**3GPP TSG-CT3 Meeting #119-e *C3-216312***

**E-Meeting, 11th – 19th November 2021 (Revision of C3-215289, 5412)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.535** | **CR** | **0012** | **rev** | **2** | **Current version:** | **17.2.0** |  |
|  | | | | | | | | |
| *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:*** | Naanf\_AKMA\_ContextRemove service operation | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | China Mobile Communications Group Co.,Ltd., Samsung, Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | AKMA-CT, SBIProtoc17 | | | | |  | ***Date:*** | | | 2021-09-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introduce the new Naanf\_AKMA\_ContextRemove service operation as specified in clause 7.1.4 in 3GPP TS 33.535.  Definition of the API URI of the Naanf\_AKMA API contains a trailing slash which needs to be removed and aligned with the latest version of the SBI TS template. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Introduce the Naanf\_AKMA\_ContextRemove service operation.  Trailing slash removed from definition of the API URI | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Stage 3 specification is not completed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.1, 4.2.2.x, 5.1.3.1, 5.1.4.1, 5.1.4.x, 5.1.6.1, 5.1.6.2.x, 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:*** | | The CR introduce backward compatible feature to the OpenAPI file for Naanf\_AKMA API. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Changes after C3-215412 agreed in CT3#118e:  1. Add the "$ref: " before '#/components/schemas/CtxRemove';  2. Add the 7th change in clause 5.1.6.1 to introduce new data type "CtxRemove". | | | | | | | | |

\*\*\* 1st 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 | 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 |
| ContextRemove | Request/Response | AUSF |
| NOTE: The service corresponds to the Naanf\_AKMA service as defined in 3GPP TS 33.535 [14]. | | | | |

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 |

\*\*\* 2nd Change \*\*\*

#### 4.2.2.x Naanf\_AKMA\_ContextRemove service operation

##### 4.2.2.x.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.x.2 AKMA Context removal

Figure 4.2.2.x.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.x.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.x.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.

Upon the reception of the HTTP POST request, if the AKMA context (e.g. A-KID, KAKMA) 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".

\*\*\* 3rd Change \*\*\*

### 5.1.1 Introduction

The Naanf\_AKMA 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.

\*\*\* 4th Change \*\*\*

#### 5.1.3.1 Overview

The Naanf\_AKMA API support only custom operations as described in clause 5.1.4 in this release of the specification.



Figure 5.1.3.1-1: Resource URI structure of the Naanf\_AKMA API

\*\*\* 5th Change \*\*\*

#### 5.1.4.1 Overview

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. |

\*\*\* 6th Change \*\*\*

#### 5.1.4.x Operation: Remove

##### 5.1.4.x.1 Description

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

##### 5.1.4.x.2 Operation Definition

This operation shall support the response data structures and response codes specified in tables 5.1.4.x.2-1 and 5.1.4.x.2-2.

Table 5.1.4.x.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.x.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 | The AKMA context matching the "CtxRemove" in the request body does not exist. Or indicates other application errors. |
| NOTE 1: The manadatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |

Table 5.1.4.x.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.x.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. |

\*\*\* 7th 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.x | 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. |  |
| RedirectResponse | 3GPP TS 29.571 [15] | Contains redirection related information. |  |
| Supi | 3GPP TS 29.571 [15] |  |  |
| SupportedFeatures | 3GPP TS 29.571 [15] | Used to negotiate the applicability of the optional features. |  |

\*\*\* 8th Change \*\*\*

##### 5.1.6.2.x Type: CtxRemove

Table 5.1.6.2.x-1: Definition of type CtxRemove

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

\*\*\* 9th 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 |
| 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. |

\*\*\* 10th Change \*\*\*

# A.2 Naanf\_AKMA API

openapi: 3.0.0

info:

title: 3gpp-akma

version: 1.0.0-alpha.2

description: |

API for Naanf\_AKMA.

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externalDocs:

description: 3GPP TS 29.535 V17.1.0; 5G System; AKMA Anchor Services.

url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.535/'

security:

- {}

- oAuth2ClientCredentials: []

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

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'

'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)

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'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_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)

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':

description: Indicates that the AKMA context for the UE as indiated in the "CtxRemove" data type in the request body does not exist.

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'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'

'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

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'

aKId:

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

kAkma:

type: string

required:

- supi

- aKId

- kAkma

CtxRemove:

description: Parameters to request to delete the AKMA context for the UE.

type: object

properties:

supi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'

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