**3GPP TSG-SA5 Meeting #148-e S5-233499rev3**

**e-Meeting, 17th-25th April, 2023**

**Source: China Unicom**

**Title: Add New Solution for URLLC performance management related to 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 v0.4.0: “Management Aspects of URLLC”

[2] 3GPP TS 28.552: “Management and orchestration; 5G performance measurements”

3 Rationale

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

This contribution proposes to a new solution for URLLC performance measurements related to reliability in RAN into TR 28.832 [1].

4 Detailed proposal

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

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| **1st Change** |

5.3 Issue #X: URLLC Performance management on reliability in RAN

5.3.X Potential solutions

Ultra-Reliable is a typical characteristic of URLLC service, thus reliability is an important metric of network which provides URLLC service. The measurement of reliability can be used to evaluate the performance of URLLC network. So the requirements for performance management of radio network providing URLLC services is:

* The OAM should have the capability of providing the reliability of NG-RAN with specific delay threshold.

Since the existing measurements and KPIs can’t match the definition of reliability in RAN considering delay threshold well, a new approach needs to be studied to measure the reliability performance in RAN. According to the definition of reliability, this solution proposes an algorithm in RAN, which is as follows: Calculate the ratio between the number of successfully transmitted packets with a delay threshold and the total number of packets between UE and gNB, and the result is reliability in RAN.

NOTE1: The delay threshold can be configured by OAM.

NOTE2: Even though this study is about URLLC, the solution is also applicable non URLLC services.

The above solution can take the best use of existing measurements. Take the downlink as an example, one possible approach for defining a KPI for reliability in RAN using existing measurement can be described as follows:

6.8.1.X Downlink reliability KPI with delay threshold between NG-RAN and UE

a) DLRel\_RAN\_DT

b) This KPI describes the reliability between NG-RAN and UE considering the required delay threshold. It is used to evaluate the reliability performance of NG-RAN. It is the percentage of number of successfully transmitted packets, the delay of which is no more than a delay threshold, out of the total number of packets between UE and gNB. It is a percentage value (%). This KPI can optionally be split into KPIs per Qos level (mapped 5QI or QCI in NR option3) and per S-NSSAI.

c) Below is the equation for downlink reliability with delay threshold between NG-RAN and UE.

 DLRel\_RAN\_DT =DlPckSucc\_DT/DlPckTotal,

Where,

DlPckSucc\_DT is the number of packet successfully transmitted to UE, the transmission delay of which is no more than the required delay threshold DT. The formular is as follows,

DlPckSucc\_DT= $\sum\_{Bin=0}^{DT}DRB.DelayDlNgranUeDist.Bin\\_Filter$, DRB.DelayDlNgranUeDist.Bin\_Filter is as defined in 5.1.1.1.6 of TS 28.552.

DlPckTotal is the total number of packet transmitted from NG-RAN to UE. The formular is as follows,

DlPckTotal=$\sum\_{Bin}^{}DRB.DelayDlNgranUeDist.Bin\\_Filter$, DRB.DelayDlNgranUeDist.Bin\_Filter is as defined in 5.1.1.1.6 of TS 28.552.

DT is the required delay threshold and can be pre-configured by OAM according to the requirements of operators.

d) NRCellCU (for non-split and 2-split scenario)

NOTE3: The solution mainly focuses on non-split and 2-split scenarios. Solutions for 3-split scenario can be discussed in normative phase.

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| **End of changes** |