3GPP SA WG2#170 S2-2506349r01

Goteborg, Sweden, 25-29 August, 2025 (Revision of S2-250xxxx)

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.369** | **CR** | **0005** | **rev** | **-** | **Current version:** | **19.0.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

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| ***Title:*** | Session release procedre and correlation ID | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | OPPO | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | AmbientIoT-ARC | | | | |  | ***Date:*** | | | 2025-08-25 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In the incoming LS from RAN3 (S2-2506146)   * *In case of indirect connectivity, as parallel sessions between gNB and AMF are supported, the AIOTF Identifier and the Correlation Identifier are included outside of the containers in all the Inventory related NGAP messages (in addition to including the Correlation Identifier inside the containers as previously agreed).* * *In case of indirect connectivity, as parallel Command procedures for different devices between gNB and AMF within the same session are supported, the AIOTF Identifier, the Correlation Identifier, and the RAN A-IoT Device NGAP ID are included outside of the containers in all the Command related NGAP messages (in addition to including the Correlation Identifier and the RAN A-IoT Device NGAP ID inside the containers as previously agreed).* * *Introduce a new A-IoT CN triggered Class 1 NGAP A-IoT Session Release procedure.* * *Introduce a new gNB triggered Class 2 NGAP A-IoT Session Release Request procedure.*   Additionally the AIoT session release has also beeen defined in BL CR in R3-253972.  Correlation ID has been used in several clauses, however there is no correlation ID definition. In the BL CR for TS 38.401 in R3-253969  **A-IoT Correlation ID:**  An A-IoT Correlation ID shall be allocated so as to uniquely identify an A-IoT session context. When a gNB receives an A-IoT Correlation ID, it shall store it for the duration of the A-IoT service operation. The A-IoT Correlation ID shall be unique within an AIOTF as specified in TS 23.369 [z].  The similar definition can also be added in TS 23.369. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Correlation ID definition is added.  The AIoT Session Release procedure is added. | | | | | | | | |
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| ***Consequences if not approved:*** | | Unnessary AIoT Session will remain in the NG-RAN and AIOTF. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.7.x (new), 6.2.4, 6.2.x (new), 7.2.4, 7.3.2, 7.4.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**\* \* \* \* First Change \* \* \* \***

### 5.7.x Correlation ID

Correlation ID is generated by AIOTF corresponding to an AF service operation request. It is used to uniquely identify an AIoT session which is corresponding to an AF service operation request. Correlation ID shall be unique within an AIOTF.

**\* \* \* \* Next Change \* \* \* \***

### 6.2.1 General

Clause 6.2.2 provides the procedure for AIoT Inventory. Clause 6.2.3 provides the procedure for AIoT Command. Clause 6.2.x provides the AIoT session release procedure for AIoT Inventory and AIoT Command.

**\* \* \* \* Next Change \* \* \* \***

### 6.2.2 Inventory Procedure

Figure 6.2.2-1 describes the inventory 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 6.2.2-1: Inventory Procedure

1. The AF invokes Nnef\_AIoT\_Inventory(AF ID, [External Target Area information], [information about the target AIoT Device(s)], [Approximate number of AIoT Devices], [time interval]) service operation request to the 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 approximate number of AIoT Devices, if provided, is used to determine the number of AIoT Devices expected to respond to this 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.

The time interval, if provided, is described in clause 5.9.

2. The NEF may further authorize the AF request as specified in clause 5.6.

The NEF determines the Target Area information from the External Target Area information, and selects one or multiple AIOTF(s) to handle the request as specified in clause 5.3.1. The Target Area information is specified in clause 5.3.

3. The NEF invokes the Naiotf\_AIoT\_Inventory(AF ID, [Target Area information], [information about the target AIoT Device(s)], [Approximate number of AIoT Devices], [time interval]) service operation towards to the selected AIOTF(s).

4. The AIOTF receives the AIoT service operation request and checks the parameters included in the request. The AIOTF may perform authorization as specified in clause 5.6. If the AIoT service operation request cannot be processed, the AIOTF rejects the AIoT service operation request with an appropriate cause code, and step 7 onwards are skipped.

The AIOTF generates a Correlation ID corresponding to this AF service operation request and the Correlation ID is used for the AIOTF to correlate the service operation responses to the request. The AIOTF creates the AIoT session for the AF service operation request, which is identified by the Correlation ID.

The AIoT Identification Information to be provided to NG-RAN can include Filtering Information, as defined in clause 5.8, or a single AIoT Device Identifier.

AIOTF performs Reader Selection, see clause 5.3.3.

The AIOTF may also use the last serving Reader to assist with determining which Readers to use for an AFs request targeting for a specific AIoT Device.

The AIOTF determines assistance information as described in clause 5.4, taking into account the parameters provided in the service request.

5. AIOTF sends the AIoT Inventory Service Response to the NEF containing the accept or reject result for the AIoT Inventory service operation request based on step 4.

6. NEF sends the AIoT service operation response to the AF, containing the accept or reject result for the AIoT Inventory service operation request as specified in clause 8.3.

7. The AIOTF sends the Inventory Request message including the Correlation ID, the AIoT Identification Information to be included in the paging message, and assistance information to the selected NG-RAN as specified in TS 38.413 [10].

8. The NG-RAN sends an Inventory Response to the AIOTF with the Correlation ID indicating that the Inventory Request is received successfully and will perform the service operation accordingly as specified in TS 38.413 [10]. If the Inventory Request is not rejected, then an AIoT Session is created in the NG-RAN.

9. Upon reception of the Inventory Request message from the AIOTF, the RAN Reader(s) will execute the inventory operation as specified in TS 38.300 [5] and TS 38.391 [11]. The RAN Reader(s) broadcast the paging message that includes the AIoT Identification Information.

The AIoT Device determines whether it matches the AIoT Identification Information, as described in clause 5.8.

If an AIoT device matches the AIoT Identification Information in the paging message, the AIoT Device responds to the paging message and sends an AIOT NAS message that includes its AIoT identity.

Editor's note: Whether and how the Device ID is concealed or encrypted will be determined and aligned with SA WG3.

10. NG-RAN sends one or more Inventory Report messages to the AIOTF including the Correlation ID, Reader ID and the AIOT NAS message(s) from the AIoT Device(s) as specified in TS 38.413 [10]. The NG-RAN may aggregate multiple Inventory Report messages based on the assistance information before reporting the response to the AIOTF as described in clause 5.9. The AIOTF stores the mapping between the Reader ID and AIoT Device ID(s).

NOTE: When to erase the stored mapping between the Reader ID and AIoT device ID(s) is up to implementation and local configuration.

11. The AIOTF validates the results, using local stored device information or device profile data retrieved from the ADM. The AIOTF may aggregate the results.

12. Optionally, if the NG-RAN detects that no more AIoT Devices will respond to the inventory procedure, the NG-RAN informs the AIOTF that the procedure is complete and the last inventory result. After the procedure has completed NG-RAN will not send any further Inventory Reports for this requested Inventory.

Editor's note: The details about completion of the procedure need to be aligned with RAN.

13. The AIOTF reports the progress of the AIoT inventory request to the NEF by sending the Naiotf\_AIoT\_Notify message including a list of AIoT Device Permanent Identifier (s). The AIOTF may send multiple reports. The AIOTF in the final Naiotf\_AIoT\_Notify message indicates it is the last report for this operation. When the last report is sent, the AIOTF ends the AIoT Session. If multiple AIOTFs are involved in the procedure, the NEF may receive the AIoT\_Notify from multiple AIOTFs.

14. When receiving the Naiotf\_AIoT\_Notify message from AIOTF, the NEF informs the AF of the outcome of the AIoT\_Inventory request by sending the Nnef\_AIoT\_Notify message(s) including the AIoT Device Permanent Identifier(s). The NEF in the final Nnef\_AIoT\_Notify message indicates that it is the last report for this operation.

**\* \* \* \* Next 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], [Command type specific parameters]) 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 (see clause 5.4), if provided, is used to indicate the number of AIoT Devices expected to respond to this command service operation, which is sent by AIOTF to the NG-RAN in the assistance information as specified in clause 5.4.

Command Type provides the operation to be performed and the Command type specific parameters provides the required parameters for the operation. The service operations are described in clause 5.2.2.

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], [Command type specific parameters]) 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 the Correlation ID is used for the AIOTF to correlate the service operation responses to the request. The AIOTF creates the AIoT session for the AF service operation request, which is identified by the Correlation ID.

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 step12 of procedure for Inventory specified in clause 6.2.2 are performed with the following clarifications:

- In step 7, the AIOTF also includes follow on command indication in the Inventory Request message to inform the NG-RAN command delivery occurs after the inventory.

- In step 10, the NG-RAN also includes the RAN AIoT Device NGAP ID for each AIoT Device in the Inventory Report as specified in TS 38.413 [10].

- 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. The AIOTF updates the corresponding AIoT device context in the AIOTF to include the RAN AIoT Device NGAP ID.

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.

8. For each successful Inventory response received, the AIOTF sends Command Request message (Correlation ID, [Reader ID], NAS Command Request, [Approximate D2R message size], RAN AIoT Device NGAP ID for each AIoT Device) to the NG-RAN directly or as a NGAP AIoT information via an AMF as specified in clause 6.2.4. The NAS Command Request message includes the AIoT data. The Correlation ID is as the same as the Correlation ID generated in step 4. The RAN AIoT Device NGAP ID for each AIoT Device is used by the NG-RAN to determine the AIoT device context in NG-RAN as specified in TS 38.413 [10].

The AIOTF uses the Command Type and Command type specific parameters received in Step 3 to determine the NAS Command Request to send to the AIoT Device, as described in clause 5.2.2.

NOTE: Command Request(s) can be sent to NG-RAN when inventory procedure is ongoing.

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 as defined in TS 38.391 [11].

10. The AIoT Device sends the AS D2R message (NAS Command Response) to the NG-RAN as defined in TS 38.391 [11]. The NAS Command Response message may include the AIoT data.

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, NAS Command Response, RAN AIoT Device NGAP ID) to the AIOTF directly or as a NGAP AIoT information via an AMF as specified in clause 6.2.4. The AIOTF determines the AIoT device context by the RAN AIoT Device NGAP ID received.

12. The AIOTF reports the result of the AIoT Command request to the NEF by sending the Naiotf\_AIoT\_Command Notify message (a list of AIoT Device(s) response information (AIoT Device ID(s), AIoT data), AF ID, [Last Report Indication]). When the last report is sent, the AIOTF ends the AIoT Session.

13. The NEF informs the AF of the result of the AIoT\_Command request by sending the Nnef\_AIoT\_Command Notify message (a list of AIoT Device(s) response information (AIoT Device ID(s), AIoT data), AF ID, [Last Report Indication]).

**\* \* \* \* Next Change \* \* \* \***

### 6.2.4 Procedures between AIOTF and NG-RAN for Indirect Connectivity

An AIOTF and NG-RAN can use an indirect interface via an AMF as described in clause 4.2.2.4. The additional steps used for indirect interface between AIOTF and NG-RAN are shown in Figure 6.2.4-1.



Figure 6.2.4-1: Procedure for AIOTF and NG-RAN for indirect connectivity via an AMF

1. The AIOTF sends Namf\_AIoT\_MessageDelivery message (NGAP AIoT information, NG-RAN ID, AIOTF ID, Message Type for NGAP AIoT information, Correlation ID, [RAN AIoT Device NGAP ID]) to the AMF. The NGAP AIoT information may be Inventory Request Transfer, Command Request Transfer, or Session Release Command Transfer. RAN AIoT Device NGAP ID is included if the NGAP AIoT information is Command Request Transfer.2. The AMF sends an NGAP message (AIOTF ID, NGAP AIoT information, Correlation ID, [RAN AIoT Device NGAP ID]) to the target NG-RAN.

3. The NG-RAN sends an NGAP message (AIOTF ID, NGAP AIoT information, Correlation ID, [RAN AIoT Device NGAP ID]) to an AMF. NGAP AIoT information may be Inventory Response Transfer, Inventory Report Transfer, Inventory Failure Transfer, Command Response Transfer, Command Failure Transfer Session Release Request Transfer, or Session Release Complete Transfer.

4. AMF sends the Namf\_AIoT\_Notify message (NGAP AIoT information, Correlation ID) to the AIOTF.

**\* \* \* \* Next Change \* \* \* \***

### 6.2.x AIoT Session Release Procedure

This procedure is used to release the AIoT session between the NG-RAN and the AIOTF. The AIoT session release procedure can be triggered by the AIOTF or the NG-RAN node, and is specified in TS 38.413 [10].

The initiation of AIoT session release may be due to:

- NG-RAN-initiated with cause; or

- AIOTF-initiated with cause, e.g. Procedure Completed.

Both NG-RAN-initiated and AIOTF-initiated AIoT Session Release procedures are shown in Figure 6.2.x-1.



Figure 6.2.x-1: AIoT Session Release Procedure

1. NG-RAN may decide to initiate the AIoT session release procedure. NG-RAN sends AIoT Session Release request message (Correlation ID, Cause) to the AIOTF directly or as a NGAP AIoT information via an AMF as specified in clause 6.2.4.

2. If the NG-RAN receives the AIoT Session Release request message or the AIOTF decides to terminate all activities related to the AIoT session, the AIOTF sends an AIoT Session Release Command message (Correlation ID, Cause) to the NG-RAN directly or as a NGAP AIoT information via an AMF as specified in clause 6.2.4. The cause indicates either the Cause from NG-RAN in step 1 or the Cause triggered by AIOTF.

3. The NG-RAN confirms the AIoT Session Release by returning an AIoT Session Release Complete message (Correlation ID) to the AIOTF directly or as a NGAP AIoT information via an AMF as specified in clause 6.2.4. The NG-RAN node releases the AIoT context and radio resources related to the AIoT session identified by the Correlation ID provided by the AIOTF, as specified in TS 38.300 [5].

4. The AIOTF may send the Naiotf\_AIoT\_Notify message to inform that the service operation request has been terminated.

5. When receiving the Naiotf\_AIoT\_Notify message from AIOTF, the NEF informs the AF the service operation request has been terminated by sending the Nnef\_AIoT\_Notify message(s).

**\* \* \* \* Next Change \* \* \* \***

### 7.2.4 Naiotf\_AIoT\_Notify service operation

**Service operation name:** Naiotf\_AIoT\_Notify

**Description:** The AIOTF uses this service operation to notify the results or status of the service operation towards the NF consumers. If the NF consumer invokes the Naiotf\_AIoT\_Inventory, or Naiotf\_AIoT\_Command service operation, the NF consumer implicitly subscribes to the results of the requested service operation.

**Inputs, Required:**

1) Common report information: Transaction ID.

**Inputs, Optional:**

1) List of AIoT Device ID or Failure Cause in case of Failure, Release Cause in case of AIoT Session Release.

2) Read command specific report information: Information obtained from each target AIoT Device corresponding to each reported AIoT Device ID.

3) The Last Report Indication, indicating the notify is the last notify for an AIoT service operation.

**Outputs, Required:** Operation execution result indication.

**Outputs, Optional:** None.

**\* \* \* \* Next Change \* \* \* \***

### 7.3.2 Namf\_AIoT\_MessageDelivery service operation

**Service operation name:** Namf\_AIoT\_MessageDelivery

**Description:** The NF consumer requests to send AIoT data towards NG-RAN or AIoT devices.

**Inputs, Required:**

1) NGAP AIoT Information to deliver to NG-RAN.

2) NG-RAN ID.

3) AIoT NGAP Message Type ("Inventory" or "Command").

4) AIOTF Identifier and Correlation Identifier, this is to allow identifying the association between NG-RAN and AMF.

**Inputs, Optional:** RAN AIoT Device NGAP ID.

**Outputs, Required:** Result indication (Success or Failure), Failure Cause in case of Failure.

**\* \* \* \* Next Change \* \* \* \***

### 7.4.4 Nnef\_AIoT\_Notify service operation

**Service operation name:** Nnef\_AIoT\_Notify

**Description:** The consumer receives notification of the status or results of the requested service operation. If the consumer invokes the Nnef\_AIoT\_Inventory, or Nnef\_AIoT\_Command service operation, the consumer implicitly subscribes to the results of the requested service operation.

**Input, Required:**

1) AF Transaction ID.

**Input, Optional:**

1) a list of AIoT Device ID(s), Failure Cause in case of Failure, Release Cause in case of AIoT Session Release.

2) Read command specific report information: Information obtained from each target AIoT Device.

3) The Last Report Indication, indicating the notify is the last notify for an AIoT service operation.

**Output, Required:** Result indication.

**\* \* \* \* End of Changes \* \* \* \***