**3GPP TSG-SA5 Meeting #155 *S5-243303d2***

**Jeju, South Korea, 27 - 31 May 2024**

**Source: China Unicom**

**Title: Add potential solution for throughput performance evaluation of RedCap**

**Document for: Approval**

**Agenda Item: 6.19.17**

# 1 Decision/action requested

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

# 2 References

[1] 3GPP TR 28.876: “Management aspects of RedCap feature”

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

[3] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)"

# 3 Rationale

It was approved in SP-231734 to study the management of aspects of RedCap features. One of the working taks is to investigate the measurements and KPIs to evaluate the performance of NR networks delivering communication services for RedCap UEs. A use case and requirement on the throughput performance evaluation for RedCap are approved in the last meeting. In order to satisfy the requirement mentioned above, a potential solution on metric of RedCap throughput performance evaluation is proposed in this contribution.

# 4 Detailed proposal

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

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| **1st Change** |

## 5.4 Use case #4: Performance evaluation on throughput of RedCap

### 5.4.1 Description

RedCap (Reduced Capability) represents a lightweight access technology within the 5G NR network, designed to satisfy the requirements for cost-effective, energy-efficient, and moderate-data-rate solutions. Some typical use cases, such as industrial sensors, video surveillance, wearables, etc., have been specified in TR 38.865 [5], primarily applied in verticals to to facilitate the digital transformation.

UE experienced data rate is an essential and important performance indicator for communication services. Compared to non-Redcap UEs, RedCap UEs have a lower cost and streamlined capabilities. For instance, in terms of average DL data rate which is measured by throughput, the requirement for legacy eMBB UEs is mostly more than 100Mbps while that for RedCap UE is ranging from less than 2Mbps to 50Mbps. In co-existence scenario, average throughput is calculated combining the two types of UEs together in the current approach specfied in TS 28.552 [10]. The result may not relect the network performance of RedCap accurately.

Consequently, it is crucial to investigate an approach for separately calculating the data rate of RedCap UEs and defining the throughput performance of networks that deliver RedCap services. This will ensure a more precise evaluation of the user experience for RedCap UEs.

### 5.4.2 Potential requirements

**REQ-RedCap-Perf-Throughput:** The MnS shall have capability to provide measurements or KPIs related to throughput for RedCap UEs in NR network.

### 5.4.3 Potential Solutions

#### 5.4.3.1 Potential solution #1

This solution proposes to reuse and enhance the exsiting measurements related to UE throughput defined in TS28.552 [10] for this use case.

Current measurements about UE throughput includes *Average DL UE throughput in gNB, Distribution of DL UE throughput in gNB, Average UL UE throughput in gNB, Distribution of UL UE throughput in gNB, etc.* In order to achieve the requirement in clause 5.4.2, most aspects of the existing measurments can be reused and some enhancements also need to be introduced.

In radio access procedure in 5G system, UEs (no matter legacy UEs or RedCap UEs) need to report to gNB about the NR UE Radio Access Capability Parameter using *UE-NR-Capability* IE, which is specified in clause 6.3.3 in TS 38.331 [2]. RedCapParameters is part of *UE-NR-Capability* IE which can be deliverd by the UE capability inquiry process.

Based on the procedures above, gNB can be aware of whether the UE is RedCap or not when a UE tries to access to NG-RAN. Consequestly, the measurements that performed after the inquiry of UE capability can be seperated for different types of UEs.

When there is more than one type of UEs (e.g. RedCap UEs, eMBB UEs) covered by a cell, the filter needs to be enhanced to optionally separate the measurement into subcounters to represent the RedCap UE throughput.

Take the Average DL UE throughput in gNB as an example:

* Introduce a new filter which can be named as NewFilter, then DRB.UEThpDl can be optionally separate as DRB.UEThpDl.NewFilter to represent RedCap UE throughput when the value of NewFilter is RedCap.

The subcounters filtered by the new filter with the value of RedCap can be used as metrics of RedCap UE throughput.

### 5.4.4 Evaluation of potential solutions

TBD

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| **End of changes** |