**3GPP TSG-SA5 Meeting #156 *S5-244815d1***

**Maastricht, NL, 19 - 23 Aug 2024**

**Source: China Unicom**

**Title: pCR TR 28.876 Update requirement and add potential solution 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: EE KPI for RedCap

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

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

TR 38.875[6] clause 5 specifies the specific requirements for RedCap service in the following use cases: industrial wireless sensors, video surveillance and wearables. Although the performance requirements for RedCap use cases are not identical, they all necessitate considerations regarding throughput, connection number, latency or reliability, similarto the performance metrics of network slices for EE.

Therefore, this solution proposes to refer to the calculation method of network slice level energy consumption and energy effiency which are defined in TS 28.554, with some enhancements on the filter to obtain energy efficiency for RedCap service. The detailed solution is shown as follows:



* The denominator of energy efficiency is the energy consumption of RedCap service which can be calculated as the RedCap proportion of the NFs energy consumption, where the proportion can be calculated as the data volume, the mean number of registered subscribers or the mean number of PDU sessions of the RedCap service relatively to the overall performance of the NFs.
* The numerator of energy efficiency is the performance of RedCap service which can be defined according to the different requirements for different use cases.

Take the industry sensors scenario as an example, the use case has a requirement on connection number, then the numerator of RedCap energy efficiency is the RedCap UE RRC connection number. Consequently, the RedCap energy efficiency in this use case is the number of connected RedCap UEs per kWh.

To sum up:

* This solution proposes to reuse the exsting mechanism to calculate the RedCap energy efficiency KPI with some enhancements on obtaining RedCap subcounters.

### 5.2.4 Evaluation of potential solutions

TBD

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| **End of changes** |