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  - 3 or greater indicates TSG approved document under change control.
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- z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

- shall** indicates a mandatory requirement to do something
- shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

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- should** indicates a recommendation to do something
- should not** indicates a recommendation not to do something
- may** indicates permission to do something
- need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

- can** indicates that something is possible
- cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

**might not** indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

**is** (or any other verb in the indicative mood) indicates a statement of fact

**is not** (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

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# 1 Scope

The present document specifies the stage 3 protocol and data model for the AAnF Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the AAnF.

The 5G System stage 2 architecture and procedures are specified in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 33.535 [14].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [4] and 3GPP TS 29.501 [5].

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# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document in the same Release as the present document.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".
- [3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [6] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.
- [7] 3GPP TR 21.900: "Technical Specification Group working methods".
- [8] 3GPP TS 33.501: "Security architecture and procedures for 5G system".
- [9] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [10] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".
- [11] IETF RFC 9113: "HTTP/2".
- [12] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [13] IETF RFC 9457: "Problem Details for HTTP APIs".
- [14] 3GPP TS 33.535: "Authentication and Key Management for Applications (AKMA) based on 3GPP credentials in the 5G System (5GS)".
- [15] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [16] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".
- [17] 3GPP TS 29.503: "5G System; Network Exposure Function Northbound APIs; Stage 3".
- [18] 3GPP TS 29.122: "T8 reference point for Northbound Application Programming Interfaces (APIs)".

## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

### 3.2 Symbols

No symbol applies in this release of the specification.

### 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

|       |                                                    |
|-------|----------------------------------------------------|
| AAnF  | AKMA Anchor Function                               |
| AF    | Application Function                               |
| AKMA  | Authentication and Key Management for Applications |
| A-KID | AKMA Key IDentifier                                |
| AUSF  | AUthentication Server Function                     |
| GPSI  | Generic Public Subscription Identifier             |
| NEF   | Network Exposure Function                          |
| OAM   | Operation, Administration, and Maintenance         |

## 4 Services offered by the AAnF

### 4.1 Introduction

The AKMA Anchor Service is used for the AAnF to store AKMA related key material and provide AKMA Application Key information. The AAnF offers to other NFs the following service:

- Naanf\_AKMA.

**Table 4.1-1: Service provided by AAnF**

| Service Name | Description                                                                                                                                                         | Service Operations                      | Operation Semantics | Example Consumer(s) |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------|---------------------|
| Naanf_AKMA   | This service enables the NF service consumers to request the AAnF to store the AKMA related key material or get the AKMA Application Key information from the AAnF. | AnchorKey_Register                      | Request/Response    | AUSF                |
|              |                                                                                                                                                                     | ApplicationKey_Get                      | Request/Response    | AF, NEF             |
|              |                                                                                                                                                                     | Notify                                  | Request/Response    | AF, NEF             |
|              |                                                                                                                                                                     | ApplicationKey_AnonUser_Get<br>(NOTE 2) | Request/Response    | AF                  |
|              |                                                                                                                                                                     | ContextRemove                           | Request/Response    | OAM                 |

NOTE 1: The service corresponds to the Naanf\_AKMA service as defined in 3GPP TS 33.535 [14].

NOTE 2: The ApplicationKey\_AnonUser\_Get service operation is defined reusing the ApplicationKey\_Get service operation.

Table 4.1-2 summarizes the corresponding APIs defined for this specification.

Table 4.1-2: API Descriptions

| Service Name | Clause | Description        | OpenAPI Specification File | apiName    | Annex                    |
|--------------|--------|--------------------|----------------------------|------------|--------------------------|
| Naanf_AKMA   | 4.2    | API for Naanf_AKMA | TS29535_Naanf_AKMA.yaml    | naanf-akma | Annex A.2 Naanf_AKMA API |

## 4.2 Naanf\_AKMA Service

### 4.2.1 Service Description

#### 4.2.1.1 Overview

The Naanf\_AKMA, as defined in 3GPP TS 33.535 [14] is provided by the AKMA Anchor Function (AAnF).

This service:

- allows consumer NFs to store the AKMA related key material.
- allows consumer NFs and the AFs to request the AKMA Application Key information for the UE.

#### 4.2.1.2 Service Architecture

The 5G System Architecture is defined in 3GPP TS 23.501 [2]. The Authentication and Key Management for Applications architecture is defined in 3GPP TS 33.535 [14].

The Naanf\_AKMA service is part of the Naanf service-based interface exhibited by the AAnF.

Known consumers of the Naanf\_AKMA service are:

- Authentication Server Function (AUSF)
- Application Function (AF)
- Network Exposure Function (NEF)
- Operation, Administration, and Maintenance (OAM)

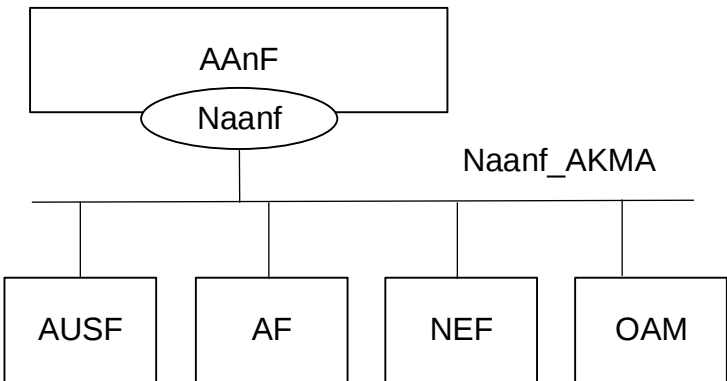
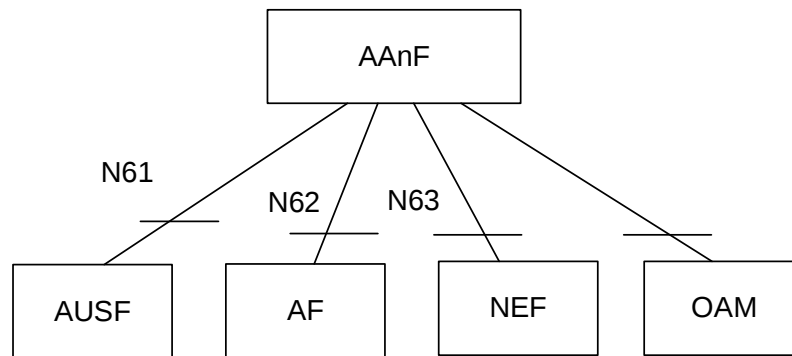


Figure 4.2.1.2-1: Reference Architecture for the Naanf\_AKMA Service; SBI representation



**Figure 4.2.1.2-2: Reference Architecture for the Naanf\_AKMA Service; reference point representation**

### 4.2.1.3 Network Functions

#### 4.2.1.3.1 AKMA Anchor Function (AAnF)

The AKMA Anchor Function (AAnF) is a functional element that stores the AKMA Anchor Key ( $K_{AKMA}$ ), A-KID for AKMA service, which is received from the AUSF after the UE completes a successful 5G primary authentication. The AAnF also generates the key material to be used between the UE and the Application Function (AF) and maintains the UE AKMA context as defined in 3GPP TS 33.535 [14].

#### 4.2.1.3.2 NF Service Consumers

The known NF service consumers are as follows:

The AUthentication Server Function (AUSF):

- provides the AKMA key material of the UE to the AAnF.

The Network Exposure Function (NEF):

- enables and authorizes the external AF accessing AKMA service and forwards the request towards the AAnF;
- performs the AAnF selection.

The Application Function (AF):

- requests for AKMA Application Key from the AAnF;
- shall be authenticated and authorized by the operator network before receiving the  $K_{AF}$  from the AAnF;
- performs the AAnF selection if the AF located inside the operator's network.

The Operation, Administration, and Maintenance (OAM):

- deletes the AKMA key material of the UE from the AAnF.

## 4.2.2 Service Operations

### 4.2.2.1 Introduction

**Table 4.2.2.1-1: Operations of the Naanf\_AKMA Service**

| Service operation name                  | Description                                                                                                                                                          | Initiated by |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Naanf_AKMA_AnchorKey_Register           | This service operation is used by an NF to store the AKMA related key material.                                                                                      | AUSF         |
| Naanf_AKMA_ApplicationKey_Get           | This service operation is used by an NF to request the AKMA Application Key information for the UE                                                                   | NEF, AF      |
| Naanf_AKMA_ApplicationKey_Anon User_Get | This service operation is used by an AF to request the AKMA Application Key information for the UE when authorized AF are not expected to receive the SUPI of the UE | AF           |
| Naanf_AKMA_ContextRemove                | This service operation is used by an NF to delete the AKMA related key material.                                                                                     | e.g. OAM     |
| Naanf_AKMA_Notify                       | This service operation is used by the AAnF to notify a previously subscribed NF service consumer on AKMA service disablement.                                        | AAnF         |

### 4.2.2.2 Naanf\_AKMA\_AnchorKey\_Register service operation

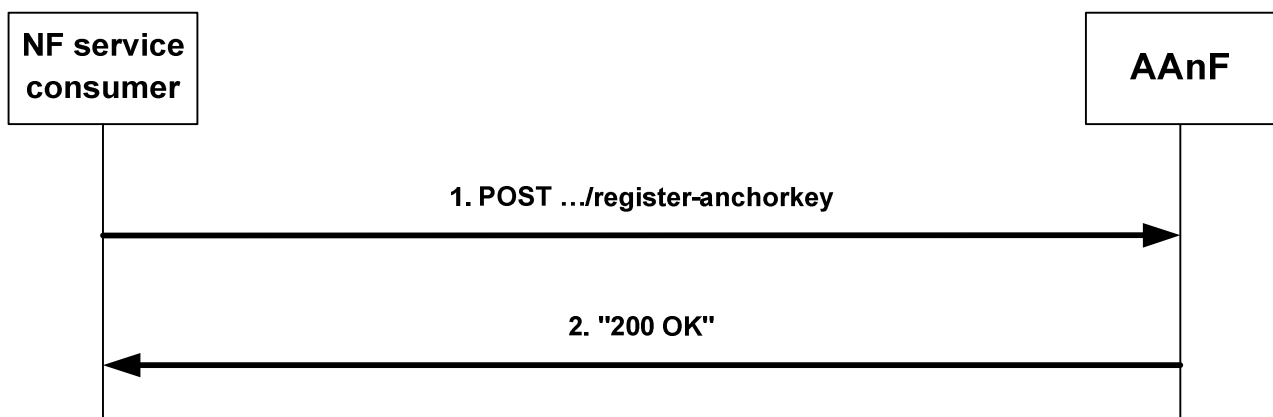
#### 4.2.2.2.1 General

The procedures support:

- store the AKMA related key material by the NF service consumer to the AAnF as described in 3GPP TS 33.535 [14];

#### 4.2.2.2.2 Store the AKMA related key material

Figure 4.2.2.2.2-1 illustrates the registration of AKMA related key material at the AAnF.



**Figure 4.2.2.2.2-1: Registration of AKMA related key material**

In order to store the AKMA related key material, the NF service consumer shall send an HTTP POST request message to the resource URI "{apiRoot}/naanf-akma/<apiVersion>/register-anchorkey" as shown in step 1 of figure 4.2.2.2.2-1, and the AkmaKeyInfo data structure as request body.

The AkmaKeyInfo data structure shall include:

- SUPI as "supi" attribute;
- A-KID as "aKid" attribute; and
- $K_{AKMA}$  as "kAkma" attribute.

If the AAnF cannot successfully fulfil the received HTTP POST request due to an internal error or an error in the HTTP POST request, the AAnF shall send an HTTP error response as specified in clause 5.1.7.

If the AAnF determines the received HTTP POST request needs to be redirected, the AAnF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

Upon successful reception of an HTTP POST request, the AAnF shall store the key material information and respond to the NF service consumer with a 200 OK status code, including the AkmaKeyInfo data structure as response body.

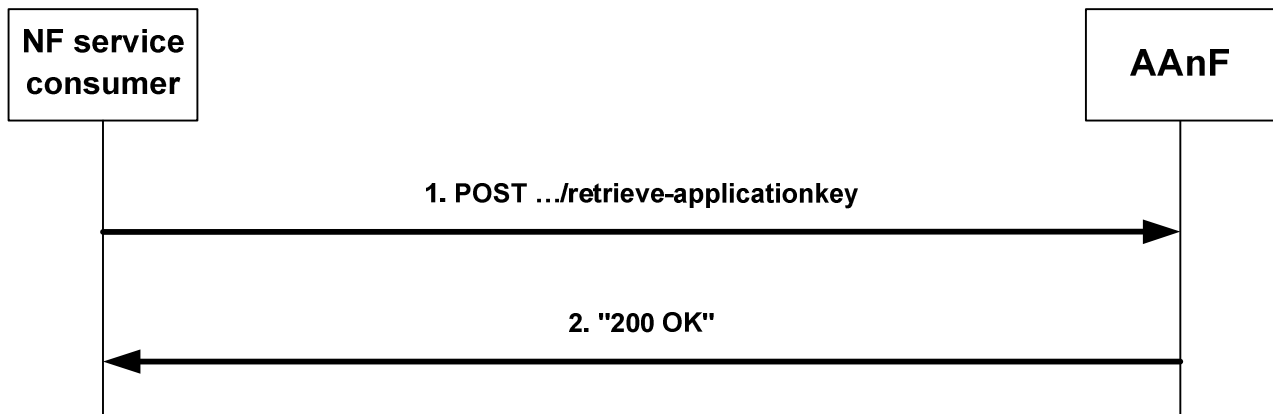
#### 4.2.2.3 Naanf\_AKMA\_ApplicationKey\_Get service operation

##### 4.2.2.3.1 General

The Naanf\_AKMA\_ApplicationKey\_Get service operation is used by an NF service consumer to request the AKMA Application Key information for the UE.

##### 4.2.2.3.2 AKMA Application Key request

Figure 4.2.2.3.2-1 shows a scenario where the NF service consumer sends a request to the AAnF to request and get the AKMA Application Key information for the UE (as shown in 3GPP TS 33.535 [14]).



**Figure 4.2.2.3.2-1: NF service consumer retrieve AKMA Application Key information**

The NF service consumer shall invoke the Naanf\_AKMA\_ApplicationKey\_Get service operation to retrieve the AKMA Application Key information. The NF service consumer shall send for this purpose an HTTP POST request with "{apiRoot}/naanf-akma/<apiVersion>/retrieve-applicationkey" as Resource URI, as shown in step 1 of figure 4.2.2.3.2-1, and the request body containing the AkmaAfKeyRequest data structure.

If the request corresponds to a Naanf\_AKMA\_ApplicationKey\_AnonUser\_Get request, then the AkmaAfKeyRequest shall contain the "anonInd" attribute set to "true".

If the AAnF determines the received HTTP POST request needs to be redirected, the AAnF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

If the AAnF cannot successfully fulfil the received HTTP POST request due to an internal error or an error in the HTTP POST request, the AAnF shall send an HTTP error response as specified in clause 5.1.7.

The AAnF shall also verify the presence of the UE specific  $K_{AKMA}$  key identified by the A-KID.

- If  $K_{AKMA}$  is not present in the AAnF, the AAnF shall reply with an HTTP "403 Forbidden" status code and the response message body including a ProblemDetails data structure with the "cause" attribute set to the "K\_AKMA\_NOT\_PRESENT" application error specified in table 5.1.7.3-1.
- If  $K_{AKMA}$  is present in the AAnF, the AAnF shall continue and process the request as specified below.

Upon the reception of the HTTP POST request, the AAnF shall respond with an HTTP "200 OK" status code and the response message body containing the AkmaAfKeyData data structure which shall include:

- $K_{AF}$  as "kaf" attribute;
- $K_{AF}$  expiration time as "expiry" attribute; and
- if the "anonInd" attribute was not present in the request or it was present and set to "false", the SUPI within the "supi" attribute or, if the "AKMA\_GPSI\_Support" feature is supported, either the SUPI within the "supi" attribute or the GPSI within the "gpsi" attribute.

If the requested AKMA Application Key information for the UE does not exist, the AAnF shall respond with "204 No Content".

If the NF service consumer is an NEF, and if UE identifier is required to relay to the AF based on local policy, the NEF invokes the Nudm\_SubscriberDataManagement service defined in 3GPP TS 29.503 [17] to translate the SUPI to a GPSI (External Id), and then invoke the AKMA API to include the GPSI (External Id) in the response to the AF as defined in 3GPP TS 29.522 [16]. The NEF shall not send the SUPI to the AF.

If the AAnF identifies that the request is targeting a UE that is currently roaming (e.g. the AAnF have received a roaming status information reporting from the UDM indicating that the UE is currently roaming) and if the AKMA service is not allowed for the roaming UE (e.g., based on the local policy), the AAnF shall reply with an HTTP "403 Forbidden" status code with the response message body including a ProblemDetails data structure containing the "cause" attribute set to the "ROAMING\_AKMA\_SERVICE\_DENIED" application error as specified in clause 5.1.7.3.

NOTE: The UE is considered as roaming if at least one of the serving PLMNs of the UE registered PLMN(s) is a VPLMN.

#### 4.2.2.4 Naanf\_AKMA\_ContextRemove service operation

##### 4.2.2.4.1 General

The Naanf\_AKMA\_ContextRemove service operation is used by an NF service consumer to request the AAnF to remove the AKMA related key material.

##### 4.2.2.4.2 AKMA Context removal

Figure 4.2.2.4.2-1 shows a scenario where the NF service consumer sends a request to the AAnF to delete the AKMA related key material (as shown in 3GPP TS 33.535 [14]).

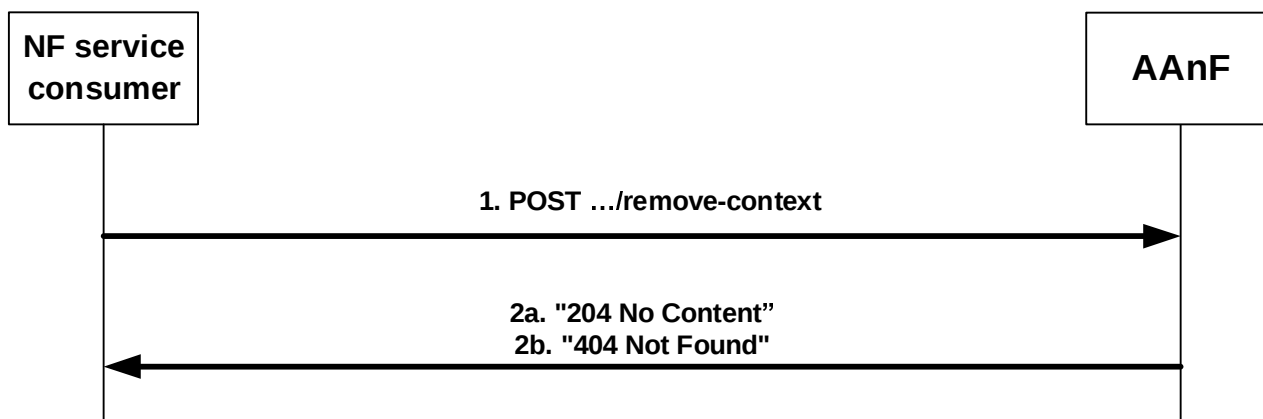


Figure 4.2.2.4.2-1: NF service consumer request to remove the AKMA related key material

The NF service consumer shall invoke the Naanf\_AKMA\_ContextRemove service operation to request the AAnF to remove the AKMA related key material. The NF service consumer shall send an HTTP POST request with "{apiRoot}/naanf-akma/<apiVersion>/remove-context" as Resource URI, as shown in figure 4.2.2.4.2-1, step 1, to request to remove AKMA related key material according to the value of the "CtxRemove" data type in the request body.

If errors occur when processing the HTTP POST request, the AAnF shall send an HTTP error response as specified in clause 5.1.7.

If the AAnF determines the received HTTP POST request needs to be redirected, the AAnF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

Upon the reception of the HTTP POST request, if the AKMA context (e.g. A-KID,  $K_{AKMA}$ ) for the UE has been removed successfully, the AAnF shall send an HTTP "204 No Content" response.

If the AKMA Context resource does not exist, the AAnF shall respond with "404 Not Found" and the "cause" attribute of the "ProblemDetails" data structure set to "AKMA\_CONTEXT\_NOT\_FOUND".

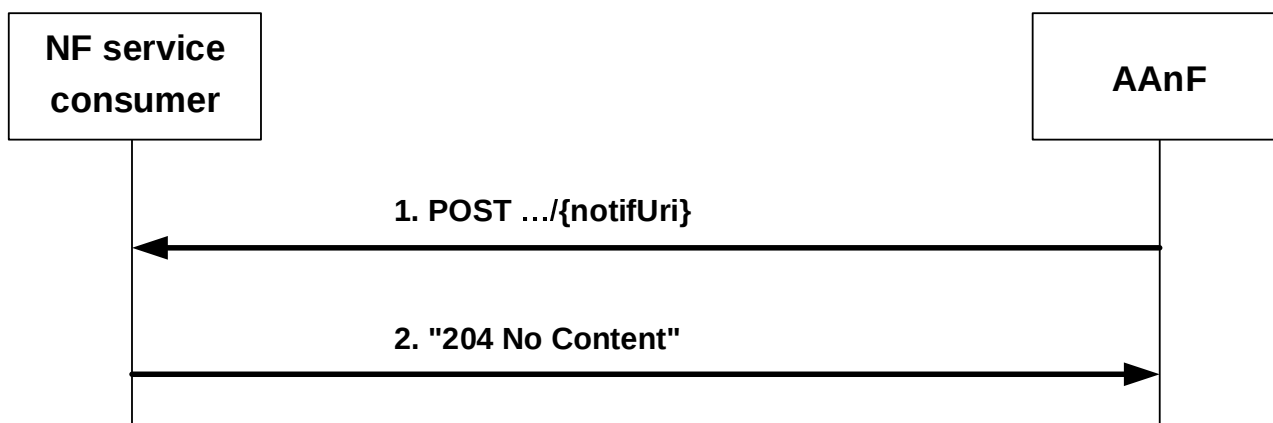
#### 4.2.2.5 Naanf\_AKMA\_Notify service operation

##### 4.2.2.5.1 General

The Naanf\_AKMA\_Notify service operation is used by the AAnF to notify a previously subscribed service consumer on AKMA service disablement.

##### 4.2.2.5.2 AKMA Service Disablement Notification

Figure 4.2.2.5.2-1 shows a scenario where the AAnF sends a notification to the NF service consumer on AKMA service disablement (see also 3GPP TS 33.535 [14]).



**Figure 4.2.2.5.2-1: AAnF notification to NF service consumer**

In order to notify a previously subscribed service consumer on AKMA service disablement, the AAnF shall invoke the Naanf\_AKMA\_Notify service operation by sending an HTTP POST request to the NF service consumer using the notification URI received during the related AKMA application key request procedure, as specified in clause 4.2.2.3.2, and the request body including the ServiceDisableNotif data structure.

Upon reception of the notification, the NF service consumer shall acknowledge the successful reception of the notification with a "204 No Content" status code.

If errors occur when processing the HTTP POST request, the NF service consumer shall send an appropriate HTTP error response as specified in clause 5.1.7. If the service consumer determines the received HTTP POST request needs to be redirected, the service consumer shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

## 5 API Definitions

### 5.1 Naanf\_AKMA Service API

#### 5.1.1 Introduction

The Naanf\_AKMA service shall use the Naanf\_AKMA API.

The API URI of the Naanf\_AKMA API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>**

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The <apiName> shall be "naanf-akma".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 5.1.3 and 5.1.4.

## 5.1.2 Usage of HTTP

### 5.1.2.1 General

HTTP/2, IETF RFC 9113 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Naanf\_AKMA API is contained in Annex A.

### 5.1.2.2 HTTP standard headers

#### 5.1.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

#### 5.1.2.2.2 Content type

JSON, IETF RFC 8259 [12], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 9457 [13].

### 5.1.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [4] shall be supported, and the optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4] may be supported.

In this release of the specification, no specific custom headers are defined for the Naanf\_AKMA Service API.

## 5.1.3 Resources

There are no resources defined for this API in this release of the specification.

## 5.1.4 Custom Operations without associated resources

### 5.1.4.1 Overview

The structure of the custom operation URIs of the Naanf\_AKMA API is shown in figure 5.1.4.1-1.

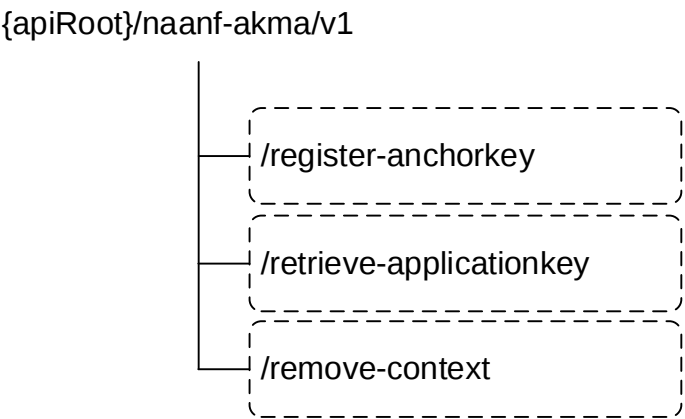


Figure 5.1.4.1-1: Custom operation URI structure of the Naanf\_AKMA API

Table 5.1.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the Naanf\_AKMA API.

Table 5.1.4.1-1: Custom operations without associated resources

| Operation               | Custom operation URI     | Mapped HTTP method | Description                                             |
|-------------------------|--------------------------|--------------------|---------------------------------------------------------|
| register-anchorkey      | /register-anchorkey      | POST               | Request to store AKMA related key material in the AAnF. |
| retrieve-applicationkey | /retrieve-applicationkey | POST               | Request to retrieve AKMA Application Key information.   |
| remove-context          | /remove-context          | POST               | Request to remove AKMA context in the AAnF.             |

5.1.4.2      Operation: Register

5.1.4.2.1      Description

The custom operation allows a NF service consumer to store AKMA related key material in the AAnF.

5.1.4.2.2      Operation Definition

This operation shall support the response data structures and response codes specified in tables 5.1.4.2.2-1 and 5.1.4.2.2-2.

Table 5.1.4.2.2-1: Data structures supported by the POST Request Body on this resource

| Data type   | P | Cardinality | Description                                                           |
|-------------|---|-------------|-----------------------------------------------------------------------|
| AkmaKeyInfo | M | 1           | AKMA related key material which is requested to be stored in the AAnF |

**Table 5.1.4.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                     | P | Cardinality | Response codes            | Description                                                           |
|-------------------------------------------------------------------------------------------------------------------------------|---|-------------|---------------------------|-----------------------------------------------------------------------|
| AkmaKeyInfo                                                                                                                   | M | 1           | 200 OK                    | The AKMA related key material was stored successfully.                |
| RedirectResponse                                                                                                              | O | 0..1        | 307<br>Temporary Redirect | Temporary redirection, during the retrieval notification.<br>(NOTE 2) |
| RedirectResponse                                                                                                              | O | 0..1        | 308<br>Permanent Redirect | Permanent redirection, during the retrieval notification.<br>(NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. |   |             |                           |                                                                       |
| NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]).            |   |             |                           |                                                                       |

**Table 5.1.4.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name                  | Data type | P | Cardinality | Description                                                                                                                                                                                                                                                                                            |
|-----------------------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location              | string    | M | 1           | Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification is redirected.<br><br>For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string    | O | 0..1        | Identifier of the target NF (service) instance towards which the notification request is redirected.                                                                                                                                                                                                   |

**Table 5.1.4.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name                  | Data type | P | Cardinality | Description                                                                                                                                                                                                                                                                                                   |
|-----------------------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location              | string    | M | 1           | Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected.<br><br>For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string    | O | 0..1        | Identifier of the target NF (service) instance towards which the notification request is redirected.                                                                                                                                                                                                          |

### 5.1.4.3 Operation: Retrieve

#### 5.1.4.3.1 Description

The custom operation allows a NF service consumer to retrieve AKMA Application Key information for the UE.

#### 5.1.4.3.2 Operation Definition

This operation shall support the response data structures and response codes specified in tables 5.1.4.3.2-1 and 5.1.4.3.2-2.

**Table 5.1.4.3.2-1: Data structures supported by the POST Request Body on this resource**

| Data type        | P | Cardinality | Description                                                         |
|------------------|---|-------------|---------------------------------------------------------------------|
| AkmaAfKeyRequest | M | 1           | Parameters to request to retrieve AKMA Application Key information. |

**Table 5.1.4.3.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                                                                                                                                                                                                                                                             | P | Cardinality | Response codes         | Description                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------|
| AkmaAfKeyData                                                                                                                                                                                                                                                                                                                                                         | M | 1           | 200 OK                 | The requested AKMA Application Key information was returned successfully. (NOTE 2)  |
| n/a                                                                                                                                                                                                                                                                                                                                                                   |   |             | 204 No Content         | If the requested data does not exist, the AAnF shall respond with "204 No Content". |
| RedirectResponse                                                                                                                                                                                                                                                                                                                                                      | O | 0..1        | 307 Temporary Redirect | Temporary redirection, during the retrieval notification. (NOTE 4)                  |
| RedirectResponse                                                                                                                                                                                                                                                                                                                                                      | O | 0..1        | 308 Permanent Redirect | Permanent redirection, during the retrieval notification. (NOTE 4)                  |
| ProblemDetails                                                                                                                                                                                                                                                                                                                                                        | O | 0..1        | 403 Forbidden          | (NOTE 3)                                                                            |
| NOTE 1: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.                                                                                                                                                                                                                                          |   |             |                        |                                                                                     |
| NOTE 2: For the "AkmaAfKeyData" data structure used in the current release of this specification, the "gpsi" attribute is not applicable and the "supi" attribute shall be included, except in the case of the anonymous user access procedure using the Naanf_AKMA_ApplicationKey_AnonUser_Get service operation, as defined in clause 6.2.2 of 3GPP TS 33.535 [14]. |   |             |                        |                                                                                     |
| NOTE 3: Failure cases are described in clause 5.1.7.3                                                                                                                                                                                                                                                                                                                 |   |             |                        |                                                                                     |
| NOTE 4: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]).                                                                                                                                                                                                                                                    |   |             |                        |                                                                                     |

**Table 5.1.4.3.2-3: Headers supported by the 307 Response Code on this resource**

| Name                  | Data type | P | Cardinality | Description                                                                                                                                                                                                                                                                                                   |
|-----------------------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location              | string    | M | 1           | Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected.<br><br>For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string    | O | 0..1        | Identifier of the target NF (service) instance towards which the notification request is redirected.                                                                                                                                                                                                          |

**Table 5.1.4.3.2-4: Headers supported by the 308 Response Code on this resource**

| Name                  | Data type | P | Cardinality | Description                                                                                                                                                                                                                                                                                                   |
|-----------------------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location              | string    | M | 1           | Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected.<br><br>For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string    | O | 0..1        | Identifier of the target NF (service) instance towards which the notification request is redirected.                                                                                                                                                                                                          |

#### 5.1.4.4 Operation: Remove

##### 5.1.4.4.1 Description

The custom operation allows a NF service consumer to delete the AKMA context for the UE.

##### 5.1.4.4.2 Operation Definition

This operation shall support the response data structures and response codes specified in tables 5.1.4.4.2-1 and 5.1.4.4.2-2.

**Table 5.1.4.4.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description                                                  |
|-----------|---|-------------|--------------------------------------------------------------|
| CtxRemove | M | 1           | Parameters to request to delete the AKMA context for the UE. |

**Table 5.1.4.4.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                    | P | Cardinality | Response codes         | Description                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                          |   |             | 204 No Content         | Successful case: The AKMA context matching the "CtxRemove" in the request body was deleted, the AAnF shall respond with "204 No Content".                                                           |
| RedirectResponse                                                                                                             | O | 0..1        | 307 Temporary Redirect | Temporary redirection, during remove procedure. The response shall include a Location header field containing an alternative URI of the resource located in an alternative AAnF (service) instance. |
| RedirectResponse                                                                                                             | O | 0..1        | 308 Permanent Redirect | Permanent redirection, during remove procedure. The response shall include a Location header field containing an alternative URI of the resource located in an alternative AAnF (service) instance. |
| ProblemDetails                                                                                                               | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                            |
| NOTE 1: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. |   |             |                        |                                                                                                                                                                                                     |
| NOTE 2: Failure cases are described in clause 5.1.7.3                                                                        |   |             |                        |                                                                                                                                                                                                     |

**Table 5.1.4.4.2-3: Headers supported by the 307 Response Code on this resource**

| Name                  | Data type | P | Cardinality | Description                                                                               |
|-----------------------|-----------|---|-------------|-------------------------------------------------------------------------------------------|
| Location              | String    | M | 1           | An alternative URI of the resource located in an alternative AAnF (service) instance.     |
| 3gpp-Sbi-Target-Nf-Id | String    | O | 0..1        | Identifier of the target AAnF (service) instance towards which the request is redirected. |

**Table 5.1.4.4.2-4: Headers supported by the 308 Response Code on this resource**

| Name                  | Data type | P | Cardinality | Description                                                                               |
|-----------------------|-----------|---|-------------|-------------------------------------------------------------------------------------------|
| Location              | string    | M | 1           | An alternative URI of the resource located in an alternative AAnF (service) instance.     |
| 3gpp-Sbi-Target-Nf-Id | string    | O | 0..1        | Identifier of the target AAnF (service) instance towards which the request is redirected. |

## 5.1.5 Notifications

### 5.1.5.1 General

Notifications shall comply to clause 6.2 of 3GPP TS 29.500 [5] and clause 4.6.2.3 of 3GPP TS 29.501 [6].

**Table 5.1.5-1: Notifications overview**

| Notification                          | Callback URI | HTTP method or custom operation | Description (service operation)                                                                     |
|---------------------------------------|--------------|---------------------------------|-----------------------------------------------------------------------------------------------------|
| AKMA Service Disablement Notification | {notifUri}   | POST                            | Enables the AAnF to notify a previously subscribed NF service consumer on AKMA service disablement. |

## 5.1.5.2 AKMA Service Disablement Notification

### 5.1.5.2.1 Description

The AKMA Service Disablement Notification is used by the AAnF to notify a previously subscribed NF service consumer on AKMA service disablement.

### 5.1.5.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 5.1.5.2.2-1.

**Table 5.1.5.2.2-1: Callback URI variables**

| Name     | Data type | Definition                                                                                                                         |
|----------|-----------|------------------------------------------------------------------------------------------------------------------------------------|
| notifUri | Uri       | The Notification URI provided by the NF service consumer during retrieval of AKMA application key as defined in table 5.1.4.3.2-1. |

### 5.1.5.2.3 Standard Methods

#### 5.1.5.2.3.1 POST

This method shall support the request data structures specified in table 5.1.5.2.3.1-1 and the response data structures and response codes specified in table 5.1.5.2.3.1-2.

**Table 5.1.5.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type           | P | Cardinality | Description                                           |
|---------------------|---|-------------|-------------------------------------------------------|
| ServiceDisableNotif | M | 1           | Represents the AKMA Service Disablement Notification. |

**Table 5.1.5.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                                | P | Cardinality | Response codes         | Description                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------|
| n/a                                                                                                                                      |   |             | 204 No Content         | Successful case. The notification is successfully received and acknowledged. |
| RedirectResponse                                                                                                                         | O | 0..1        | 307 Temporary Redirect | Temporary redirection.<br>(NOTE 2)                                           |
| RedirectResponse                                                                                                                         | O | 0..1        | 308 Permanent Redirect | Permanent redirection.<br>(NOTE 2)                                           |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] shall also apply. |   |             |                        |                                                                              |
| NOTE 2: The RedirectResponse data structure may be provided by an SCP (see clause 6.10.9.1 of 3GPP TS 29.500 [5]).                       |   |             |                        |                                                                              |

**Table 5.1.5.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name                  | Data type | P | Cardinality | Description                                                                                                                                                                                                                                                                                            |
|-----------------------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location              | string    | M | 1           | Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification is redirected.<br><br>For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string    | O | 0..1        | Identifier of the target NF (service) instance towards which the notification request is redirected                                                                                                                                                                                                    |

**Table 5.1.5.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name                  | Data type | P | Cardinality | Description                                                                                                                                                                                                                                                                                            |
|-----------------------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location              | string    | M | 1           | Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification is redirected.<br><br>For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string    | O | 0..1        | Identifier of the target NF (service) instance towards which the notification request is redirected                                                                                                                                                                                                    |

## 5.1.6 Data Model

### 5.1.6.1 General

This clause specifies the application data model supported by the Naanf\_AKMA API.

Table 5.1.6.1-1 specifies the data types defined for the Naanf\_AKMA service based interface protocol.

**Table 5.1.6.1-1: Naanf\_AKMA specific Data Types**

| Data type   | Clause defined | Description                             | Applicability |
|-------------|----------------|-----------------------------------------|---------------|
| AkmaKeyInfo | 5.1.6.2.2      | AKMA related key material.              |               |
| CtxRemove   | 5.1.6.2.3      | Indicate the AKMA context to be remove. |               |

Table 5.1.6.1-2 specifies data types re-used by the Naanf\_AKMA service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Naanf\_AKMA service based interface.

**Table 5.1.6.1-2: Naanf\_AKMA re-used Data Types**

| Data type           | Reference           | Comments                                                            | Applicability      |
|---------------------|---------------------|---------------------------------------------------------------------|--------------------|
| AKId                | 3GPP TS 29.522 [16] |                                                                     |                    |
| AkmaAfKeyData       | 3GPP TS 29.522 [16] | Parameters to present AKMA Application Key information.             |                    |
| AkmaAfKeyRequest    | 3GPP TS 29.522 [16] | Parameters to request to retrieve AKMA Application Key information. |                    |
| ServiceDisableNotif | 3GPP TS 29.522 [16] | Represents the AKMA Service Disablement Notification.               | RoamingRestriction |
| RedirectResponse    | 3GPP TS 29.571 [15] | Contains redirection related information.                           |                    |
| Supi                | 3GPP TS 29.571 [15] | Represents the SUPI.                                                |                    |
| Gpsi                | 3GPP TS 29.571 [15] | Represents the GPSI.                                                |                    |
| SupportedFeatures   | 3GPP TS 29.571 [15] | Used to negotiate the applicability of the optional features.       |                    |
| Uri                 | 3GPP TS 29.122 [18] | Represents a URI.                                                   | RoamingRestriction |

### 5.1.6.2 Structured data types

#### 5.1.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

## 5.1.6.2.2 Type: AkmaKeyInfo

**Table 5.1.6.2.2-1: Definition of type AkmaKeyInfo**

| Attribute name                                                                                                                                                                                                                                | Data type         | P | Cardinality | Description                                                                 | Applicability     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---|-------------|-----------------------------------------------------------------------------|-------------------|
| supi                                                                                                                                                                                                                                          | Supi              | C | 0..1        | SUPI of the UE.<br>(NOTE)                                                   |                   |
| aKId                                                                                                                                                                                                                                          | AKId              | M | 1           | A-KID                                                                       |                   |
| kAkma                                                                                                                                                                                                                                         | string            | M | 1           | K <sub>AKMA</sub>                                                           |                   |
| gpsi                                                                                                                                                                                                                                          | Gpsi              | C | 0..1        | GPSI of the UE.<br>(NOTE)                                                   | AKMA_GPSI_Support |
| suppFeat                                                                                                                                                                                                                                      | SupportedFeatures | O | 0..1        | Indicates the list of Supported features used as described in clause 5.1.8. |                   |
| NOTE: When the "AKMA_GPSI_Support" feature is supported, the presence of "supi" attribute and the "gpsi" attribute are mutually exclusive. When the "AKMA_GPSI_Support" feature is not supported, only the "supi" attribute shall be present. |                   |   |             |                                                                             |                   |

## 5.1.6.2.3 Type: CtxRemove

**Table 5.1.6.2.3-1: Definition of type CtxRemove**

| Attribute name                                                                                                                                        | Data type | P | Cardinality | Description | Applicability |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---|-------------|-------------|---------------|
| supi                                                                                                                                                  | Supi      | C | 0..1        | SUPI of UE  |               |
| NOTE: In current release of specification, only "supi" can be used to indicate the AKMA context to be remove. The "supi" attribute shall be included. |           |   |             |             |               |

## 5.1.6.3 Simple data types and enumerations

## 5.1.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.1.6.3.2 Simple data types

None in this release of the specification.

## 5.1.6.4 Data types describing alternative data types or combinations of data types

None in this release of the specification.

## 5.1.6.5 Binary data

None in this release of the specification.

## 5.1.7 Error Handling

## 5.1.7.1 General

For the Naanf\_AKMA API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

In addition, the requirements in the following clauses are applicable for the Naanf\_AKMA API.

### 5.1.7.2 Protocol Errors

No specific procedures for the Naanf\_AKMA service are specified.

### 5.1.7.3 Application Errors

The application errors defined for the Naanf\_AKMA service are listed in Table 5.1.7.3-1.

**Table 5.1.7.3-1: Application errors**

| Application Error           | HTTP status code | Description                                                                                                                                          | Applicability      |
|-----------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| K_AKMA_NOT_PRESENT          | 403 Forbidden    | Indicates that the K <sub>AKMA</sub> identified by the A-KID provided in the AKMA Application Key retrieval request body is not present at the AAnF. |                    |
| ROAMING_AKMA_SERVICE_DENIED | 403 Forbidden    | Indicates that the AAnF identifies the request is for a roaming UE and denies the request if the AKMA service is not allowed for the roaming UE.     | RoamingRestriction |
| AKMA_CONTEXT_NOT_FOUND      | 404 Not Found    | Indicates that the AKMA context to be deleted indicated by the "CtxRemove" Data type in the request body is not found.                               |                    |

### 5.1.8 Feature negotiation

The optional features in table 5.1.8-1 are defined for the Naanf\_AKMA API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

**Table 5.1.8-1: Supported Features**

| Feature number | Feature Name       | Description                                                                                                                   |
|----------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1              | AKMA_GPSI_Support  | This feature indicates the support of sending the GPSI as an alternative UE ID to an internal AF based on local policy.       |
| 2              | RoamingRestriction | This feature indicates the support of roaming UE detection by the network and the denial of the AKMA services to roaming UEs. |

### 5.1.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Naanf\_AKMA API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Naanf\_AKMA API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], clause 5.4.2.2.

**NOTE:** When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Naanf\_AKMA service.

The Naanf\_AKMA API defines the following scopes for OAuth2 authorization as described in clause 4.10 of 3GPP TS 29.501 [5].

Table 5.1.9-1: OAuth2 scopes defined in Naanf\_AKMA API

| Scope                                      | Description                                                                                                      |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| "naanf-akma"                               | Access to the Naanf_AKMA API                                                                                     |
| "naanf-akma:anchorkey"                     | Access to service operations applying to store and remove the AKMA related key material.                         |
| "naanf-akma:applicationkeyget"             | Access to service operations applying to request the AKMA Application Key information for the UE.                |
| "naanf-akma:applicationkeyget:supi-access" | Access to the Naanf_AKMA API to enable the returning of SUPI in the AKMA Application Key information for the UE. |

---

# Annex A (normative): OpenAPI specification

## A.1 General

This Annex specifies the formal definition of the API(s) defined in the present specification. It consists of OpenAPI 3.0.0 specifications in YAML format.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see 3GPP TS 29.501 [5] clause 5.3.1 and 3GPP TR 21.900 [7] clause 5B).

---

## A.2 Naanf\_AKMA API

```
openapi: 3.0.0
info:
  title: 3gpp-akma
  version: 1.1.1
  description: |
    API for Naanf_AKMA.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.535 V18.7.0; 5G System; AKMA Anchor Services.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.535/'

security:
  - {}
  - OAuth2ClientCredentials:
      - naanf-akma
servers:
  - url: '{apiRoot}/naanf-akma/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.

paths:
  /register-anchorkey:
    post:
      summary: Store AKMA related key material.
      operationId: RegisterAKMAKey
      tags:
        - Register the AKMA related key material
      security:
        - {}
        - OAuth2ClientCredentials:
            - naanf-akma
        - OAuth2ClientCredentials:
            - naanf-akma
            - naanf-akma:anchorkey
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AkmaKeyInfo'
      responses:
```

```

'200':
  description: The requested information was returned successfully.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/AkmaKeyInfo'
'307':
  $ref: 'TS29571_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29571_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29571_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29571_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29571_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29571_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29571_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29571_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29571_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29571_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
'502':
  $ref: 'TS29571_CommonData.yaml#/components/responses/502'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'

/retrieve-applicationkey:
  post:
    summary: Request to retrieve AKMA Application Key information.
    operationId: GetAKMAAPPKeyMaterial
    tags:
      - Retrieve the AKMA Application key material (Collection)
    security:
      - {}
      - OAuth2ClientCredentials:
          - naanf-akma
      - OAuth2ClientCredentials:
          - naanf-akma
          - naanf-akma:applicationkeyget
      - OAuth2ClientCredentials:
          - naanf-akma
          - naanf-akma:applicationkeyget
          - naanf-akma:applicationkeyget:supi-access
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: 'TS29522_AKMA.yaml#/components/schemas/AkmaAfKeyRequest'
    responses:
      '200':
        description: The requested information was returned successfully.
        content:
          application/json:
            schema:
              $ref: 'TS29522_AKMA.yaml#/components/schemas/AkmaAfKeyData'
      '204':
        description: No Content (The requested AKMA Application material does not exist.)
      '307':
        $ref: 'TS29571_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29571_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29571_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29571_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29571_CommonData.yaml#/components/responses/403'
      '404':

```

```

    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29571_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29571_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '502':
    $ref: 'TS29571_CommonData.yaml#/components/responses/502'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
callbacks:
  ServiceDisablementNotification:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          description: >
            Represents the AKMA Service Disablement Notification.
          required: true
          content:
            application/json:
              schema:
                $ref: 'TS29522_AKMA.yaml#/components/schemas/ServiceDisableNotif'
        responses:
          '204':
            description: No content. The notification is successfully received and processed.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/remove-context:
  post:
    summary: Request to remove the AKMA related key material.
    operationId: RemoveContext
    tags:
      - Remove the AKMA Application key material (deletion)
    security:
      - {}
      - OAuth2ClientCredentials:
          - naanf-akma
      - OAuth2ClientCredentials:
          - naanf-akma
          - naanf-akma:anchorkey
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/CtxRemove'

```

```
responses:
  '204':
    description: No Content (The AKMA context for the UE has been removed successfully.)
  '307':
    $ref: 'TS29571_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29571_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29571_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29571_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29571_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29571_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '502':
    $ref: 'TS29571_CommonData.yaml#/components/responses/502'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            naanf-akma: Access to the Naanf_AKMA API
            naanf-akma:anchorkey: >
              Access to service operations applying to store or remove the AKMA related key
              material.
            naanf-akma:applicationkeyget: >
              Access to service operations applying to request the AKMA Application Key information
              for the UE.
            naanf-akma:applicationkeyget:supi-access: >
              Return SUPI in the AKMA Application Key information for the UE.
```

```
schemas:
  AkmaKeyInfo:
    description: Represents AKMA related key material.
    type: object
    properties:
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      supi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
      gpsi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      aKId:
        $ref: 'TS29522_AKMA.yaml#/components/schemas/AKId'
      kAkma:
        type: string
    required:
      - aKId
      - kAkma
    oneOf:
      - required: [supi]
      - required: [gpsi]
```

```
CtxRemove:
  description: >
    Parameters to request to delete the AKMA context for the UE, the "supi" attribute shall be
    included.
  type: object
```

```
properties:
  supi:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
```

## Annex B (informative): Change history

| Change history |          |           |      |     |     |                                                                                                                           |             |
|----------------|----------|-----------|------|-----|-----|---------------------------------------------------------------------------------------------------------------------------|-------------|
| Date           | Meeting  | TDoc      | CR   | Rev | Cat | Subject/Comment                                                                                                           | New version |
| 2020-11        | CT3#112e |           |      |     |     | TS skeleton of AKMA Anchor Services.                                                                                      | 0.0.0       |
| 2020-11        | CT3#112e |           |      |     |     | Inclusion of documents agreed in CT3#112e C3-205585, C3-205586.                                                           | 0.1.0       |
| 2021-01        | CT3#113e |           |      |     |     | Inclusion of documents agreed in CT3#113e C3-210291, C3-210292, C3-210222, C3-210293, C3-210294, C3-210295.               | 0.2.0       |
| 2021-01        | CT3#113e |           |      |     |     | Inclusion of documents agreed in CT3#114e C3-211238, C3-21396, C3-211397, C3-211398, C3-211399, C3-211400, and C3-211401. | 0.3.0       |
| 2021-03        | CT#91e   | CP-210182 |      |     |     | Sent to plenary for Approval                                                                                              | 1.0.0       |
| 2021-03        | CT#91e   | CP-210182 |      |     |     | TS approved by plenary                                                                                                    | 17.0.0      |
| 2021-06        | CT#92e   | CP-211234 | 0001 | 1   | F   | Adding a missing description field to data type definitions in OpenAPI specification files of the Naanf_AKMA API          | 17.1.0      |
| 2021-06        | CT#92e   | CP-211214 | 0002 | 1   | F   | Adding a missing description field to data type definitions in OpenAPI specification files of the Naanf_AKMA API          | 17.1.0      |
| 2021-06        | CT#92e   | CP-211214 | 0003 |     | F   | Adding Clause 5.1.4.3.1                                                                                                   | 17.1.0      |
| 2021-06        | CT#92e   | CP-211214 | 0005 | 1   | F   | Custom operation URI                                                                                                      | 17.1.0      |
| 2021-06        | CT#92e   | CP-211214 | 0006 |     | F   | Terminology alignment of AKMA Application Key information                                                                 | 17.1.0      |
| 2021-06        | CT#92e   | CP-211234 | 0007 | 1   | F   | Redirect responses with "application/json" media type                                                                     | 17.1.0      |
| 2021-06        | CT#92e   | CP-211234 | 0008 | 1   | F   | Optional header clarification                                                                                             | 17.1.0      |
| 2021-06        | CT#92e   | CP-211265 | 0009 |     | F   | Update of OpenAPI version and TS version in externalDocs field                                                            | 17.1.0      |
| 2021-09        | CT#93e   | CP-212220 | 0011 | 1   | F   | CR 0011 29.535 Rel-17 Correcting CR #0007 implementation                                                                  | 17.2.0      |
| 2021-12        | CT#94e   | CP-213218 | 0012 | 2   | B   | Naanf_AKMA_ContextRemove service operation                                                                                | 17.3.0      |
| 2021-12        | CT#94e   | CP-213218 | 0014 | 2   | F   | Correction on Naanf_AKMA_ApplicationKey_Get service operation on sending UE ID to the AKMA AF                             | 17.3.0      |
| 2021-12        | CT#94e   | CP-213246 | 0015 |     | F   | Update of OpenAPI version and TS version in externalDocs field                                                            | 17.3.0      |
| 2022-01        |          |           |      |     |     | Update of specification filename in the zip                                                                               | 17.3.1      |
| 2022-03        | CT#95e   | CP-220180 | 0016 |     | B   | Specifying the error case of KAKMA key not present in the AAnF                                                            | 17.4.0      |
| 2022-03        | CT#95e   | CP-220180 | 0017 | 1   | F   | Miscellaneous corrections                                                                                                 | 17.4.0      |
| 2022-03        | CT#95e   | CP-220194 | 0018 |     | F   | Update of info and externalDocs fields                                                                                    | 17.4.0      |
| 2022-06        | CT#96    | CP-221159 | 0019 |     | F   | Update of info and externalDocs fields                                                                                    | 17.5.0      |
| 2022-09        | CT#97e   | CP-222096 | 0020 | 2   | F   | Application errors reference update in the tables defining methods on the resources for Naanf_AKMA API                    | 17.6.0      |
| 2022-09        | CT#97e   | CP-222096 | 0021 | 1   | F   | Support for Naanf_AKMA_ApplicationKey_AnonUser_Get service operation                                                      | 17.6.0      |
| 2022-09        | CT#97e   | CP-222096 | 0023 |     | F   | Missing redirection in AKMA Context removal procedure                                                                     | 17.6.0      |
| 2022-09        | CT#97e   | CP-222121 | 0024 |     | F   | Update of info and externalDocs fields                                                                                    | 17.6.0      |
| 2022-12        | CT#98e   | CP-223168 | 0026 | 1   | F   | Correction for AKMA Application Key Request                                                                               | 17.7.0      |
| 2022-12        | CT#98e   | CP-223168 | 0027 | 1   | F   | Cardinality for CtxRemove                                                                                                 | 17.7.0      |
| 2022-12        | CT#98e   | CP-223188 | 0028 |     | F   | Update of info and externalDocs fields                                                                                    | 17.7.0      |
| 2022-12        | CT#98e   | CP-223191 | 0025 |     | F   | Adding the mandatory error code 502 Bad Gateway                                                                           | 18.0.0      |
| 2022-12        | CT#98e   | CP-223189 | 0029 |     | F   | Update of info and externalDocs fields                                                                                    | 18.0.0      |
| 2023-03        | CT#99    | CP-230167 | 0030 | 1   | B   | OAuth2 scopes in Naanf_AKMA API                                                                                           | 18.1.0      |
| 2023-03        | CT#99    | CP-230166 | 0031 |     | F   | Miscellaneous changes in Naanf_AKMA API                                                                                   | 18.1.0      |
| 2023-03        | CT#99    | CP-230161 | 0033 |     | F   | Update of info and externalDocs fields                                                                                    | 18.1.0      |
| 2023-06        | CT#100   | CP-231131 | 0034 | 1   | F   | Correction of a referenced clause number                                                                                  | 18.2.0      |
| 2023-06        | CT#100   | CP-231261 | 0037 | 2   | B   | Including GPSI attribute support                                                                                          | 18.2.0      |
| 2023-06        | CT#100   | CP-231132 | 0040 | 1   | F   | Corrections to the redirection mechanism description                                                                      | 18.2.0      |
| 2023-06        | CT#100   | CP-231141 | 0041 |     | F   | Update of info and externalDocs fields                                                                                    | 18.2.0      |
| 2023-09        | CT#101   | CP-232086 | 0039 | 2   | F   | Support for SUPI access in AKMA Application Key information                                                               | 18.3.0      |
| 2023-09        | CT#101   | CP-232085 | 0042 |     | F   | Update of info and externalDocs fields                                                                                    | 18.3.0      |
| 2023-12        | CT#102   | CP-233229 | 0044 | 1   | F   | IETF RFC 7540, RFC 7807 obsoleted by RFC 9113 and RFC 9457 respectively                                                   | 18.4.0      |
| 2024-06        | CT#104   | CP-241095 | 0046 | 1   | B   | Update AKMA procedures to support Roaming restrictions.                                                                   | 18.5.0      |
| 2024-06        | CT#104   | CP-241085 | 0048 |     | F   | Update of info and externalDocs fields                                                                                    | 18.5.0      |
| 2024-07        | CT#105   |           |      |     |     | Correction to fix OpenAPI parsing errors" in the comments                                                                 | 18.5.1      |
| 2024-12        | CT#106   | CP-243103 | 0050 | 1   | F   | Correcting the name of the data type conveying the AKMA service disablement notification                                  | 18.6.0      |
| 2025-09        | CT#109   | CP-252098 | 0059 | 1   | F   | Misalignment name of security scope for OAuth2                                                                            | 18.7.0      |
| 2025-09        | CT#109   | CP-252095 | 0063 |     | A   | Incorrect consumer of ContextRemove service operation                                                                     | 18.7.0      |
| 2025-09        | CT#109   | CP-252112 | 0065 |     | F   | Update of info and externalDocs fields                                                                                    | 18.7.0      |

---

# History

| Document history |                |             |
|------------------|----------------|-------------|
| V18.4.0          | May 2024       | Publication |
| V18.5.1          | August 2024    | Publication |
| V18.6.0          | January 2025   | Publication |
| V18.7.0          | September 2025 | Publication |
|                  |                |             |