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**pCR Title: Update Use case on energy saving service for UE**

**Draft Spec: 3GPP TR 22.883**

**Agenda item: 7.2 (FS\_EnergyServ\_Ph2)**

**Document for: Approval**

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*Abstract: This pCR proposes the update of clause 5.1 on the use case on energy saving service for UE.*

**1. Introduction**

This contribution proposes to update the use case “Energy saving service for UE”.

**2. Reason for Change**

This contribution proposed to slove the existing editor’s notes.Editor’s Note: Levels of UE energy saving services is FFS.

Regards to above Editor’s Note, considering the level of UE energy saving services is related with solutions aspects. So this contribution proposes to update the description about level of UE energy saving services. Basiclly, the use case proposes that the network could provide different UE energy saving service options for the subscribers. Also the description of the UE energy saving services are updated to explain the possible network mechnisms to support the service.

Editor’s Note: It is FFS if the network can support UE to save energy (communication part) without degrading UE’s service experience.

In order to solve above Editor’s Note, this contribution proposes to add the reference to some potential mechnisms in the radio access network as the examples.

Editor’s Note: It is FFS whether PRs are already supported.

Regards to above Editor’s Note, considering that the currenet PRs are not covered by the existing specification, so it is proposed to remove this EN.

**3. Conclusions**

It is proposed to update the use case in clause 5.1 to solve the editor’s note.

**4. Proposal**

It is proposed to agree the following changes to clause 5.1 of 3GPP TR 22.883.

\* \* \* First Change \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TR 22.882: "Study on Energy Efficiency as a service criteria".

[3] 3GPP TS 22.261: "Service requirements for the 5G system".

[4] ETSI EN 303 472: "Environmental Engineering (EE); Energy Efficiency measurement methodology and metrics for RAN equipment".

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

[6] Internet draft "Green networking metrics"; draft-cx-opsawg-green-metrics

[7] Internet draft " Challenges and Opportunities in Management for Green Networking"; draft-irtf-nmrg-green-ps

[8] ETSI GS OEU 020 (v1.1.1): "Operational energy Efficiency for Users (OEU); Carbon equivalent Intensity measurement; Operational infrastructures; Global KPIs; Global KPIs for ICT Sites".

[9] <https://ghgprotocol.org/corporate-value-chain-scope-3-standard>. Accessed 05/08/2024.

[10] 3GPP TS 23.041: "Technical realization of Cell Broadcast Service (CBS)".

[11] 3GPP TR 23.700-66: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".

[12] E. D. Fitkov-Norris and A. Khanifar, "Dynamic pricing in mobile communication systems," First International Conference on 3G Mobile Communication Technologies, London, UK, 2000, pp. 416-420, doi: 10.1049/cp:20000083.

[x] 3GPP TR 38.869: " Study on low-power wake-up signal and receiver for NR".

\* \* \* Second Change \* \* \* \*

## 5.1 Use case on energy saving service for UE

### 5.1.1 Description

With the development of mobile networks, 5G is expected to accommodate more and more services, e.g., AR, XR, which will cause higher energy/power consumption at the device side. However, considering the users’ experience, the weight of all kinds of AR and/or XR glasses needs to be strictly controlled to be very light, the battery weight, size and capacity of these glasses are very limited. Only in this way, the users will be willing to order new devices and services.

To achieve providing immersive service experience, the 5G system is required to provide a long-time high data rate data transmission with low energy/power consumption on the device. Considering end-to-end energy efficiency, the energy consumption of the overall 5G system also needs to be optimized.

To achieve energy efficiency, the operator will need to introduce the concept of energy as a service to provide different energy saving services for subscribers. For users, when subscribing specific network services (e.g., for AR, XR applications), they will have the opportunities to choose the energy saving services based on their requirement.

### 5.1.2 Pre-conditions

Operator or 3rd party (acting as service provider) is offering different energy saving services in some areas.

Operator A, who has a high sense of responsibility for sustainability development, offers multiple energy saving service options at different prices or incentives for subscribers to reduce energy consumption and extend their battery life with respect to the required service experience. Considering the coordination between device, 5G network and application server, different energy saving services may be as following:

* UE energy saving service option A: Reducing UE energy consumption by applying certain energy saving features in the radio network (e.g., LP-WUS, as described in TR 38.869 [x]) whilst maintaining the service experience (e.g., low latency, high throughput).
* UE energy saving service option B: Reducing UE energy consumption by adjusting certain network policies which may impact the service experience.

NOTE 1: The operator may offer one or multiple UE energy saving services to the subscribers based on its network deployment. Different services may according to different prices or incentives. The subscriber may subscribe the services based on the device capability and the preference.

### 5.1.3 Service Flows

1. John bought a new pair of AR glasses, and subscribed the application service published by operator A, with energy saving service option A or B.

2. Operator runs the 5G network and provides communication service to John.

3. When the battery is fully charged or John is easy to charge his AR glasses, no energy saving service option is applied. In this case, it is possible that the energy/power consumption of the AR glasses of John is high.

4. When the battery capacity drops to 20%, and John has no possibility to charge the AR glasses in time, he turns his AR glasses into energy saving mode or requests to enter energy saving mode.

- If John chooses or subscribes UE energy saving service option A, the service experience is not affected. Some energy saving features (e.g., LP-WUS) may be leveraged by the network to improve the energy efficiency to lower the UE energy/power consumption without degrading the service experience.

- If John chooses or subscribes UE energy saving service option B, according to UE consent, the network will modify the network policies, for example, QoS modification, to further realize the trade-off between the service experience and the UE energy consumption.

5. Operator applies the selected energy saving service option, monitors and optimizes the energy efficiency and energy consumption at UE granularity.

### 5.1.4 Post-conditions

John is able to experience the AR immersive service with extended battery life, according to the subscribed energy saving service options.

### 5.1.5 Existing features partly or fully covering the use case functionality

No existing features are identified.

### 5.1.6 Potential New Requirements needed to support the use case

[PR.5.1.6-1] The 5G network shall be able to support a mechanism for the subscriber to provide their preference for the energy saving actions to be provided by the network, e.g., by providing energy saving service options to the subscriber.

NOTE 1: The mapping between energy saving service options and network actions is defined by the operator.

NOTE 2: This mechanism is not assumed to increase the overall 5G system energy consumption compared with the case not applying the energy saving actions.

\* \* \* End of Change \* \* \* \*