**3GPP TSG-WG SA2 Meeting #165 *S2-2410745***

**Hyderabad, IN, 14th Oct – 18th Oct, 2024 (revision of S2-24010410)**

**Source: Huawei, HiSilicon**

**Title: Conclusion on key Issue 1 for Topology 1 Architecture**

**Document for: Approval**

**Agenda Item: 19.14.1**

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

*Abstract: conclusion principles are proposed on key issue 1 for topology 1 architecture.*

# 1. Introduction/Discussion

This is a revision of S2-24010410 which takes all the inputs related to KI1 (copied into Annex A for reference), sorts them into various categories and from then then presents the conclusion for Topology 1 aspects of KI1. Topology 2 and common aspects will be handled by revisions of other documents and together they form the conclusion for KI1.

The highlighting in the text in Annex A shows Topology 1 aspects and Topology 2 aspects. The remainder are considered common aspects.

# 2. Text Proposal

It is proposed to capture the following changes vs. TR 23.700-13, v1.0.0.

Foe guidance, the expected clause structure for clause 8.1 is:

8.1.1 General

8.1.2 Architecture to Support Topology 1

8.1.3 Architecture to Support Topology 2

\* \* \* \* First change (All new?) \* \* \* \*

8.1.1 General

Key issue #1 includes the following aspects:

- System architecture identified along with the solutions for KI#2 and KI#3.

Key issue#2 aspect on "Ambient IoT Device subscription management" and key issue#3 aspect on "Ambient IoT service exposure" is considered in this section.

At least the following principles are agreed for the architecture to support topology 1:

- A new core network function is introduced to support Ambient IoT.

Editor's note: Whether the new core network function also applies to topology 2 is FFS.

\* \* \* \* Second change (All new) \* \* \* \*

8.1.2 Architecture to Support Topology 1

The principles and aspects in this clause are agreed to support Topology 1:

- The new core network function (AIoTF) introduced to support Ambient IoT supports the functionality described in clause 8.1.1, with the following additions:

- The BS Reader and the new core network function always communicate for AIoT signaling (e.g., inventory request).

- Manage the BS Reader information, e.g. based on BS reader reporting or via OA&M configuration

- Ambient IoT services can be deployed isolated from existing deployments.

- BS Reader selection is performed by the AIoT NF selecting one or multiple BS Reader(s) and forwards the AIoT service request to the BS Reader(s).

- The Authorization and configuration of a BS Reader is assumed to be handle by OAM as part of the BS Reader authorization and configuration.

**A BS Reader and the AIoTF communicate directly:**

- The AIoTF communicates with a BS Reader via a direct interface Nx.

- Figure 8.1.2-x below shows the aspects related to Topology 1 (direct path) reference architecture with other NFs removed.



Figure 8.1.2-1: Non-Roaming 5G System Architecture (Direct Path)

- Figure 8.1.2-x below shows the aspects related to Topology 1 (direct path) in reference point representation with other NFs removed.



Figure 8.1.2-2: Non-Roaming 5G System Architecture in reference point representation (Direct Path)

- The protocol used over N2 will support procedures and information to be exchanged as specified by RAN2, RAN3 and SA2.

NOTE X: The protocol stack used between the AIoTF and the BS Reader will be concluded by RAN3.

- Figure 8.1.2-x below shows the aspects related to Topology 1 (direct path) protocol stack between the BS Reader and AIoTF.



Figure 8.1.2-3: Example Protocol Stack between AIoTF and AIoT Device for Topology 1 (Direct Path)

Editor’s Note: The details of the protocol stack are FFS.

**A BS Reader and the AIoTF communicate via an AMF:**

- The AIoTF connects with a BS Reader via AMF. The interface between the BS Reader and AMF supports Ambient IoT services including delivery of inventory/command messages.

NOTE X: The enhancements used between the AMF and the BS Reader will be concluded by RAN3.

- The BS Reader provides the supporting reader ID list or serving area list for AIoT services to the AMF and the AMF updates that information to the NRF via NF profile update procedure.

- The AMF shall be enhanced to support Services which are used by an AIoTF for Ambient IoT Operations.

Editor’s Note: The AMF enhancements are FFS.

- An SBI based service on the AMF (to be used by the AIoTF) is introduced in 5GC.

Editor’s Note: Details of the Service (e.g. whether it is a new service, whether the existing Namf service is enhanced is FFS).

- Figure 8.1.2-x below shows the aspects related to Topology 1 (AMF path) reference architecture with other NFs removed.



Figure 8.1.2-4: Non-Roaming 5G System Architecture (AMF Path)

- Figure 8.1.2-x below shows the aspects related to Topology 1 (AMF Path) in reference point representation with other NFs removed.



Figure 8.1.2-5: Non-Roaming 5G System Architecture in reference point representation (AMF Path)

- Figure 8.1.2-x below shows the aspects related to Topology 1 (AMF path) protocol stack between the BS Reader and AIoTF.



Figure 8.1.2-6: Example Protocol Between AIoTF and AIoT Device for Topology 1 (AMF Path)

Editor’s Note: The details of the protocol stack are FFS.

It is proposed to capture the following changes vs. TR 23.700-13, v1.0.0.#

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