**3GPP TSG-SA5 Meeting #157 *S5-246103d1***

Hyderabad, India, 14 - 18 October 2024

**Source: China Unicom**

**Title: Add potential solution, evaluation and conclusion for EE KPI 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 method to evaluate the energy efficiency for RedCap network. In order to achieve the objective mentioned above, potential solution for EE KPI of RedCap is proposed in this contribution.

# 4 Detailed proposal

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

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| **1st Change** |

## 5.2 Use case #2: Monitoring EE KPI for RedCap service

### 5.2.1 Description

RedCap is a lightweight network access solution aiming at scenarios with low-cost, low-power, low-energy-consumption and low-speed requirements, mainly applying to industrial sensors, video surveillance, wearable scenarios.

As stated in 3GPP TS 28.554 [7], clause 6.7, the network Energy Efficiency (EE) KPI is related to the performance and the energy consumption of the network providing the specific service. When network delivers communication services for RedCap UEs, there has some impacts on the evaluation of EE:

- In the aspect of performance, the key performance of RedCap service is different from the services such as eMBB, URLLC and MIoT (higher than MIoT but lower than URLLC and eMBB).

- In the aspect of energy consumption, 3GPP has introduced some complexity reduction features (such as bandwidth reduction and eDRX) for RedCap. These new features may have some impacts on the energy consumption of network which should be evaluated separately.

However, 3GPP TS 28.554 [7] only provides EE KPIs for eMBB, URLLC and MIoT. How to evaluate the EE for RedCap service should be investigated.

### 5.2.2 Potential requirements

**REQ-RedCap-Perf-EE-1:** The 3GPP management system should have capability to evaluate the energy efficiency for RedCap service.

### 5.2.3 Potential Solutions

#### 5.2.3.1 Potential solution #1

The RedCap EE KPI can reuse the method for network slice with some enhancements in granularity. The generic EE KPI for RedCap service can be defined as follows:

For the *Performance of RedCap*, it can be set according to different RedCap services. TS 38.875[6] specifies typical RedCap use cases including industrial wireless sensors, video surveillance and wearables. These uses cases have different performance requirements in the aspects of bit, latency or reliability, which are similar to the performance of network slices. Therefore,

* If the RedCap service has the eMBB slice property, the *Performance of RedCap* can be set as the data volume of RedCap service, which refers to 6.7.2.2 in TS 28.554 [7];
* If the RedCap service has the URLLC slice property, the *Performance of RedCap* can be set as latancy/data volume of RedCap service, which refers to 6.7.2.3 in TS 28.554 [7];
* If the RedCap service has the MIoT slice property, the *Performance of RedCap* can be set as the number of registered subscribers of RedCap or the number of active RedCap UEs, which refers to 6.7.2.4 in TS 28.554 [7].

For *Energy Consumption of RedCap*, it can be estimated as the proportion of the total estimated NF energy consumption, where the proportion is calculated in RedCap granularity. Take gNB as an example, the proportion can be obtained by dividing the data volume for RedCap services by the total volume.

### 5.2.4 Evaluation of potential solutions

The possible solution described in clause 5.2.3.1 provide a method to evaluate the EE for RedCap service, which is based on the way for network slices in TS 28.554 [7]. The change is lightweight and and largely reuses existing methods.

In summary, the solution described in clause 5.2.3.1 is feasible.

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| **2nd Change** |

## 6.X Use case #2: Monitoring EE KPI for RedCap service

This use case investigates the EE KPI for RedCap service. Since 3GPP TS 28.554 only provides EE KPIs in network slice granularity, it cannot reflect the EE for RedCap service. Potential solution provides a method to evaluate the EE for RedCap service by reusing EE KPI for network slice with some enhancements in granularity.. Detailed description about this solution is shown in clause 5.2.3.

It is recommended to make some enhancements on EE KPI according to this solution in the future normative work to satisfy the requirements for the evaluation of EE for RedCap services.

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| **End of changes** |