**3GPP TSG-SA5 Meeting #145e S5-225461rev4**

**e-meeting 15 - 24 August 2022**

**Source: China Unicom**

**Title: Add sulotion for URLLC performance measurements related on reliability in RAN**

**Document for: Approval**

**Agenda Item: 6.8.3 Study on Management Aspects of URLLC**

# 1 Decision/action requested

***The group is asked to approve the proposal.***

# 2 References

[1] 3GPP TR 28.832 v0.2.0: “Management Aspects of URLLC”

[2] 3GPP TS 23.501: “System architecture for the 5G System (5GS); Stage 2”

# 3 Rationale

It was approved in SP-220146 to study the management aspects of URLLC and one of the objectives is to investigate performance management related to URLLC. In order to achieve the objective mentioned above, some performance measurements related to URLLC is proposed in this contribution.

# 4 Detailed proposal

This contribution proposes to make the following changes in [1].

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| **1st Change** |

# 3 Definitions of terms, symbols and abbreviations

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5QI 5G QoS Identifier

AN PDB Access Network Packet Delay Budget

CN PDB Core Network Packet Delay Budget

GBR Guaranteed Bit Rate

PDB Packet Delay Budget

PER Packet Error Rate

# 5 Key Issues Investigation and Potential Solutions

## 5.X Issue #X: URLLC Performance management on reliability in RAN

5.X.2 Potential solutionsURLLC services can be deployed using 5G network technologies. 5QI is a mechanism to ensure end-to-end differentiation of 5G. In the current network, dedicated 5QI is used to carry corresponding services. Table 5.7.4-1 in TS 23.501[2] defines the key characteristics of 5QI. Among them 5QI 82-90 are delay-critical GBRs. The service examples for delay critical GBRs matches the use cases of URLLC servcies. Meantime, the definitions for characterisctics PDB and PER in URLLC scenario are explained in TS 23.501[2]. For GBR QoS Flows with Delay-critical GBR resource type, a packet with delay more than PDB is counted as lost. PER under this scenario includes the packets which is delayed more than PDB. It is pointed out that the time constraint can be defined by PDB, which includes CN PDB and AN PDB. AN PDB can be obtained by the total PDB minus CN PDB which can be replaced by static values corresponding to different 5QI based on Table 5.7.4-1 in TS 23.501[2]. Then AN PDB, namely the time constraint of radio network, is obtained and we can design the delay reliability measurement of NG-RAN according to the time constraint.

The requirements for performance management of radio network providing URLLC services is:

* The OAM should have the capability of performing measurement on reliability with specific delay constraint in NG RAN including air interface.

Based on the requirement, a measurement on reliability of NG-RAN can be defined as follows:

* **Measurement name**: Downlink reliability with time constraint in RAN
* **Statistical method:** a) Taking AN PDB corresponding to a specific 5QI as the time constraint. b) Comparing the delay of each downlink packet transmitted over the air interface from gNodeB to UE with AN PDB. c) the number of all packets whose transmission delay is less than AN PDB is the numerator, and the number of all transmitted packets is the denominator. d) The ratio calculated at the end of the statistical period is the downlink reliability in RAN.
* **Measurement name**: Uplink reliability with time constraint in RAN
* **Statistical method:** a) Taking AN PDB corresponding to a specific 5QI as the time constraint. b) Comparing the delay of each uplink packet transmitted over the air interface from UE to gNodeB with AN PDB. c) the number of all packets whose transmission delay is less than AN PDB is the numerator, and the number of all transmitted packets is the denominator. d) The ratio calculated at the end of the statistical period is the uplink reliability in RAN.

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| **End of changes** |