**3GPP TSG-SA5 Meeting #158 *S5-246933***

**Orlando, USA, 18 - 22 November 2024**

**Source: Huawei (moderator), China Unicom**

**Title: New** **WID on Charging for Ambient power-enabled Internet of Things**

**Document for: Approval**

**Agenda Item: 7.2**

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: New WID on Charging for Ambient power-enabled Internet of Things

Acronym: AmbientIoT\_CH

Unique identifier:

{A number to be provided by MCC at the plenary}

Potential target Release: Rel-19

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  |  | X | X |  |
| No | X | X |  |  | X |
| Don't know |  |  |  |  |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

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

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

## 2.2 Parent Work Item

{"Parent" Work Item refers to the related, earlier-Stage, Work Item, e.g. the related Stage 1 Work Item shall be indicated here when a Stage 2 normative Work Item or Study Item is presented. "Parent" Work Item can also refer to the related preceding Study Item e.g. the related Study Item and the earlier-stage Work Item shall be indicated here when a normative-work Work Items is started. List here all parent Work Items of which requirements are either fully or partially covered by the proposed Item. }

{This section is mandatory to be filled out by the rapporteur. This section is to be filled with care: it indicates to the companies monitoring the parent Work Item that it will be addressed in this study/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) |
| AmbientIoT | SA2 |  | Architecture support of Ambient power-enabled Internet of Things |

### 2.3 Other related Work Items and dependencies

{List here other Work Items which relate to the proposed one, such as a Work Item in an earlier Release if further enhancing the feature from the previous Release)}

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 950004 | Study on Ambient power-enabled Internet of Things | The Rel-19 study (SA1) on the stage 1 service requirement of Ambient IoT |
| 1020030 | Stage 1 of Ambient power-enabled Internet of Things | The Rel-19 normative work (SA1) on the stage 1 service requirement of Ambient IoT |
| 1020071 | Study on Architecture support of Ambient power-enabled Internet of Things | The Rel-19 study (SA2) on the architecture support of Ambient IoT |
|  |  |  |

# 3 Justification

Ambient power-enabled Internet of Things (Ambient IoT) is a new type of 3GPP IoT technology that is powered by energy harvesting (e.g. radio wave, light, motion, etc), being either battery-less or with limited energy storage capability (e.g. using a capacitor). Combining Ambient IoT with cellular network, operator can provide Ambient IoT Services (e.g. inventory) to third party applications, especially for vertical industries (e.g. smart manufacturing, logistics and warehousing).

For instance, per TS 22.369 caluse 4.3, one typical use case of Ambient IoT Services is inventory, i.e. discover what goods (e.g. boxes, containers, packages, tools) are present in a specific area. Upon request sent by the network within the specific area, Ambient IoT devices attached to these goods report an identifier associated with the good, which is possibly in a periodical manner.

Based on the use cases, SA1 specified the charging requirement for using Ambient IoT services in TS 22.369 clause 5.2.5, i.e. *“The 5G system shall be able to collect charging information in a suitable way for using Ambient IoT services on per Ambient IoT device basis or a group of Ambient IoT devices (e.g., total number of communications per charging period).”*.

From the architecture perspective, the exposure of Ambient IoT service is supported via NEF towards the AF, and there are five types of Ambient IoT services (i.e. inventory, read, write, disable, enable) for both topology 1 and topology 2. This makes it possible to support the charging for using Ambient IoT services based on the exposure function northbound API charging specified in TS 32.254.

To support the charging for using Ambient IoT services, the charging system may be enhanced, e.g. the enhancement to the exposure function northbound API charging.

Note: the scope may be adjusted to align with SA2 conclusion.

# 4 Objective

The objective of the work item is to specify the charging support for Ambient power-enabled Internet of Things by enhancing the exposure function northbound API charging, with the following tasks.

- WT-1: Specify the charging requirement and principle for using Ambient IoT Services, e.g. inventory, command.

- WT-2: Specify the charging information for using Ambient IoT services, e.g. service request identifier, report periodicity.

## TU estimates and dependencies

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Work Task ID** | **TU Estimate****(Study)** | **TU Estimate****(Normative)** | **RAN Dependency****(Yes/No/Maybe)**  | **SA Dependency****(Yes/No/Maybe)** | **Non-3GPP Dependency** |
| WT-1 | 0 | 2 | Maybe | Yes | No |
| WT-2 | 0 | 2 | Maybe | Yes | No |

**Total TU estimates for the study phase: 0**

**Total TU estimates for the normative phase: 4**

**Total TU estimates: 4**

# 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 |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| TS 32.254 | Introduce the charging principle, procedure, and potentially new charging information for Ambient IoT Services in a normative Annex. | TSG SA #107(June, 2025) |  |
| TS 32.240 | Introduce the charging for Ambient IoT Services | TSG SA #108(June, 2025) |  |
| TS 32.291 | Enhancement to Open API | TSG SA #108(Sep, 2025) |  |
| TS 32.298 | Enhancement to CHF CDR ASN.1 | TSG SA #108(Sep, 2025) |  |

# 6 Work item Rapporteur(s)

# 7 Work item leadership

SA5

# 8 Aspects that involve other WGs

SA2 on the architecture and identification of Ambient IoT Services.

# 9 Supporting Individual Members

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| --- |
| Supporting IM name |
| Huawei |
| China Unicom |
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