Motivation for study on NR QoE management and optimizations for diverse services

China Unicom

➢ **In UTRAN and E-UTRAN, QoE Measurement Collection for streaming services have been specified**. This function enables collection of application layer measurements from the UE, and both streaming service and MTSI service are supported. With this feature, operators can be able to collect and utilize QoE measurement information to better understand the user experience, and then more optimizations could be enabled.

➢ NR is designed for different kinds of services and scenarios, and **operators have strong demands to optimize their networks in order to offer better user experiences to different services.**

➢ In SA4, the SI of "Study on QoE metrics for VR" has been 100% completed. The related **WI of "New WID on VR QoE metrics"** was agreed at TSG SA WG4#103 meeting.

➢ We have observed that different 5G services have different requirements and the typical QoE metrics may be also different. Thus **NR QoE management scheme should be designed for more services**, e.g. typical stream services, MTSI, VR, AR, URLLC, etc.

Scenarios

➢ **Service types:**

- Streaming services

- MTSI services, e.g. IMS related services

- AR/VR video services, including real-time gaming

- URLLC services, e.g. remote healthcare, smart factory

➢ For every service type, there are typical QoE metrics to closely reflect user experiences, so **it requires corresponding and multiple types of QoE parameters and management schemes**.

➢ **Network deployment scenarios:**

- 5G network architectures include Option 2, Option 3x, Option 5, Option 4, Option 7.

- Operators have different choices of 5G network options and NR QoE should consider different options.

- Rel-17 NR QoE item should consider **Option 2 and Option 3x as baseline deployment scenarios**.

Motivations

➢ QoE management in 5G will not just collect the experience parameters of streaming services but also consider the typical performance requirements of diverse services (e.g. AR/VR and URLLC). Based on requirements of services, we suggest Rel-17 to focus on more adaptive QoE management schemes and corresponding network intelligent optimization to satisfy user experience for diverse services.

➢ 5G network is aiming to provide services for various kinds of vertical industries and users, and we observe that the 5QI parameters may not be effective enough to provide good user experience for diverse services. Thus it is required that 5G RAN can collect the user KPI information and other QoE parameters to optimize the user experience and also optimize the network resource utilization.

➢ In 5G network, users can customize their own demands on user experiences for certain services, and then RAN has adaptive optimization and send the resource utilization status to OAM or core network.

NR QoE in RAN

In order to support traditional streaming services and new services in NR , the following aspects can be considered:

➢ RAN collects the QoE measurement information from the UE side:

- QoE based/assisted RAN resource management and optimization.

- UE services differentiate RAN QoE parameters definition and optimizations.

- To reduce the RAN resource utilization.

➢ For solutions:

- Trigger, configuration and corresponding optimization mechanisms for QoE measurement collection.

➢ RAN sends resource utilization status for achieving certain QoE to OAM/CN.

➢ RAN supports to collect the QoE parameters for the OAM/CN, OAM/CN can optimize the network according to the reporting information:

  - All the UEs in the network report the QoE information required by the OAM/CN, and the OAM/CN can optimize the QoE according to these information.

➢ RAN supports to collect the UE KPI report for certain services to optimize the UE QoE:

  - UE KPI information configuration and reporting for certain services, e.g. latency. The KPI information may be in AS layer or in application layer.

➢ RAN supports to directly optimize the network resource allocation according to the QoE reporting:

  - Ensuring a reasonable utilization of radio resources according to UE QoE information, and avoid unnecessary waste of radio resources.

➢ For all above use cases, trigger, configuration and corresponding optimization mechanisms for QoE measurement collection:

  - Configure different information reporting for difference service and avoid unnecessary reports in order to save the radio resource.
  - Configure different reporting modes (e.g. periods) for different services.

➢ RAN supports to send the resource utilization status for difference QoEs to OAM/CN:

  - For different services and different QoEs, RAN could be able to send the corresponding resource utilization status to OAM/CN in order for OAM optimization and CN charging, and etc.