**3GPP TSG-CT3 Meeting #134 *C3-242066***

[**Changsha**](https://www.3gpp.org/ftp/tsg_ct/WG3_interworking_ex-CN3/TSGC3_128_Bratislava/Invitation/)**, China, 15th April – 19th April 2024**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.535** | **CR** |  **0046** | **rev** | **-** | **Current version:** | **18.4.0** |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Update AKMA procedures to support Roaming restrictions. |
|  |  |
| ***Source to WG:*** | Nokia, China Mobile |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | TEI18, AKMA-CT |  | ***Date:*** | 2024-04-08 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *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 canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| Reason for change: | As per agreed stage-2 CR (S3-240915), following new requirements related to detection of roaming UEs and restrictions of AKMA services to such roaming UEs has been agreed. From TS 33.535:cl 6.2.1:If the AAnF finds that roaming is not allowed, it shall respond the AF containing a failure indication that roaming is not allowed.7.1.3 Naanf\_AKMA\_ApplicationKey\_Get service operation **Service operation name:** Naanf\_AKMA\_ApplicationKey\_Get.**Description:** The NF consumer requests AKMA Application Key and UE ID from the AAnF.**Input, Required:** A-KID, AF\_ID **Input, Optional:** Service Disable URI. **Output, Required:****Output, Optional:** KAF, KAF expiration time and SUPI or GPSI or failure indication.7.1.5 Naanf\_AKMA\_ApplicationKey\_ AnonUser\_Getservice operation **Service operation name:** Naanf\_AKMA\_ApplicationKey\_AnonUser\_Get.**Description:** The NF consumer requests only the AKMA Application Key from the AAnF. This service is for allowing anonymous user access to the AF based on A-KID (i.e., UE identification is not required at the AF). The A-KID functions as a temporary user identifier.**Input, Required:** A-KID, AF\_ID **Input, Optional:** Service Disable URI. 7.1.x Naanf\_AKMA\_ServiceDisableNotification service operation**Service operation name:** Naanf\_AKMA\_ServiceDisableNotification**Description:** AAnFnotifies the NF consumer about AKMA service disableNOTE: The AF is implicitly subscribed to receive Naanf\_AKMA\_ServiceDisableNotification service operation. **Input, Required:** A-KID**Input, Optional:** None**Output, Required:** None**Output, Optional:** None |
|  |  |
| ***Summary of change:*** | 1. Including support of Notification from AAnF towards NF service consumer.
2. Define new data type ServiceDisableNotif used in notification of AKMA service disable information.

Added new application error to deny AKMA service for the roaming UE. |
|  |  |
| ***Consequences if not approved:*** | Misalignment between stage-3 implementations and stage-2 requirements. |
|  |  |
| ***Clauses affected:*** | 4.1, 4.2.1.3.2, 4.2.2.1, 4.2.2.3.2, 4.2.2.5 (new), 5.1.5, 5.1.5.1(new), 5.1.5.2 (new), 5.1.6.1, 5.1.8, 5.1.7.3, A.2  |
|  |  |
|  | **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 provides new backward compatible feature support to the Open API: Naanf\_AKMA API |
|  |  |
| ***This CR's revision history:*** |  |

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

# 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)".

\* \* \* \* Next change \* \* \* \*

## 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 | OperationSemantics | 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 |
| ServiceDisableNotification | Request/Response | AF, NEF |
| ApplicationKey\_AnonUser\_Get(NOTE 2) | Request/Response | AF |
| ContextRemove | Request/Response | AUSF |
| 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 |

\* \* \* \* Next change \* \* \* \*

#### 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\_AnonUser\_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. | AUSF |
| Naanf\_AKMA\_ ServiceDisableNotification | This service operation is used by an NF to notify AKMA service disable information. | AAnF |

\* \* \* \* Next change \* \* \* \*

##### 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.

- notify an NF service consumer about AKMA service disable.

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 KAF from the AAnF;

- performs the AAnF selection if the AF located inside the operator's network.

\* \* \* \* Next change \* \* \* \*

##### 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, which may include a notification URI within "notifUri" if the feature "RoamingRestriction" is supported to receive notification regarding AKMA service disable information.

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 KAKMA key identified by the A-KID.

- If KAKMA 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 KAKMA is present in the AAnF, the AAnF shall continue and process the request as specified below.

The AAnF shall also verify the roaming status of the UE by querying the UDM using the Nudm\_EventExposure\_Subscribe service as defined in clause 6.3 in 3GPP TS 33.535 [14].

- If AAnF identifies the request is for the Roaming UE (e.g. the AAnF have received the roaming status from the UDM) 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 and the response message body including a ProblemDetails data structure with the "cause" attribute set to the "AKMA\_SERVICE\_DENIED\_FOR\_ROAMING\_UE" application error specified in table 5.1.7.3-1.NOTE: When UE is dual registered, the UE is treated as roaming if at least one of the serving PLMNs indicates the UE is roaming.

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:

- KAF as "kaf" attribute;

- KAF 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.

\* \* \* \* Next change \* \* \* \*

#### 4.2.2.5 Naanf\_AKMA\_ServiceDisableNotification service operation

##### 4.2.2.5.1 General

The Naanf\_AKMA\_ServiceDisableNotification service operation is used by AAnF to notify the Service consumer about AKMA service disable notification information.

##### 4.2.2.5.2 AKMA Service Disable notification

Figure 4.2.2.5.2-1 shows a scenario where the AAnF sends a notification to the NF service consumer the AKMA service disable information (as shown in 3GPP TS 33.535 [14]).



Figure 4.2.2.5.2-1: AAnF notification to NF service consumer

When the AAnF receives a notification Nudm\_EventExposure\_Notification from the UDM indicating that the UE is roaming, the AAnF shall invoke the Naanf\_AKMA\_ServiceDisableNotification service operation to subscribed NF service consumer to notify AKMA service disable information. The AAnF shall send an HTTP POST request to the NF service consumer using the notification URI received in the AKMA application key request, as specified in clause 4.2.2.3.2, and appending the "notify" segment path at the end of the URI. The AAnF shall provide in the body of the HTTP POST request the "ServiceDisableNotify" data type including:

- the A-KID as "aKId" attribute;

If the HTTP POST request from the AAnF is accepted, the NF service consumer (e.g. AF) shall acknowledge the receipt of the notification with a "204 No Content" response to HTTP POST request and may stop the AKMA service.

If errors occur when processing the HTTP POST request, the NF service consumer shall send an 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].

\* \* \* \* Next change \* \* \* \*

### 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) |
| ServiceDisableNotification | {notifUri}/notify | notify (POST) | AAnF notifies the subscribed NF service consumer the AKMA service disable information. |

\* \* \* \* Next change \* \* \* \*

#### 5.1.5.2 AKMA Service Disable Notification

##### 5.1.5.2.1 Description

The ServiceDisableNotification is used by the AAnF to notify the subscribed NF service consumer about AKMA service disable information.

\* \* \* \* Next change \* \* \* \*

##### 5.1.5.2.2 Target URI

The Callback URI **"{notifUri}/notify"** 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 retrievel of AKMA application key as defined in table 5.1.4.3.2-1. |

\* \* \* \* Next change \* \* \* \*

##### 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 | Provides AKMA service disable information. |

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 | The receipt of the Notification is acknowledged. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during the notification. (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during the notification. (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [5] for the POST method 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.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.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 |

\* \* \* \* Next change \* \* \* \*

#### 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] | Parameters to notify the AKMA service disable information. | 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. | Uri |

\* \* \* \* Next change \* \* \* \*

### 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 dening AKMA services to the roaming UE. |

\* \* \* \* Next change \* \* \* \*

#### 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 KAKMA identified by the A-KID provided in the AKMA Application Key retrieval request body is not present at the AAnF. |  |
| AKMA\_SERVICE\_DENIED\_FOR\_ROAMING\_UE | 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. |  |

\* \* \* \* Next change \* \* \* \*

# A.2 Naanf\_AKMA API

openapi: 3.0.0

info:

 title: 3gpp-akma

 version: 1.1.0-alpha.4

 description: |

 API for Naanf\_AKMA.

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externalDocs:

 description: 3GPP TS 29.535 V18.3.0; 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

 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:

 ServiceDisableNotification:

 '{$request.body#/notifUri/notify}':

 post:

 requestBody:

 description: >

 Represents the AKMA service disable information.

 required: true

 content:

 application/json:

 schema:

 $ref: 'TS29522\_AKMA.yaml#/components/schemas/ServiceDisableNotif'

 responses:

 '204':

 description: No content. The notification is successfully received.

 '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'

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