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

**Goteborg, SE, 25th Aug – 29th Aug, 2025 (revision of S2-250xxxx)**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.369** | **CR** | **XXXX** | **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 |  | Core Network | **X** |

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| ***Title:*** | Service operation clarifications and alignments | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | AmbientIoT-ARC | | | | |  | ***Date:*** | | | 2025-08-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | **1. The role of Transaction ID for AIOTF/NEF service**  To support the implicit sub-notify mechanism for ambient IoT inventory or command service, some parameters require to be clarified to complete the related service operations and procedures:  1. **Transaction ID** in response: provided by Producer (e.g., NEF AIOTF), the identifier of the transaction that is created for the inventory/command request. This ID can be used by the Consumer to identify the NF Service Consumer request.  2. **Notification Endpoint** in the request: provided by Consumer, this is used to indicate where the notifications shall be delivered.  In the context of Ambient IoT, the key point is to enable the consumer to link the notifications to the correct inventory/command request. Thus, for each notify message towards the consumer, the producer includes the Transaction ID, and the consumer can use the Transaction ID to link to the previous service request. This “Transaction ID” is same as the “Transaction Reference ID” used in other services as defined in 23.502: like Trigger, ChargeableParty, AFsessionWithQoS, ServiceParameter, AF\_request\_for\_QoS etc.  See the usage example of “Transaction Reference ID” in ServiceParameter notify service: “The Transaction Reference ID identifies the AF request for service specific parameter provisioning that the notification (i.e., notification of an authorization update or reporting a subscribed event) is related to.” Thus, it is proposed to change the current Transaction ID term to “Transaction Reference ID” to align with the traditional implicit sub-notify mechanism.  .  The term "**AF Transaction ID**" is used in the **AF request**, provided by AF in the request, identifies the AF request, this "**AF Transaction ID**" is returned in the response back to AF, see usage example of this for TrafficInfluence service: "The AF Transaction Id refers to the request”. This is defined in TS23.502 and TS29.522, for examples AMInfluence, ECSAddress, TrafficInfluence, PolicyAuthorization NF services. The traditional **AF Transaction ID** is used differently from AIoT sub-notify mechanism, it is proposed to change the current AF transaction id term to “Transaction Reference ID” to align with the traditional implicit sub-notify mechanism.    **Proposal 1:** update the NEF service operations and AIOTF service operations to align the terms (i.e., change transaction id, AF transaction id to transaction reference id).  **2. AMF implicit sub-notify service operation**  Same for AIOTF/NEF service, notification endpoint is needed.  For inventory-only procedure,   * For each involved gNB, the AMF transfers one inventory request message from AIOTF towards gNB, and transfers at least one feedback message from gNB towards AIOTF.   For inventory and command procedure,   * For each involved gNB, the AMF transfers one inventory request message from AIOTF towards gNB, and transfers at least one feedback message from gNB towards AIOTF. * Later, for each target device, the AMF transfer one command request message from AIOTF towards gNB, and transfers at least one feedback message from gNB towards AIOTF. * In this case, the same NGAP session is used for inventory phase and command phase, **this means the AMF needs to share same transaction for different message delivery requests from one AIOTF towards the same gNB** in inventory phase and command phase   The AMF maintains the notification endpoint for a transaction per AIOTF ID, per Correlation ID and per gNB for the inventory-only procedure, also for inventory and command procedure.  If the AMF manages the notification endpoint per transaction (link to one AIOTF ID, one Correlation ID and one gNB), then the AMF needs to assign and return the Transaction Reference ID. The AIOTF links the feedback messages to the inventory request or command request sent before using Transaction Reference ID. This aligns with the **sub-notify mechanism principle.**  If the AMF manages the notification endpoint per AIOTF ID, Correlation ID, the AMF can reuse the AIOTF ID, Correlation ID outside the container to link to notification endpoint for the feedback messages. The AIOTF links the feedback messages to the AF request or command request sent before using Correlation ID inside the container. This optimization is different with the current sub-notify mechanism, and is not recommended in this proposal.  **Proposal 2:** update the AMF service operation to return the transaction reference ID to align the implicit sub-notify service operation in the spec and stage 3 design. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Update the NEF service operations and AIOTF service operations to align the terms for Transaction Reference ID and AF transaction ID  2. Update the AMF message delivery service operation to add the Transaction Reference ID, notification endpoint and align command names.  3. Align the styles to document the parameters  4. Update message type to align with RAN3 progress throughout | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Incomplete implicit sub-notify mechanism for AIoT service operations | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.2.2, 7.2.3, 7.2.4, 7.3.1, 7.3.2, 7.3.3, 7.4.2, 7.4.3, 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 \* \* \* \*

### 7.2.2 Naiotf\_AIoT\_Inventory service operation

**Service operation name:** Naiotf\_AIoT\_Inventory.

**Description:** The NF consumer requests an inventory operation for one or multiple AIoT Device(s).

**Inputs, Required:**

- AF ID.

- At least one of the following parameters are included:

- Target Area information for the inventory operation.

- Information about the target AIoT Device(s):

- either the AIoT Device ID(s) or the filtering information(see clause 5.8) for multiple target AIoT Devices.

- Notification Endpoint.

**Inputs, Optional:**

- Information to be used for resource allocation:

- Approximate number of AIoT Devices.

- Time Interval for result aggregation.

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

**Outputs, Optional:** None.

\* \* \* \* Second change \* \* \* \*

### 7.2.3 Naiotf\_AIoT\_Command service operation

**Service operation name:** Naiotf\_AIoT\_Command.

**Description:** The NF consumer requests a command operation for one or multiple AIoT Device(s).

**Inputs, Required:**

- AF ID.

- At least one of the following parameters are included:

- Target Area information for the command operation.

- Information about the target AIoT Device(s):

- either the AIoT Device ID(s) or the filtering information(see clause 5.8) for multiple AIoT Devices.

- Notification Endpoint.

- Command Type: Read, Write or Permanent Disable.

**Inputs, Optional:**

- Information to be used for resource allocation:

- Approximate number of AIoT Devices.

- Approximate message size from the AIoT Device for Read Operation.

- If the Command Type is Read, the offset to read application data from and the length of application data to read shall be included.

- If the Command Type is Write, the offset where to write the application data, the application data to write and its length shall be included.

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

**Outputs, Optional:** None.

\* \* \* \* Third 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:**

- Common report information: Transaction Reference ID.

**Inputs, Optional:**

- List of AIoT Device ID or Failure Cause in case of Failure.

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

- 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.

\* \* \* \* Forth change \* \* \* \*

## 7.3 AMF services

### 7.3.1 General

AMF supports to expose AIoT services towards the AIOTF as described in Table 7.3.1-1. The Namf\_AIoT AMF service is used when the NG-RAN and the AIOTF communicate indirectly via an AMF.

Table 7.3.1-1: NF services provided by the AMF

|  |  |  |  |
| --- | --- | --- | --- |
| Service Name | Service Operations | Operation  Semantics | Example Consumer(s) |
| Namf\_AIoT | MessageDelivery | Request/Response | AIOTF |
|  | Notify | Subscribe/Notify | AIOTF |

\* \* \* \* Fifth change \* \* \* \*

### 7.3.2 Namf\_AIoT\_MessageDelivery service operation

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

**Description:** The NF consumer requests to send AIoT NGAP Messages towards NG-RAN.

**Inputs, Required:**

- NGAP AIoT Information to deliver to NG-RAN.

- NG-RAN ID.

- AIoT NGAP Message Type ("Inventory Request" or "Command Request" or "Session Release Command").

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

- Notification Endpoint or Transaction Reference ID.

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

\* \* \* \* Sixth change \* \* \* \*

### 7.3.3 Namf\_AIoT\_Notify service operation

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

**Description:** The NF consumer requests to receive notifications for AIoT NGAP messages from NG-RAN. If the NF consumer invokes the Namf\_AIoT\_MessageDelivery, the NF consumer implicitly subscribes to receive the Namf\_AIoT\_Notify’s.

**Inputs, Required:**

- AIoT NGAP Message Type ("Inventory Reponse", "Inventory Failure", "Inventory Report", "Command Response", "Command Failure", "Session Release Complete").

- NGAP AIoT Information received from NG-RAN.

- Transaction Reference ID.

**Input, Optional:** None.

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

**Output, Optional:** None.

\* \* \* \* Seventh change \* \* \* \*

### 7.4.2 Nnef\_AIoT\_Inventory service operation

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

**Description:** The consumer requests to perform an inventory operation for an AIoT Device or multiple AIoT Devices.

**Input, Required:**

- AF ID.

- At least one of the following parameters are included:

- External Target Area information.

- Either AIoT Device ID(s) or AIoT Device ID filter information for the inventory operation.

- Notification Endpoint.

**Input, Optional:**

- Information to be used for resource allocation:

- Approximate number of AIoT Devices.

- Time Interval for result aggregation.

**Output, Required:** Transaction Reference ID, Result indication, Failure cause in case of Failure.

**Output, Optional:** None.

\* \* \* \* Eighth change \* \* \* \*

### 7.4.3 Nnef\_AIoT\_Command service operation

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

**Description:** The consumer requests to perform a command operation for an AIoT Device or multiple AIoT Devices.

**Input, Required:**

- AF ID.

- At least one of the following parameters are included:

- External Target Area information.

- Either AIoT Device ID(s) or AIoT Device ID filter information for the command operation.

- Notification Endpoint.

- Command type (Read, Write, or Permanent Disable).

**Input, Optional:**

- Information to be used for resource allocation:

- Approximate number of AIoT Devices.

- Approximate message size from the AIoT Device for Read Operation.

- If the Command Type is Read, the offset to read application data from and the length of application data to read shall be included.

- If the Command Type is Write, the offset where to write the application data, the application data to write and its length shall be included.

**Output, Required:** Transaction Reference ID, Result indication, Failure cause in case of Failure.

**Output, Optional:** None.

\* \* \* \* Nineth 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:**

- Transaction Reference ID.

**Input, Optional:**

- a list of AIoT Device ID(s), Failure Cause in case of Failure.

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

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

**Output, Required:** Result indication.

**Output, Optional:** None.

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