3GPP TSG SA WG4 Meeting #121 TDoc S4-221288

E-Meeting, 17th – 26th August 2022

**Title: Draft Reply LS to RAN3 on RAN visible QoE value**

**Response to: LS S4-221234 (R3-226014**

**Release: Rel-18**

**Work Item: NR\_QoE\_enh-Core**

**Source:** **3GPP SA4**

**To:** **3GPP RAN3, ITU-T SG12**

**Cc: 3GPP RAN2, 3GPP SA5**

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**Attachments: none**

# 1 Overall description

SA4 thanks RAN3 for your LS on RAN visible QoE value, and wishes to respond to the two questions from RAN3 regarding QoE metrics in SA4’s Rel-18 specifications on AR, MR and MBS.

**Question 1:**

**Can a RAN visible QoE value be defined that reflects the overall QoE of an ongoing service, assuming multiple QoE metrics taken into account, like MOS value for audio? In that respect, RAN3 notices that the TR 26.909 states:**

***"While MOS calculation in the client is possible, it severely limits the use of advanced network optimization, use of flexible MOS windowing, and also introduces problems when the MOS model calculation needs to be updated. A better solution is to make sure that the raw reported QoE metrics are enough to be able to calculate the final MOS value in the QoE server."***

**RAN3 wonders whether the above conclusion about MOS in TR 26.909 still holds.**

**SA4 reply**:

In general, SA4 believes that while in principle it is possible to define a RAN visible QoE value as described above by RAN3, the absence of the necessary standards makes it not feasible in practice at this stage. The above conclusion in TR 26.909 as cited by RAN3 still holds, and furthermore, additional factors for consideration are described below:

1. As a general principle, MOS-based QoE characterization must be performed according to standardized algorithms. The development of objective streaming quality standards is within the responsibility of ITU-T SG12. One example, is the standard ITU-T P.1203 "Parametric bitstream-based quality assessment of progressive download and adaptive audiovisual streaming services over reliable transport", which was approved in 2016.
2. ITU-T P.1203 addresses both individual short-term video and audio MOS estimation, as well as longer-term A/V MOS integration (minutes or longer, e.g., for the entire media session). The standardized algorithms include also low-complexity modes intended for implementation in receiving streaming client devices. However, its algorithms are somewhat outdated, and only cover H.264 up to HD quality.
3. There is related follow-up ITU-T work to P.1203 in P.1204, which addresses MOS estimation for other, more modern codecs including H.265 and VP9, and up to 4K/UHD resolution. However, the planned specification of low-complexity quality assessment modules in P.1204 has not yet concluded in ITU-T SG12.
4. A measure of the overall QoE value for an ongoing service must in principle estimate the experience of the human user of the service. For multimedia services this inherently means that the overall service QoE cannot be evaluated “instantly”, but rather must be based on data covering longer periods of time, i.e., at a “human time-scale”. This input time-scale may vary from 10 seconds to the whole duration of the associated media content. For instance, P.1203 states 30 seconds as the shortest valid calculation interval. In other words, a provided MOS value would likely not support real-time RAN resource optimization.
5. Another characteristic of a MOS value is the inherent absence of granular information regarding the contributing components, making it difficult to know what aspect of the transmission chain to improve. Therefore, SA4 suggests that RAN3 evaluate the means to determine, when a quality degradation is detected, whether that is mainly attributable to the network itself, and if so, which network “knobs and dials” to adjust towards achieving dynamic and practical improvement in subjective QoE.
6. The MOS-based QoE assessment methods of ITU-T, when applied to 3GPP, incurs additional processing overhead on the UE, especially at the application layer in executing the associated algorithms, the degree of which depends on the complexity of algorithm design. As stated earlier, the low-complexity algorithms of P.1204 are still not standardized.

Due to the relation to the ITU-T P.1204 work, SA4 also copies this LS reply to ITU-T SG12, with inquiry on their plans for further work/completion of that work item.

**Question 2: If the above conclusion about MOS from TR 26.909 does not hold, is it feasible to define such a RAN visible QoE value that would be useful at the gNB?**

**SA4 reply**: Please refer to the above reply. Overall, SA4 wishes to defer a specific answer to this question at this stage, and would also like to seek feedback from ITU SG12.

# 2 Actions

**To RAN3**

**ACTION:** SA4 kindly asks RAN3 to take the above information into account, and provide feedback to SA4 if necessary.

**To ITU-T SG12**

**ACTION:** SA4 kindly requests ITU-T SG12 to check the above responses provided by SA4 to RAN3 and provide your comments and suggestions, along with any corrections. In addition, SA4 requests ITU-T SG12 to inform 3GPP (esp. SA4, RAN3 and RAN2) about your plans regarding the P.1204 work item.

# 3 Dates of next TSG SA WG 4 meetings

SA4#122 20th – 24th February 2023 EU

SA4#123 17th – 21st April 2023 TBD