**3GPP TSG-WG SA2 Meeting #169 *S2-250xxxx***

**Fukuoka City, Fukuoka, JP, 19th May – 23rd May, 2025 (revision of S2-250xxxx)**

**Source: Huawei, HiSilicon**

**Title: Command Procedure Update**

**Document for: Approval**

**Agenda Item: 19.4.2**

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

*Abstract: Clause 6.2.3 is updated to add more details about the command procedure.*

# 1. Introduction/Discussion

The clause 6.2.3 about Command Procedure is updated to solve the ENs and add more clarification and reference to make the procedure clearer.

Editor's note: Additional information in the steps, parameters, and their naming throughout the procedures requires alignment with other clauses and references adding as required.

The parameters and their names have been aligned with those in other clauses, e.g., align with the Inventory Procedure, and additional information in the steps has been added. Therefore, this EN can be deleted.

Editor's note: Alignment is required for how to document and describe Direct Connectivity and Indirect Connectivity options in the procedures.

Step 8 and Step 11 already have some description about Indirect Connectivity options, which refers to clause 6.2.4, which describe the procedure between AIOTF and NG-RAN for Indirect Connectivity. Therefore, this EN can be deleted without any change.

Editor's note: What parameter(s) are used in the Command Request to enable NG-RAN node to target a specific AIoT Device requires coordination with RAN3.

RAN3 has update the Command Procedure in R3-252459. In that call flow, RAN A-IoT device NGAP ID has been included in the Command Request to target the A-IoT device. The NG-RAN also replies Command Response message with RAN A-IoT device NGAP ID. To align with this, step 8 and step 11 have been updated accordingly. This EN can be deleted.

Apart from the Editor’s note, this contribution also clarifies how to complete the Command Procedure using a stop message. When AIOTF determines to end the Command procedure when, e.g., all the target AIoT Devices have had commands sent to them, the AIOTF can stop Command Procedure and release the context in NG-RAN and itself.

# 2. Text Proposal

It is proposed to capture the following changes vs. TS 23.369.

\* \* \* \* First change \* \* \* \*

### 6.2.3 Command Procedure

Figure 6.2.3-1 depicts the command procedure.

The procedure focuses on the messages and parameters used for the communication between AIOTF and NG-RAN regardless of the path to access NG-RAN, see clause 4.2.2.1. The handling of the different communication paths is described in clause 6.2.4.



Figure 6.2.3-1: Command Procedure

1. The AF sends the Nnef\_AIoT\_Command (in case of untrusted AF) Request (AF ID, Command Type, information about the target AIoT Device(s), [External Target Area information],  [Approximate number of AIoT Devices], [Approximate D2R message size], AIoT data) message to NEF.

 Information about the target AIoT Device(s) may include Filtering Information, as described in clause 5.8, or include complete AIoT Device Identifier(s).

 The External Target Area information is specified in clause 5.3.

 The approximate number of AIoT Devices, if provided, is used to determine the number of AIoT Devices expected to respond to the inventory service operation, which is sent by AIOTF to the NG-RAN in the assistance information for NG-RAN in step 7 for proper radio resource allocation.

Editor's note: It is FFS whether and how to structure the AIoT data if the Command Type is Read, Write or Disable.

 The AIoT Device identification information may include one or more AIoT Device ID(s) or the filtering information which is used to associate with multiple AIoT devices.

2. The NEF selects the AIOTF(s) as described in clause 5.3.1. If no AIOTF can be selected, the NEF rejects the AIoT Command request with an appropriate cause code and step 6 is performed before ending the procedure.

3. The NEF sends Naiotf\_AIoT\_Command Request message (AF ID, Command Type, information about the target AIoT Device(s), [Target area information] , [Approximate number of AIoT Devices], [Approximate D2R message size], AIoT data) message to the selected AIOTF.

4. The AIOTF receives the AIoT command operation request and checks the parameters included in the request. The AIOTF performs NG- RAN and optionally RAN Reader selection as specified in clause 5.3.3. If no NG-RAN or RAN Reader can be selected, the AIOTF rejects the AIoT Command request with an appropriate cause code.

 The AIOTF generates a Correlation ID corresponding to this AF service operation request, and is used for the AIOTF to correlate the service operation responses to the request.

 The AIOTF determines assistance information as described in clause 5.4.

 The AIOTF performs AF authorization for AIoT command operation as described in clause 5.6.

 The AIOTF performs AMF selection as described in clause 5.3.4.

5. AIOTF sends the Naiotf\_AIoT\_Command Response message (accept or reject, [cause code]) to the NEF.

6. NEF sends the Nnef\_AIoT\_Command Response message (accept or reject, [cause code]) to the AF. If the response was a reject the procedure stops here.

7. Step 7 to step 12 of procedure for Inventory specified in clause 6.2.2 are performed with the following clarifications:

- In step 7, the AIOTF sends a “follow-on command indication” in the Inventory Request.

- In step 10, the NG-RAN allocates RAN A-IoT device NGAP ID in the Inventory Report, based on the “follow-on command indication” it received in step 7.

- In step 11, the AIOTF validates the results as specified in TS 33.369 [9], and determines whether the command should be sent to an AIoT Device, e.g., by checking the Target AIoT device information.

If none of successful Inventory response is received, Step 8 -11 is not performed and the AIOTF sends a failure report to the NEF in Step 12.

The AIOTF don’t need to wait for all the inventory procedure complete to start Command Request.

8. For each successful Inventory response received, the AIOTF sends Command Request message (Correlation ID, RAN A-IoT device NGAP ID, CN A-IoT device NGAP ID, [Reader ID], NAS Command Request, [Approximate D2R message size]) to the NG-RAN directly or as an AIoT Transfer Container via an AMF as specified in clause 6.2.4. The NAS Command Request message includes the AIoT data. Editor's note: Additional information included in the NAS Command Request for security will be determined and aligned with SA WG3.

9. The NG-RAN sends the AS R2D message (NAS Command Request) to the AIoT Device.

10. The AIoT Device sends the AS D2R message (NAS Command Response) to the NG-RAN. The NAS Command Response message may include the AIoT data.

Editor's note: The AS R2D message and AS D2R message will be aligned with RAN WG's specification.

Editor's note: Additional information included in the NAS Command Response for security will be determined and aligned with SA WG3.

11. The NG-RAN responds with a Command Response message (Correlation ID, Reader ID, RAN A-IoT device NGAP ID, CN A-IoT device NGAP ID, NAS Command Response) to the AIOTF directly or as an AIoT Transfer Container via an AMF as specified in clause 6.2.4.

12. The AIOTF reports the result of the AIoT Command request to the NEF by sending the Naiotf\_AIoT\_Command Notify message (AIoT Device ID(s), AF ID, AIoT data).

13. The NEF informs the AF of the result of the AIoT\_Command request by sending the Nnef\_AIoT\_Command Notify message (AIoT Device ID(s), AF ID, AIoT data).

14. The AIOTF sends a Command End message to NG-RAN, indicating to end the Command service operation associated with the correlation ID, which means the Command service operation is completed, e.g., after it determines all the target AIoT Devices has been send commands.

When the Command service operation associated with the Correlation ID is completed, the AIOTF and NG-RAN can release the context associated with the Correlation ID.

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