**3GPP TSG-WG SA2 Meeting #170 *S2-250xxxx***

**Goteborg, SE, 25th Aug – 29th Aug, 2025 (revision of S2-2507250)**

**Source: Huawei, HiSilicon**

**Title: WT2 KI Support of DO-A Capable AIoT Devices**

**Document for: Approval**

**Agenda Item: 20.5.1**

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*Abstract: KI for WT2 on support of DO-A Capable AIoT Devices*

# 1. Introduction/Discussion

## 1.1 Introduction

The following is the Key Issue relating to the following WT in Study on Architecture support of Ambient power-enabled Internet of Things - Phase 2:

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| --- |
| **WT#2: Study the support of DO-A Capable AIoT Devices**, including:- Support of the AIoT Device informing the network of its presence autonomously (e.g., an AIoT Device initiated registration-like procedure).- Support for an autonomous AIoT Device originated procedure to send data to the AIOTF, and support for routing the received data by AIOTF.- Naiotf and Nnef interface enhancements to provide the data received from an AIoT Device to the AF.NOTE 4: topology 2 aspect of WT#2 has dependency on WT#1. |

## 1.2. Updates after Submission

### 1.2.1 Inputs to SA2#170

The following contributions and the listed aspects were identified and a summary of inputs is provided in the Annex:

- S2-2506353 (Oppo)

- S2-2506369 (China Telecom)

- S2-2506495 (Qualcomm)

- S2-2506539 (Ericsson)

- S2-2506685 (Samsung)

- S2-2506711 (Tejas Networks)

- S2-2506922 (Lenovo et al)

- S2-2506949 (ZTE)

- S2-2507008 (China Mobile)

- S2-2507027 (vivo)

- S2-2507041 (LG Electronics)

- S2-2507062 (NTT DOCOMO)

 S2-2507096 (CATT)

- S2-2507250 (Huawei et al)

- S2-2507331 (InterDigital)

- S2-2507365 & S2-2507366 (Xiaomi)

- S2-2507414 (HONOR)

### 1.2.2 Topics for Discussion

The following additional aspects from the KI input contributions have also been considered for the proposed KI update:

a. Triggers for the AIoT Device to inform the network of its presence,

b. Separate descriptions for sending data to the AIOTF and sending data to AF(s),

c. RAN-CN signalling updates,

d. Support of Inventory,

e. Support of Rel-19 command procedure,

f. Reader configuration,

g. Device profile (subscription) enhancements,

h. Device context management,

i. Whether and how to support AF requirement/request to support of DO-A Capable AIoT Device,

j. Monitoring capability for AIoT Devices,

k. Informing Readers about AIoT Devices presence,

l. Available Reader discovery by AIoT Devices,

m. Balance between power consumption and service availability,

n. Support of service continuity,

o. Priority of the sensor data collection of the DO-A Capable AIoT Devices,

p. Preventing/enabling an AIoT Device from sending data, and

q. Configuration data from the AF for an AF (e.g., data periodicity).

# 2. Text Proposal

It is proposed to capture the following changes vs. TR 23.700-30.

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

## 5.X Key Issue #X: Support of DO-A Capable AIoT Devices

This key issue will study the system architecture to support DO-A capable Ambient IoT Devices in Topology 1 and Topology 2.

The following aspects will be studied:

1.- Providing configuration required (if any) for enabling DO-A service to a capable Reader.

2.- How an AIoT Device discovers the available Readers for DoA traffic.

3.- How the AIoT Device informs the network of its presence autonomously (e.g., an AIoT Device initiated registration-like procedure) and what are the triggers for the DO-A capable device to inform the network of its presence.

4.- Management of AIoT Device and service context within the network, e.g., under device mobility scenario.

5.- How are Readers informed about an AIoT Device’s presence and it has data ready to be sent.

6.- Whether and how to keep the balance between power consumption and service availability DO-A Capable AIoT Devices.

7.- How an AIoT Device sends data to the AIOTF autonomously.

8.- Support for routing data received by AIOTF from an AIoT Device to an AF.

9.- Whether and how to trigger/stop the AIoT Device from sending DO-A traffic.

10.- Whether and how DO-A AIoT Devices interact with Inventory and Rel-19 NAS Command procedures.

11.- Naiotf and Nnef interface enhancements to provide a monitoring capability for AIoT Devices to, e.g., indicate when data can be sent to the AIoT Device, and data received from an AIoT Device.

12.- Whether and how to support service continuity for DO-A Capable AIoT Devices.

13.- Whether and how to support different priority of the sensor data collection of the DO-A Capable AIoT Devices.

14.- Whether and how to provision DO-A traffic configuration (e.g., DO-A traffic period information) to the network and support AF requirement/requests to support of DO-A Capable AIoT Devices.

15.- Identify any additional CN-RAN aspects that may require further work/coordination with RAN WGs.

NOTE: The conclusions from Key Issue #Y are the basis for supporting DO-A capable AIoT Devices in topology 2 in this key issue.

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

# Annex: Summary of Inputs

**S2-2506353 (Oppo):**

- Support of the AIoT Device informing the network of its presence autonomously.

- Support for an autonomous AIoT Device originated procedure to send data to the AIOTF, and support for routing the received data by AIOTF.

- Namf, Naiotf and Nnef interface enhancements to provide the data received from an AIoT Device to the AF and responses from the AF to the AIoT Device.

NOTE: Topology 2 aspect of KI#2 has dependency on KI#1.

**S2-2506369 (China Telecom):**

* Study when and how the DO-A Capable AIoT Devices informing the network of its presence autonomously and DOA Capable;
* Study when and how the DO-A Capable AIoT Devices autonomously originated procedure to send data to the AIOTF or AF;
* Study how the DOA information transfer for AIoT Device, related system functionality and AF, including the DOA informaiton transfer for an AIoT Device and for a group of AIoT Devices.
* NOTE : ALL above key issues apply to topology 1 and topology 2.

**S2-2506495 (Qualcomm):**

- How the DO-A capable device can perform a procedure to inform the network of its presence (e.g. registration-like procedure towards the network).

- What are the triggers for the DO-A capable device to inform the network of its presence.

- How the DO-A capable device can autonomosuly send DO-A data to the AIOTF.

- How the AIOTF sends the data received from a DO-A device to the appropriate AF(s).

- How new procedures co-exist with the inventory procedure and command procedure.

- Whether any enhancements are required for the RAN-CN signalling.

NOTE 1: any enhancements to RAN-CN signalling are to be coordinated with RAN WGs.

NOTE 2: Security aspects for the registration-like procedure and the protection of the DO-A data shall be addressed by SA3.

**S2-2506539 (Ericsson):**

- How the DO-A capable device can perform registration-like procedure towards the network.

NOTE X: During the registration-like procedure, the security parameter exchange and security context establishment between AIoT devices and AIOTF are to be studied by SA3.

- How the DO-A capable device can send DO-A data to the AIOTF.

NOTE Y: The protection of DO-A data is to be studied by SA3.

- How the AIOTF sends the received DO-A data to the right target AF(s).

- Wheter and how the inventory procedure and command procedure can be improved to make the communication between the DO-A capable AIoT devices and network more efficiently.

- Identify any additional CN-RAN aspects that may require further work/coordination with RAN WGs

**S2-2506685 (Samsung):**

- Support of the AIoT Device informing the network of its presence autonomously (e.g., an AIoT Device initiated registration-like procedure).

- Support for an autonomous AIoT Device originated procedure to send data to the AIOTF, and support for routing the received data by AIOTF.

- Naiotf and Nnef interface enhancements to provide the data received from an AIoT Device to the AF.

**S2-2506711 (Tejas Networks):**

* Procedure for signaling and configurations for supporting Registration like procedure for enabling DO-A service in a capable device.
* Procedures for signaling and configurations required (if any) for enabling DO-A service in a capable reader.
* Whether and how DO-A procedures interact with ongoing Inventory and command procedures.
* Whether and how Inventory and Command procedures for Rel-20 are impacted.
* Procedures for supporting DO-A data transfer from device to AIOTF and further routing from AIOTF to a suitable NF.
* Enhancements to Naiotf, Nnef interfaces to provide the data received from AIOTF to the AF.
* Enhancements to device profile data storage.

**S2-2506922 (Lenovo et al):**

* Study how to support the DOA-capable Devices access the network, notify the network about its presence autonomously, and manage the device and service context within the network, e.g., under device mobility scenario.
* Study how to support the autonomous uplink data transmission initiated by the DOA-capable Devices to an AF via the core network (routed by the AIOTF).
* Study how to enhance the Naiotf and Nnef interface to provide the data received from an AIoT Device to the AF.

**NOTE 3:** The topology 2 aspects of the key issue 2 has dependency on the key issue 1 progress.

**S2-2506949 (ZTE):**

- Study how the AIoT Device informs the network of its presence autonomously.

- Study how an autonomous AIoT Device originates the procedure to send data to the AIOTF, and how the AIOTF routes the received data.

- Study how to enhance Naiotf and Nnef interface to provide the data received from an AIoT Device to the AF.

NOTE: Topology 2 aspect of this key issue has dependency on the key issue of supporting AIoT service in Topology 2.

**S2-2507008 (China Mobile):**

- How to support attachment procedure (equivalent to registration and authentication) of DO-A capable AIoT device;

NOTE 1: The security level and the credentials used for this attachment procedure needs coordination with SA3.

- Whether and how to support mobility management of DO-A capable AIoT device for MT AIoT request and data transfer;

- How to support DO-A capable AIoT Device to initiate sending data to the AIOTF, including whether session management and UP is needed for data transfer;

- How to define and store device profile data of DO-A capable AIoT device;

- Whether and how to support co-existence of DO-A capable devices and DTT devices.

**S2-2507027 (vivo):**

- Support of the AIoT Device informing the network of its presence autonomously (e.g., an AIoT Device initiated registration-like procedure).

- Support for an autonomous AIoT Device originated procedure to send data to the AIOTF, and support for routing the received data by AIOTF.

- Naiotf and Nnef interface enhancements to provide the data received from an AIoT Device to the AF.

NOTE 4: topology 2 aspect of WT#2 has dependency on WT#1.

**S2-2507041 (LG Electronics):**

- Howto support the AIoT Device informing the network of its presence autonomously (e.g., an AIoT Device initiated registration-like procedure) and the exposure to the AF.

- How to support for an autonomous AIoT Device originated procedure to send data to the AIOTF, and support for routing the received data by AIOTF to the designated AF.

- SBI interface(e.g. Namf, Naiotf and Nnef) enhancements to support of DO-A Capable AIoT Device

- Whether and how to support AF requirement/request to support of DO-A Capable AIoT Device.

**S2-2507062 (NTT DOCOMO):**

This key issue will address the system architecture to support DO-A capable Ambient IoT Devices, especially on the following aspects:

- Support of the AIoT Device informing the network of its presence autonomously (e.g., an AIoT Device initiated registration-like procedure).

- Support for an autonomous AIoT Device originated procedure to send data to the AIOTF, and support for routing the received data by AIOTF.

- Naiotf and Nnef interface enhancements to provide the data received from an AIoT Device to the AF.

NOTE X: Topology 2 aspect of WT#2 has dependency on WT#1.

**S2-2507096 (CATT):**

This Key Issue aims to study the following aspects:

- Support of the AIoT Device informing the network of its presence autonomously (e.g., an AIoT Device initiated registration-like procedure), triggered by AIoT Device initiated DO-A traffic or mobility update.

- Support for an autonomous AIoT Device originated procedure to send data to the AIOTF, and support for routing the received data by AIOTF.

- Naiotf and Nnef interface enhancements to provide the data received from an AIoT Device to the AF.

NOTE 1: Topology 2 aspect of this KI has dependency on KI#1, and the work will not start until KI#1 is concluded.

NOTE 2: Conclusions of this KI will be coordinated with RAN WGs.

S2-2507250 (Huawei et al):

- Support of the AIoT Device informing the network of its presence autonomously (e.g., an AIoT Device initiated registration-like procedure).

- Support for an autonomous AIoT Device originated procedure to send data to the AIOTF, and support for routing the received data by AIOTF.

- Naiotf and Nnef interface enhancements to provide a monitoring capability for AIoT Devices to, e.g., indicate when data can be sent to the AIoT Device, and data received from an AIoT Device.

NOTE: The conclusions from Key Issue #Y are the basis for supporting DO-A capable AIoT Devices in topology 2 in this key issue.

**S2-2507331 (InterDigital):**

 - Study how are the network/Readers are informed about the AIoT device’s presence and it has data ready to be sent.

 - Study how the AIoT device discovers the available Readers for DoA traffic and how the Reader collects the DoA data from the device.

 NOTE: This issue requires coordination with RAN groups.

 - Study how the AIOTF and AF is determined for routing the received DoA data, and how Naiotf and Nnef interfaces are enhanced for data routing.

**S2-2507365 (Xiaomi):**Study the outdoor support of DO-A Capable AIoT Devices, including:

* Whether and how to keep the balance between power consumption and service availability of the outdoor DO-A Capable AIoT Devices (e.g. adaptive mornitoring and report).
* Whether and how to support the service continuity for the outdoor support of DO-A Capable AIoT Devices.

**S2-2507366 (Xiaomi):**

Study the sensor data collection support of DO-A Capable AIoT Devices, including:

* Whether and how to support the different priority of the sensor data collection of the DO-A Capable AIoT Devices.
* Which NFs and how to enhance these NFs to support the sensor data collection of the DO-A Capable AIoT Devices.
* Whether and how to support the mornitoring subscription and notification of sensor data collection (e.g. whether power consumption restriction).

**S2-2507414 (HONOR):**

- Support of the AIoT Device informing the network of its presence autonomously (e.g., an AIoT Device initiated registration-like procedure).

- Support for an autonomous AIoT Device originated procedure to send data to the AIOTF, including whether to trigger/stop the AIoT device for DO-A traffic, and support for routing the received data by AIOTF.

- Naiotf and Nnef interface enhancements including providing the data received from an AIoT Device to the AF, and potential DO-A traffic configuration (e.g., DO-A traffic period information).

NOTE: Topology 2 aspect of KI#x has dependency on KI#y.