**3GPP TSG-WG SA2 Meeting #167 *S2-2501706***

**Athens, GR, 17 – 21 Feb, 2025 Revision of S2-2500522**

**Source: China Mobile**

**Title: pCR to 23.xyz: Reader selection for Ambient IoT service request**

**Document for: Approval**

**Agenda Item: 19.14.2**

**Work Item / Release: AmbientIoT/ Rel-19**

*Abstract: This paper proposes the BS reader selection methods.*

# 1. Introduction/Discussion

This contribution is proposed to add reader selection functionality in 5.3 in TS 23.xyz.

# 2. Text Proposal

It is proposed to approve the following changes.

*FIRST CHANGE*

# High level functionality and features

## 5.3 Reader selection

For topology 1, the AF may provide NEF with the expected location information (e.g., external location identifier or geographic location) in the Ambient IoT service request. NEF can convert the expected location information to an internal location identifier (e.g., TAI or BS reader service area) list. NEF can query NRF to obtain serving AIOTF based on internal location identifiers. Then, NEF forwards the Ambient IoT service request to the AIOTF, including the internal location identifier list.

Editor’s note: How NEF converts external location identifier information to internal location identifier is out of the scope of 3GPP.

Editor’s note: The definition of the BS reader service areas must be coordinated with RAN WG(s).

Editor’s note: The BS reader information is not exposed to the AF.

The AIoT RAN shall inform BS reader information (e.g., BS reader service area, status and, optionally, BS reader ID) to the AIOTF. The AIOTF can obtain the BS reader information using the NGAP procedures or OAM configuration.

In direct connection mode, the AIoT RAN can transfer the BS reader information to AIOTF via the Nx interface using the NG Setup procedure. If the BS reader information changes, the AIoT RAN should inform the AIOTF of the change using the RAN Configuration Update procedure.

In indirect connection mode, the AIOTF shall subscribe to the Subscribe/Notify service about BS reader information towards the AMF. The AIoT RAN can transfer the BS reader information to AMF via the N2 interface using the NG Setup procedure. If the BS reader information changes, the AIoT RAN should inform the AMF using the RAN Configuration Update procedure. The AMF shall forward the updated BS reader information to AIOTF via the Na interface based on the Subscribe/Notify mechanism.

Editor’s note: The way the AIOTF obtains the BS reader information by OAM configuration is out of the scope of 3GPP.

The AIOTF selects AIoT RAN node(s) and one of the BS reader service area(s) or BS reader ID(s). The AIOTF can select the AIoT RAN based on the internal location identifier list. The AIOTF selects targeted BS reader information (BS reader service area or BS reader ID) by matching the internal location identifiers from NEF with the BS reader service areas from AIoT RAN. Then, the AIOTF sends the BS reader information (e.g., BS reader service area and, optionally, BS reader ID) to AIoT RAN directly or indirectly via AMF.

Editor’s note: The AIOTF can select targeted BS reader ID(s) only when it can obtain the BS reader ID(s) information from the AIoT RAN.

If the AIOTF can only obtain the BS reader service area information without the BS reader ID, it matches the internal location identifier list with the BS reader service area list to obtain the targeted BS reader service area list. Then, the AIOTF forwards the ambient IoT service requests with the target BS reader service area list to the AIoT RAN, and the AIoT RAN can choose the BS reader(s) based on the target BS reader service area list.

If the AIOTF can obtain both the BS reader service area(s) and the BS reader ID(s), it can select the BS reader ID(s) by matching the internal location identifier list with the BS reader service area list to obtain the targeted BS reader ID(s) list directly. Then, the AIOTF forwards the Ambient IOT service requests with the selected BS reader ID list to the AIoT RAN, and the AIoT RAN can use the BS reader(s) decided by the AIOTF.

Editor’s note: If multiple AIoT RAN Nodes are selected, the AIOTF shall send the AIoT service request to all the selected AIoT RAN nodes.

If the AIOTF determines that BS reader service area(s) under one AIoT RAN node need to be all involved in the Ambient IoT service request, it doesn’t transfer any targeted BS reader(s) list information in the Ambient IoT service request to the AIoT RAN, then AIoT RAN needs to use all available BS readers.

If the internal location identifier and BS reader service area do not match, the AIOTF shall reject the service request with an appropriate cause code.

If the Ambient IoT service is for one or multiple specific ambient IoT devices, optionally, the AIOTF may consider the last known serving BS reader(s) which is serving these Ambient IoT devices, as targeted BS reader(s) directly. If the selected BS reader(s) fail to page the target Device(s), the AIOTF still needs to re-perform reader selection again based on the location information match mechanism as described in the solutions mentioned above.

Editor’s note: Selecting the last known serving BS reader as the targeted BS reader is not applied to Ambient IoT service without knowing the specific Ambient IoT device’s amount (e.g., inventory with partial EPC ID).

*END OF CHANGE*