**3GPP TSG-SA3 Meeting #123 S3-252935**

**Goteburg, Sweden, August 25 - 29, 2025** **(revision of S3-25XXXX)**

**Source: OPPO, Huawei, HiSilicon**

**Title: Revised WID on Ambient IoT Security**

**Document for: Approval**

**Agenda Item: 6**

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: Security Aspects of Ambient IoT Services in 5G for Isolated Private Networks

Acronym: AmbientIoT-SEC

Unique identifier: *1070022*

Potential target Release: Rel-19

# 1 Impacts

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

# 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 |
|  | 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\_AmbientIoT | SA1 | 950004 | R19 Study on Ambient power-enabled Internet of Things |
| FS\_Ambient\_IoT\_RAN | RAN | 970078 | R18 Study on Ambient IoT (Internet of Things) in RAN |
| AmbientIoT | SA1 | 1020030 | R19 Stage 1 of Ambient power-enabled Internet of Things |
|  |  |  |  |

### 2.3 Other related Work Items and dependencies

|  |  |  |
| --- | --- | --- |
| Other related Work /Study Items (if any) | | |
| Unique ID | Title | Nature of relationship |
| 1020071 | Study on Architecture support of  Ambient power-enabled Internet of Things | R19 SA2 AIoT study focuses on architectural impact and solutions to address the service and system requirements that have been identified by SA1 and RAN. |
| 1020085 | Study on solutions for Ambient IoT (Internet of Things) in NR | R19 RAN AIoT study focuses on solutions for Ambient IoT in NR to address requirements that have been identified by RAN. |
| XXXXXX | Solutions for Ambient IoT (Internet of Things) in NR | R19 RAN normative WID |
| XXXXXX | R19 Architecture Support of Ambient power-enabled Internet of Things | R19 SA2 WID on architecture support of AIoT |

**Dependency on non-3GPP (draft) specification: N/A**

# 3 Justification

SA1 specifies in TS 22.369 the service and performance requirements for ambient power-enabled Internet of Things (i.e. Ambient IoT). Ambient IoT device is an IoT device powered by energy harvesting, being either battery-less or with limited energy storage capability (e.g. using a capacitor). An Ambient IoT device has low complexity, small size and lower capabilities and lower power consumption than previously defined 3GPP IoT devices (e.g. NB-IoT/eMTC devices). Ambient IoT devices can be maintenance free and can have long life span (e.g. more than 10 years).

RAN WGs has investigated RAN level solutions for Ambient IoT in TR 38.769 for various traffic types and connectivity topologies.

SA2 has progressed a study to investigate solutions for architectures to support Ambient IoT, identifier of Ambient IoT Device and end-to-end procedure of Ambient IoT Services (Inventory and Command) in TR 23.700-13.

SA3 has progressed a feasibility study on security aspect of 5G Ambient IoT (AIoT) focusing on key issues, threat analysis, security requirements that are required to support secure AIoT services in 5G for isolated private networks. Some key issues have reached partial conclusions

# 4 Objective

This work item aims to specify the security support for the Ambient IoT Devices and Ambient IoT Services in isolated private netsworks taking into account as much as possible the preliminary conclusions in draft TR 33.713 (Clause 7), focusing on Device 1 in Topology 1. The scope in Release 19 is limited to Ambient IoT in isolated private networks only as per SA decision outlined in SP-250852.

Specifically, the work item objectives are:

1. Network Layer Authentication between AIoT device and 5G core of isolated private networks
   1. AIoTF is the endpoint in the 5G core
   2. Credentials are securely stored in the ADM on the network side

NOTE 1: The credentials are assumed to be stored in a secure environment in the ADM. How this is realized is left to implementation. The requirements will reflect this.

* 1. Secure storage and processing of credentials in the AIoT device

NOTE 2: For isolated private network deployment the storage of the credentials of non-AKA based methods is out of scope as described in TS 33.501 Annex I 2.2.

* 1. Security aspects of the storage of the credentials at the ADM

2. Confidentiality, anti-replay and integrity protection of information during AIoT service communication

3. Privacy of AIoT device identifiers using the AIoT Temp ID as concluded in TR 33.713.

4. Security to protect the permanent disabling RF transmission capabilities of AIoT device(s) as concluded in TR 33.713.

TU estimates

|  |  |
| --- | --- |
| Work Task ID | TU Estimate  (Normative) |
| Objective #1 | 6 |
| Objective #2 | 3 |
| Objective #3 | 4 |
| Objective #4 | 1 |

Total TU estimates for the normative phase: 14.

# 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 |
| TS | 33.369 | Security Aspect of Ambient IoT services in 5G in isolated private networks | *TSG#108*  *(June 2025)* | *TSG#109*  *(Sep 2025)* | Marcus Wong  [marcus.wong@oppo.com](mailto:marcus.wong@oppo.com)  *Guo Longhua* [*guolonghua@huawei.com*](mailto:guolonghua@huawei.com) |

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

# 6 Work item Rapporteur(s)

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# 7 Work item leadership

SA3

# 8 Aspects that involve other WGs

*SA2 is responsible for the system architectural aspects of Ambient IoT in 5G.*

*RAN working groups are responsible for RAN aspects.*

*SA5 for the Charging and OA&M aspects.*

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| OPPO |
| Huawei |
| HiSilicon |
| Intel |
| Lenovo |
| Inter Digital |
| China Unicom |
| Sony |
| Vivo |
| Xiaomi |
| China Mobile |
| Philips |
| Cable Labs |
| CATT |
| ZTE |
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