**3GPP TSG- SA1 Meeting # 105 [S1-2402](file:///E:\\TSGS1_104_Chicago\\docs\\S1-233283.zip)14**

**Athens, Greece, 26 Feb - 1 March 2024** *revision of [S1-240080](file:///E:\\TSGS1_104_Chicago\\docs\\S1-233283.zip), S1-233283*

**Source: China Mobile**

**Title: Study on Energy as Service Criteria Ph2**

**Document for: Approval**

**Agenda Item: 4**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>   
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on Energy as Service Criteria Ph2

Acronym: FS\_EnergyServ\_Ph2

Unique identifier:

Potential target Release: Rel-20

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | x | x | x | Application Service Enabler Aspects |
| No |  |  |  |  |  |
| Don't know | x |  |  |  |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
| X | Study |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

**\* Other = e.g. testing**

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |  |  |  |
| --- | --- | --- | --- |
| Parent Work / Study Items | | | |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| FS\_EnergyServ | SA1 | 960019 | Study on Energy Efficiency as service criteria |
| EnergyServ | SA1 | 1000033 | Energy Efficiency as service criteria |

### 2.3 Other related Work Items and dependencies

|  |  |  |
| --- | --- | --- |
| Other related Work /Study Items (if any) | | |
| Unique ID | Title | Nature of relationship |
| 870021 | Study on new aspects of EE for 5G networks | This study considered energy efficiency from OAM perspective. |
| 810023 | Energy Efficiency of 5G | This study considered energy efficiency from OAM perspective. |
| 760064 | Study on system and functional aspects of Energy Efficiency in 5G networks | This study considered energy efficiency from OAM perspective. |
| 710049 | Study on Energy Efficiency Aspects of 3GPP Standards | This study considered energy efficiency from SA aspects. |
| 940036 | Study on new aspects of EE for 5G networks Phase 2 | This study considered related topics to those of this study. |
| 940037 | Enhancements of EE for 5G Phase 2 | This study considered energy efficiency from OAM perspective. |
| 940080 | Study on network energy savings | This study considered energy saving from RAN side. |

# 3 Justification

Following the study and work on Energy Efficiency as service criteria in R19, more scenarios can be studied to further address the improvement of energy saving and energy efficiency from end-to-end perspectives.

For example, energy as service criteria have been considered so far within a single network (PLMN or NPN), for services served by multiple PLMNs (i.e. roaming case, network sharing, etc), different energy consideration and different capabilities of the networks need to be considered, related information exchange and other functional requirements may be needed.

In addition, energy availability for network elements and functions may be limited and/or intermittent, in particular when relying on batteries and/or renewable energy sources (e.g. onboard satellites etc) or during power grid disruptions. For low-orbit satellite, energy is usually limited, the limitation of total energy consumption of RAN or 5GC NF on satellite will need to be consider as a prerequisite when considering the communication service (e.g. TN/NTN selection, QoS requirements etc). However, the energy impact/cost of retrieving and/or providing this information within the 5GS should also be considered.

In the SA1 Rel-19 work study, only best-effort service was considered with policy to limit energy consumption. In this release, However, services with stringent QoS requirements should be studied to which extent they could take into account energy service criteria as well (e.g. user preferences or operator policies) and/or be impacted by energy availability limitations.User awareness and/or consent should be considered.

Besides, a study on network support for UE energy saving is also needed. There are existing work and mechanisms in RAN to study how to do energy saving in RAN side, however, it’s worth study whether more aspects can be involved especially for system level support to further assist energy saving and achieving energy-related service policies, including on UE.

The studies of SA, SA2, SA4, SA5 and RAN and especially ongoing work on energy efficiency will be taken into account as the starting point and cooperation of this study in SA1.

# 4 Objective

This study is aiming at identifying use cases, providing gap analysis and defining potential requirements in the following aspects regarding enhancement on energy as service criteria.

The objectives include:

- Support energy-related service criteria of a network subscriber involving roaming .

- Support energy-related service criteria of a network subscriber involving network sharing.

- Information exposure on the changes of energy-related characteristics of the service (i.e. energy supply mix, or changes to carbon footprint, limited energy capacity and availability) to users or 3rd party.

- Potential dynamic adjustments of the delivered service (e.g. according to network decision, or based on user preference or agreement between 3rd party and network, etc.) resulting from the changes of energy-related characteristics of this service.

- Network support on enable UE to achieve end-to-end energy related service criteria under UE awareness (e.g. UE inform network to enable some energy saving actions to satisfy end-to-end energy criteria, etc.)

Note: Existing mechanisms and work on UE energy saving need to be considered to find the gaps. New requirements and actions should not conflict with existing mechanisms.

- Any impact on security, charging and privacy & trust for the scenarios above, in particular when sharing energy-related and other information across multiple stakeholders.

# 5 Expected Output and Time scale

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| New specifications {One line per specification. Create/delete lines as needed} | | | | | |
| Type | TS/TR number | Title | For info  at TSG# | For approval at TSG# | Rapporteur |
| TR |  | Study on Energy Efficiency as Service Criteria Ph2 | SA#106 | SA#107 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} | | | |
| TS/TR No. | Description of change | Target completion plenary# | Remarks |
|  |  |  |  |

# 6 Work item Rapporteur(s)

# 7 Work item leadership

SA1

# 8 Aspects that involve other WGs

SA2 for specifications regarding energy efficiency architecture enhancement, SA4 for specifications regarding energy efficiency considering media applications etc., SA5 for specifications regarding energy efficiency from OAM and charging, RAN for specifications regarding energy efficiency on RAN side

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| China Mobile |
| vivo |
| ZTE |
| Rakuten Mobile |
| MediaTek |
| SK Telecom |
| LG Uplus |
| Samsung? |
| Huawei? |
| Nokia |
| Nokia Shanghai Bell |
| Qualcomm? |
| Xiaomi |
| TNO |
| KPN |
| Telefonica |
| CATT |