei, China Unicom, Qualcomm Incorporated) CR0841r, TS 38.413 v17.0.0, Rel-17, Cat. F
13. R3-223636, CR to 38.423 on corrections to QoE measurement continuity (Huawei) CR0840r, TS 38.423 v17.0.0, Rel-17, Cat. F
14. R3-223661, CR for 38.413 on NR QoE (ZTE) CR0849r, TS 38.413 v17.0.0, Rel-17, Cat. F
15. R3-223662, CR for 38.423 on NR QoE (ZTE) CR0845r, TS 38.423 v17.0.0, Rel-17, Cat. F
16. R3-223050, (CR TS 38.413): QoE Rel-17 Corrections (Ericsson) CR0763r, TS 38.413 v17.0.0, Rel-17, Cat. F
17. R3-223051, (CR TS 38.423): QoE Rel-17 Corrections (Ericsson) CR0769r, TS 38.423 v17.0.0, Rel-17, Cat. F