**3GPP TSG-RAN WG2 Meeting 124 R2-231XXXX**

**Chicago, USA, Nov. 13th-17th**

**Agenda item: 7.14.2**

**Title: Remaining issues on QMC in RRC\_IDLE and RRC\_CONNECTED**

**Source:** **CMCC**

**Document for:** **Discussion**

# 1. Introduction

In RAN2#123bis, companies discuss QMC in RRC\_IDLE and RRC\_INACTIVE and formulate the following WA:

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| * Working assumption: For QoE configurations applicable to RRC\_IDLE/INACTIVE state, area scope checking is performed by the UE AS layer when the UE is in RRC\_IDLE/INACTIVE state.
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There are still some controversies on AS and APP layer solution. Due to time constraints, RAN2 should prioritize addressing critical issues, e.g., area scope check and QoE configuration retrieval.

Also, there are some technical issues captured in the post meeting email discussion require further consideration.

# 2. Discussion

## Area Scope Check

RAN2 has already discussed this issue several times. For RAN’s perspective, UE AS layer is anyway aware of UE location on Cell or TA granularity, it’s quite more complex for APP layer to handle Area scope IE since UE AS layer has to send both RRC state and UE location to APP layer.

**Proposal 1: Turn WA into agreement that area scope checking is performed by the UE AS layer when the UE is in RRC\_IDLE/INACTIVE state.**

Regarding AS layer solution, in RRC\_CONNECTED, RAN handles area scope check and only configure UE within the area indicated by Area scope IE, however, in RRC\_INACTIVE/IDLE, whether UE is in or out of QMC area may be determined by UE AS layer. Therefore, UE AS layer should be able to inform UE APP layer the area scope check result to avoid UE performing QMC out of the area indicated by Area scope IE.

Hence, considering the time limit, RAN2 should discuss how to inform APP layer the area scope check.

**Proposal 2: RAN2 to discuss how UE AS layer informs APP layer area scope check result in RRC\_IDLE and RRC\_INACTIVE.**

There are at least two feasible options for this open issue.

Option 1 is to reuse the activation or deactivation for QoE measurement collection job. In this option, UE AS layer should store QoE configuration and QoE container (which RAN sends to UE before UE transfers to RRC\_INACTIVE/IDLE), and when UE move into or out of the area indicated by area scope IE, UE AS layer should perform activation or deactivation of QMC job.

Option 2 is kind of a simplicity of option 1. Option 2 requires to introduce a new AT command or extend existing AT command (e.g., +CAPPLEVMCNR) to indicate APP layer whether UE is inside or outside of the area indicated by Area scope IE.

For option 1, there is little impact on other WG, but the outcome of potential frequent activation or deactivation of QMC job is not evaluated. For option 2, UE AS layer needn't to send the whole QoE configuration every time UE moves into the related area, but it requires CT1 to introduce or extend AT command.

We see no significant benefits or drawbacks for both options, hence we prefer to wait for more comments from companies.

**Proposal 3: RAN2 should evaluate the following two options for how UE AS layer informing APP layer area scope handling result:**

**Option 1: Reuse QMC job activation and deactivation procedure.**

**Option 2: Inform CT1 to introduce or extend AT command (e.g., +CAPPLEVMCNR).**

If there are other feasible solutions, they should be also captured.

## 2.2 QoE configuration storage and retrieval

For QMC job continuity, when UE moves to RRC\_CONNECTED, UE should send its idle/inactive QoE configuration to gNB in case gNB is not aware of such configurations. Also, RAN3 has already made the agreement that UE-based solution for QoE configuration is a working assumption.

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| **WA: UE based solution for IDLE QoE configuration retrieve in Rel-18 IDLE/INACTIVE QoE.**  |

Hence, in RRC\_IDLE/RRC\_INATIVE, UE should store QoE configuration and when UE transfers to RRC\_CONNECTED, UE should send that QoE configurations to gNB.

Regrading the area scope issue, UE should anyway store area scope IE in RRC\_IDLE/RRC\_INACTIVE. Therefore, for RAN2, UE-based solution should also be adopted.

**Proposal 3: Reuse AS layer memory for paused QoE and QoE report in RRC\_IDLE and RRC\_INACTIVE for QoE configuration storage.**

Considering that the complete QoE configuration can cause significant overhead in Uu, UE should only send the minimal necessary QoE configuration IE to gNB. The majority of the minimal necessary QoE configuration has been captured in the post-meeting discussion and RAN3 agreement (e.g., QoE reference and MCE information).

Apart from the QoE configuration information captured in the email discussion, we would like to add the session status indication in the QoE configuration retrieval procedure since it has already been agreed by RAN2 but somehow be overlooked in the email discussion.

**Proposal 4: Capture session status indication in QoE configuration retrieval message.**

For RRC message containing QoE configuration, RAN2 should start the discussion soon since there are only one meeting left.

## 2.3 Priority information in QoE configuration

RAN3 has agreed to introduce priority information as assistance information in NG. Considering that RAN2 has agreed that UE can discard QoE report and release QoE configuration after 48H in RAN2#122, we think both time-based and priority-based discard solution should be adopted. Due to there isn’t too much time left, detail can be discussed in Rel-19.

**Proposal 5: When UE AS layer buffer is full, UE discards older QoE reports with low priority first.**

In RAN overload, UE support paused QoE should be able to store QoE reports in their AS layer memory. In case the AS layer memory for paused QoE is full, the same priority-based solution should be adopted to avoid critical QoE report being discarded.

**Proposal 6: For RAN overload, UE can discard paused QoE reports with low priority first in case AS layer buffer is full.**

Considering that there are lots of discarding strategies, details can be left for UE vendors’ implementation.

## 2.4 PLMN checking

For UE transition to RRC\_CONNECTED, concern raises on UE forwarding QoE report and QoE configuration information to gNB belonging to a different operator. And therefore, suggestion emerges to introduce UE checking PLMN of target gNB before forwarding any QoE information.

**Proposal 7: When transferring to RRC\_CONNECTED, UE should check the PLMN of target gNB before UE forwards any QoE information. If PLMN changes, UE should not forward QoE configuration and report and keep them in UE AS layer memory.**

Please notice any QoE information should include at least QoE configuration, QoE reporting and Session status indication, the last of which is agreed in RAN2#123bis.

Another issue is whether UE should continue QoE measurement collection in different PLMN after UE transfers to RRC\_CONNECTED. Obviously, it should be prevented due to potential network performance leakage.

Moreover, considering the LS of SA4 and SA5, including PLMN in LocationFilter can be difficult and may consume plenty of time (at least 2 meetings). And RAN2 at least has the WA that UE AS layer performs area scope checking, UE APP layer solution for checking PLMN should not be pursued.

**Proposal 8: When transferring to RRC\_CONNECTED, UE AS layer should check PLMN and Inform APP layer whether to stop or continue QoE measurement.**

## 3. Conclusion

Guidance – Draw a clear conclusion and potential actions expected from the working group

## 4. References

Guidance – List the references (if any) to other documents (internal/external to 3GPP)

Note: The following values are permitted:

• Decision

• Information

• Discussion

• Agreement

• Approval