**SA WG2 Meeting #161 S2-240XXXX**

**Athens, Greece, February 26 - March 1, 2024 (revision of S2-2402499)**

**Source: China Mobile**

**Title: New Solution on Registration procedure for Ambient IoT Devices**

**Document for: Approval**

**Agenda Item: 19.14**

**Work Item / Release: FS\_AmbientIoT /Rel-19**

# 1. Introduction

This solution addresses key issue on Identification, Subscription, Registration and Connection management for Ambient IoT Devices.

# 2. Text Proposal

It is proposed to capture the following changes vs. TR 23.700-13.

\* \* \* \* First change(all new) \* \* \* \*

## 6.0 Mapping of Solutions to Key Issues

Table 6.0-1: Mapping of Solutions to Key Issues

|  |  |
| --- | --- |
|  | Key Issues |
| Solutions | Key Issue #1 | Key Issue #2 | Key Issue #3 |
| #X | √ |  |  |
|  |  |  |  |

## 6.X Solution #X: Registration procedure for Ambient IoT Devices

### 6.X.1 Description

This solution is for Key Issue #2 "Identification, Subscription, Registration and Connection management".

As depicted in Architecture Requirements, the traffic types of DT and DO-DTT will be studied in this stage. The Ambient IoT devices could be driven by network for Topology1 or UE for topology 2 before registering to the network. This proposal proposes one potential mechanism for identification, subscription, registration management and the registration procedures as well.

The principles are given as below:

- A new network function named Ambient IoT NF may be adopted to manage Ambient IoT devices and procedures. If not, this relevant function can be supported by AMF.

- In 5GC, each Ambient IoT device has the unique internal ID which consists of at least MCC, MNC and Company. Optionally, the group ID in terms of the client or the type of item may be contained in the device ID.

### 6.X.2 Procedures

### 6.X.2.1 Procedures for AF triggered Registration

The following figure presents a procedure of AF triggered registration for Topology 1.

5. AF Triggered Registration Request (TID lists, EPC info …)

8. AF Triggered Registration Response

10. AF Triggered Registration Response

1. AF Triggered Registration Request ( TID Lists, EPC info lists, Location, …)

 2. AMF or New Ambient IoT NF selection

9. AF Triggered Registration Response

3. AF Triggered Registration Request (TID lists, TA Lists, EPC info …)

AMF or New

Ambient IoT NF

Ambient AF

fd

AAA

NEF

NG-RAN

Ambient IoT Device

1. Pre-configuration

4. NG-RAN Selection

 6. Device Access

 7. Authentication and Registration

UDM

 **Figure 6.X.2-1 AF triggered Registration Procedure for Topology 1**

 0. The Ambient IoT devices are pre-configured with default internal AIoT device ID and credentials.

 The 5GC is pre-configured with the default Ambient IoT devices profile which contains the device ID and credentials too. The default internal AIoT device ID only contains MCC, MNC and Company info , without product info, serial number and so on.

1. AF triggers registration and sends AF Triggered Registration Request to NEF. The service information such as EPC code list, TID code list and the location information may be included.
2. The NEF selects an AMF or Ambient IoT NF that supports Ambient IoT services based on the location information. It will map the location information into TA list.
3. The NEF sends AF Triggered Registration Request to the AMF/Ambient IoT NF, including the TID list, EPC info, the TA list.
4. The AMF/Ambient IoT NF selects NG-RAN based on the TA list.
5. The AMF/Ambient IoT NF forwards the registration request to NG-RAN, including TID list , EPC info , and so on.
6. NG-RAN activates the AIoT devices based on TID list. The devices matched TID list access and register to the network via NG-RAN with EPC info. A receiving limit time may be configured on NG-RAN. Once timeout, the message received after this time will be discarded by NG-RAN.
7. The AIoT devices perform interaction with 5GC for Authentication/Security. After successful registration, 5GC will generate full internal AIoT device ID, containing MCC, MNC, Company info, product info, serial number based on EPC info.
8. The NG-RAN returns the Response to the AMF/Ambient IoT NF.
9. The AMF/Ambient IoT NF returns the response to the NEF.
10. The NEF returns AF Triggered Registration Response to the AF.

### 6.X.2.2 Procedures for UE triggered Registration

For Topology 2, the registration may be triggered by UE which performs as a reader. The UE interact with AMF or Ambient IoT NF via NG-RAN, which could be regarded as the supplement for AF triggered registration procedure.

Editor’s Notes: The procedure for UE triggered registration is FFS.

### 6.X.3 Impacts on services, entities and interfaces

NEF:

- The NEF supports conversion between the internal AIoT device ID and EPC code.

AMF/Ambient IoT NF:

-The AMF/Ambient IoT NF selects NG-RAN based on the TA list or gNB list and activates the AIoT devices.

UDM:

-The UDM stores the subscription information of Ambient IoT devices in group.

NG-RAN as a reader:

-The NG-RAN performs paging and receives response of Ambient IoT devices in Topology 1.

UE as a reader:

-The UE performs paging and receives response of Ambient IoT devices in Topology 2.

-The UE supports to trigger the registration procedure.

Ambient IoT device:

-The device stores the internal AIoT device ID or the group ID.

\* \* \* \* End of changes \* \* \* \*