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TECHNICAL SPECIFICATION

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UE radio capability management services;
Stage 3
(3GPP TS 29.673 version 19.1.0 Release 19)**



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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.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

- 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.

1 Scope

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

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

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].

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: "Hypertext Transfer Protocol Version 2 (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 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [15] 3GPP TS 38.413: "NG Radio Access Network (NG-RAN); NG Application Protocol (NGAP)".
- [16] 3GPP TS 29.274: "3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3".
- [17] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)"

3 Definitions of terms, symbols and abbreviations

3.1 Terms

void

3.2 Symbols

void

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].

| | |
|------|---|
| MME | Mobility Management Entity |
| UCMF | UE radio Capability Management Function |

4 Overview

4.1 Introduction

Within the 5GC, the UCMF offers services to the NF (e.g. AMF and MME) via the Nucmf service based interface (see 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3]).

Figure 4.1-1 provides the reference model (in service based interface representation and in reference point representation), with focus on the UCMF and the scope of the present specification.

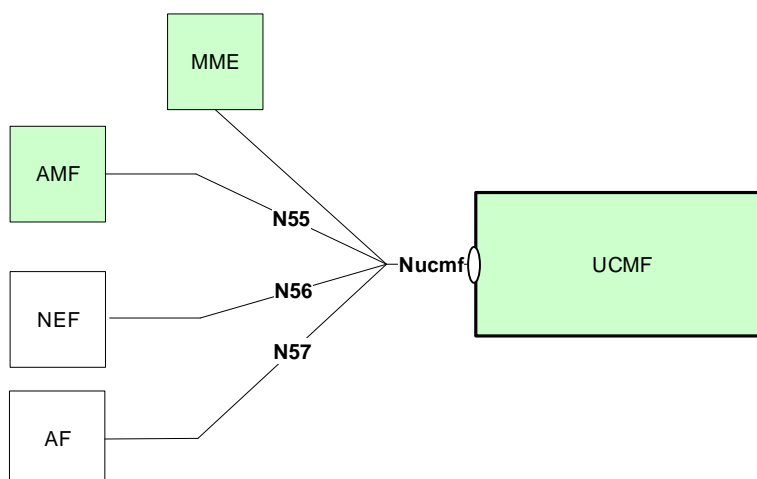


Figure 4.1-1: Reference model – UCMF

The functionalities supported by the UCMF are listed in clause 6.2.5 of 3GPP TS 23.501 [2].

5 Services offered by the UCMF

5.1 Introduction

The UCMF supports the following services.

Table 5.1-1: NF Services provided by UCMF

| Service Name | Description | Example Consumer |
|------------------------------|--|------------------|
| Nucmf_UECapabilityManagement | <p>Allows the NF consumer to resolve UE Radio Capability ID (either Manufacturer-assigned or PLMN-assigned) into the corresponding UE radio access capability and the corresponding UE Radio Capability for Paging.</p> <p>Allows the NF consumer to obtain a PLMN-assigned UE Radio Capability ID for a specific UE radio access capability.</p> <p>Allows the NF consumer to subscribe or unsubscribe for notifications of UCMF dictionary entries.</p> <p>Allows the NF consumer to be notified about creation and deletion of UCMF dictionary entries.</p> | AMF, MME |

5.2 Nucmf_UECapabilityManagement Service

5.2.1 Service Description

The Nucmf_UECapabilityManagement service operates on the dictionary entries for the mapping between UE Radio Capability ID and UE Radio Access Capability Information. The service operations exposed by this service allow service consumer NF, e.g. an AMF:

- to retrieve UE radio access capability information with a UE Radio Capability ID (either Manufacturer-assigned or PLMN-assigned);
- to obtain a PLMN-assigned UE Radio Capability ID for a specific UE radio access capability information;
- to subscribe or unsubscribe for notifications of UCMF dictionary entries;
- to be notified about creation and deletion of UCMF dictionary entries;

The Nucmf_UECapabilityManagement service supports the following service operations;

Table 5.2.1-1: Service operations supported by the Nucmf_UECapabilityManagement service

| Service Operations | Description | Operation Semantics | Example Consumer(s) |
|--------------------|--|---------------------|---------------------|
| Resolve | Retrieve UE radio access capability information from the dictionary entry identified by the UE Radio Capability ID (either Manufacturer-assigned or PLMN-assigned) | Request/Response | AMF, MME |
| Assign | Request to assign a UE Radio Capability ID by providing the UE Radio Capability Information. See 3GPP TS 23.502 clause 5.2.18.3.2. | Request/Response | AMF, MME |
| Subscribe | Subscribe for notifications of UCMF dictionary entries. | Subscribe/Notify | AMF, MME |
| Unsubscribe | Unsubscribe for notifications of UCMF dictionary entries. | Subscribe/Notify | AMF, MME |
| Notify | To be notified about creation and deletion of UCMF dictionary entries. | Subscribe/Notify | AMF, MME |

5.2.2 Service Operations

5.2.2.1 Introduction

See Table 5.2.1-1 for an overview of the service operations supported by the Nucmf_UECapabilityManagement service.

5.2.2.2 Service Operation Resolve

5.2.2.2.1 General

The Resolve service operation shall be used to retrieve UE Radio Access Capability Information from a dictionary entry stored in the UCMF, by a NF service consumer, e.g. an AMF, when:

- it has received an unknown UE Radio Capability ID, which is either Manufacturer-assigned or PLMN-assigned;

The NF Service Consumer (e.g. AMF) shall retrieve UE Radio Access Capability Information by using the HTTP GET method as shown in Figure 5.2.2.2.1-1.

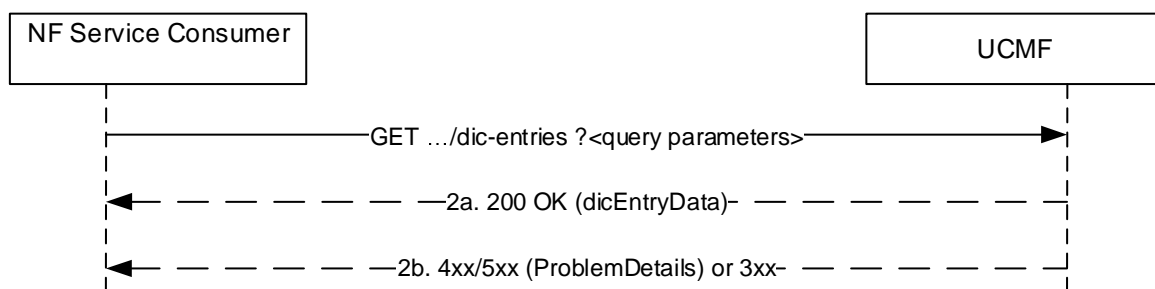


Figure: 5.2.2.2.1-1 Retrieve UE Radio Access Capability Information

1. The NF Service Consumer, e.g. an AMF, shall send an HTTP GET request to the resource URI Dictionary Entries collection resource. The query parameters are a Manufacturer-assigned or a PLMN-assigned UE Radio Capability ID, and the Coding format (e.g. 5GS or EPS) in which UE Radio Access Capability Information needs to be provided.
- 2a. On success, "200 OK" shall be returned. The response body shall contain UE Radio Access Capability Information in the requested Coding format stored in the dictionary entry that is matching the UE Radio Capability ID in query, and may contain a PLMN-assigned UE Radio Capability ID if the query parameter is a Manufacturer-assigned UE Radio Capability ID and if the PLMN-assigned UE Radio Capability ID mechanism is used in the network.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.3.2-3 shall be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.3.3.2-2, where applicable.

5.2.2.2.2 Retrieve a Dictionary Entry

The Resolve service operation may be used to retrieve a dictionary entry stored in the UCMF, by a NF service consumer, e.g. an AMF, when it has the Dictionary Entry ID available.

The NF Service Consumer (e.g. AMF) shall retrieve a Dictionary Entry by using the HTTP GET method as shown in Figure 5.2.2.2.1-1.

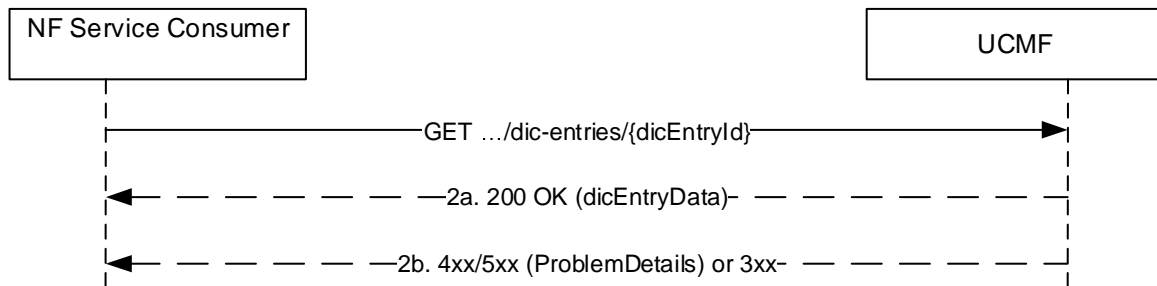


Figure 5.2.2.2.1-1 Retrieve a dictionary entry

1. The NF Service Consumer, e.g. an AMF, shall send an HTTP GET request to an individual Dictionary Entry resource. The query parameter is the Coding Format (e.g. 5GS or EPS) in which UE Radio Access Capability Information needs to be provided.
- 2a. On success, "200 OK" shall be returned. The response body shall the dictionary entry information for the given Dictionary Entry ID.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.3.2-3 shall be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.3.3.2-3, where applicable.

5.2.2.3 Service Operation Assign

The Assign service operation shall be used by the service consumer NF (e.g. AMF) to obtain a PLMN-assigned UE Radio Capability ID from the UCMF for a specific UE radio access capability information. The UCMF shall create a new dictionary entry and assign a PLMN-assigned UE Radio Capability ID unless such dictionary entry already exists and a PLMN-assigned UE Radio Capability ID has already been assigned to the given UE radio access capability information in the UCMF. The NF service consumer, e.g. an AMF, may consume the service by providing the UE Radio Access Capability Information retrieved from the UE, and Type Allocation Code of PEI of the UE, e.g. when it hasn't received any UE Radio Capability ID.

The NF Service Consumer (e.g. AMF) shall obtain the PLMN Assigned UE Radio Capability ID by using the HTTP POST method as shown in Figure 5.2.2.3.1-1.

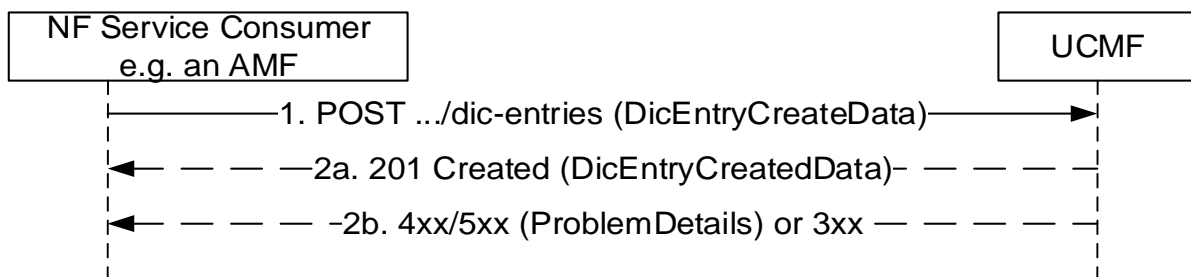


Figure 5.2.2.3.1-1 Create a dictionary entry

1. The NF Service Consumer shall send a POST request to the resource representing the Dictionary Entries collection resource of the UCMF. The content of the POST request shall contain:
 - the UE Radio Access Capability Information for the current radio configuration of the UE in 5GS format, or EPS format, or both the formats;
 - the Type Allocation Code of the PEI of the UE.
- 2a. On success, the UCMF shall check whether for the provided input a dictionary entry already exists and a PLMN Assigned UE Radio Capability ID has already been assigned. If so "201 Created" shall be returned, the content of the POST response shall contain already assigned PLMN Assigned UE Radio Capability ID included in DicEntryCreatedData and the "Location" header shall be present and shall contain the URI of the already existing resource. Otherwise a new dictionary entry shall be created and "201 Created" shall be returned, the content of the POST response shall contain the newly assigned PLMN Assigned UE Radio Capability ID included in DicEntryCreatedData and the "Location" header shall be present and shall contain the URI of the newly created resource.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.2.3.2-3 shall be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.3.2-2, where applicable. A UCMF configured to operate in Mode of Operation A (3GPPP TS 23.501, Clause 5.4.4.1a) shall reject the operation if the request does not contain UE Radio Access Capability Information in both the formats and the UCMF is not able to find match of the received UE Radio Access Capability Information in its database.

5.2.2.4 Service Operation Subscribe

5.2.2.4.1 General

The Subscribe service operation shall be used by a NF Service Consumer, e.g. an AMF, to create a subscription in the UCMF, to get notifications for one or more new dictionary entries creation or for the deletion of one or more PLMN Assigned UE Radio Capability IDs.

The NF Service Consumer shall request to create a new subscription by using HTTP method POST with URI of the subscriptions collection, see clause 6.1.3.4. A `ucmfNotificationUri` shall be provided in the `CreateSubscription` to be used by the UCMF to send notifications later. See Figure 5.2.2.4.1-1.

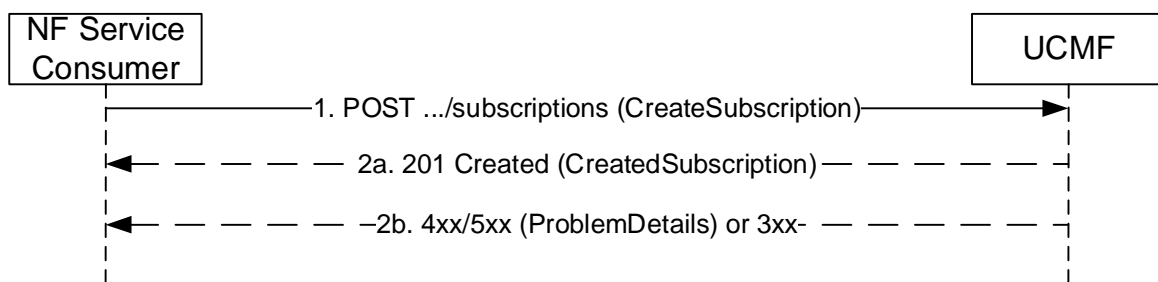


Figure 5.2.2.4.1-1 Create a subscription

1. The NF Service Consumer shall send a POST request to create a subscription resource in the UCMF. The content of the POST request shall contain a representation of the individual subscription resource to be created. The request may contain an expiry time, suggested by the NF Service Consumer as a hint, representing the time upto which the subscription is desired to be kept active and the time after which the subscribed event(s) shall stop generating report.
- 2a. On success, the request is accepted, the UCMF shall include a HTTP Location header to provide the location of a newly created resource (subscription) together with the status code 201 indicating the requested resource is created in the response message. The UCMF may also include the highest dictionary entry ID which has been allocated. (NOTE)

NOTE: To enable the AMF to retrieve the dictionary entries in the UCMF according to the highest dictionary entry ID, where the AMF assumes that the Dictionary entry IDs are allocated by the UCMF in incremental order of sequence. When the UCMF does not to allocate dictionary entry IDs in incremental order of sequence, the UCMF can set the dicEntryID to 1 to indicate this, since the dicEntryID attribute is mandatory in the CreatedSubscription (see clause 6.1.6.2.7).

The response, based on operator policy and taking into account the expiry time included in the request, may contain the expiry time, as determined by the UCMF, after which the subscription becomes invalid. Once the subscription expires, if the NF Service Consumer wants to keep receiving notifications, it shall create a new subscription in the UCMF. The UCMF shall not provide the same expiry time for many subscriptions in order to avoid all of them expiring and recreating the subscription at the same time. If the expiry time is not included in the response, the NF Service Consumer shall consider the subscription to be valid without an expiry time.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.4.3.1-3 shall be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.4.3.1-3.

5.2.2.5 Unsubscribe

5.2.2.5.1 General

The Unsubscribe service operation is used by a NF Service Consumer, e.g. AMF, towards the UCMF, to remove an existing subscription previously created by itself at the UCMF.

The NF Service Consumer shall unsubscribe to the subscription by using HTTP method DELETE with the URI of the individual subscription resource (see clause 6.1.3.5) to be deleted. See Figure 5.2.2.5.1-1.

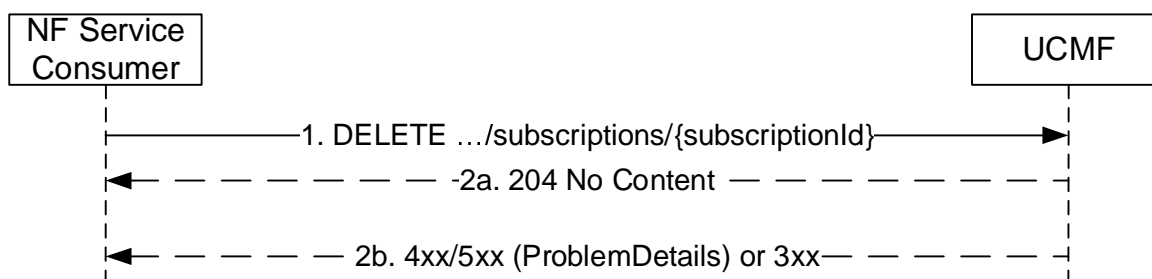


Figure 5.2.2.5.1-1 Unsubscribe a subscription

1. The NF Service Consumer shall send a DELETE request to delete an existing subscription resource in the UCMF.
- 2a. On success, the request is accepted, the UCMF shall reply with the status code 204 indicating the resource identified by subscription ID is successfully deleted in the response message.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.5.3.2-3 shall be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.5.3.2-3.

5.2.2.6 Notify

5.2.2.6.1 General

The Notify service operation is used by the UCMF, to send a notification, towards the notification URI, when certain event included in the subscription has taken place.

The UCMF shall use the HTTP method POST, using the notification URI received in the subscription creation as specified in clause 5.2.2.4.1. See Figure 5.2.2.6.1-1.

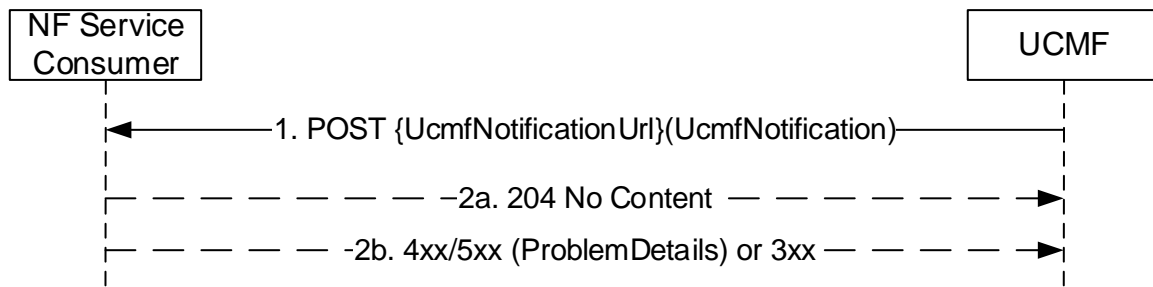


Figure 5.2.2.6.1-1 Notify

1. The UCMF shall send a POST request to send a notification. The content of the POST request shall contain an event type indicating whether creation of dictionary entries, deletion of PLMN assigned IDs or new version of PLMN assigned IDs is notified. If new Dictionary entries are created, in the Post request message, the UCMF shall set either a dictionary entry data ID to indicate the highest DicEntryId that has been allocated in the UCMF if the UCMF has allocated dictionary entry IDs in incremental order of sequence, or set the dictionary entry data ID to 1 otherwise, and in this case, the UCMF shall include an array of DicEntryData for the new dictionary entries.
- 2a. On success, "204 No content" shall be returned by the NF Service Consumer.
- 2b. On failure or redirection, the appropriate HTTP status code listed in Table 6.1.5.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body may contain appropriate additional error information.

6 API Definitions

6.1 Nucmf_UECapabilityManagement Service API

6.1.1 Introduction

The Nucmf_UECapabilityManagement service shall use the Nucmf_UECapabilityManagement API.

The API URI of the Nucmf_UECapabilityManagement API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URI 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 "nucmf-uecm".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 5.3.

6.1.2 Usage of HTTP

6.1.2.1 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 <API Name> API is contained in Annex A.

6.1.2.2 HTTP standard headers

6.1.2.2.1 General

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

6.1.2.2.2 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].

Multipart messages shall also be supported (see clause 6.1.2.4) using the content type "multipart/related", comprising:

- one JSON body part with the "application/json" content type; and
- one or more binary body parts with 3gpp vendor specific content subtypes.

The 3gpp vendor specific content subtypes defined in Table 6.1.2.2.2-1 shall be supported.

Table 6.1.2.2.2-1: 3GPP vendor specific content subtypes

| content subtype | Description |
|-----------------|---|
| vnd.3gpp.ngap | Binary encoded content, encoding NG Application Protocol (NGAP) IEs, as specified in clause 9.3 of 3GPP TS 38.413 [15] (ASN.1 encoded). |
| vnd.3gpp.s1ap | Binary encoded content, encoding S1 Application Protocol (S1AP) IEs, as specified in clause 9.2 of 3GPP TS 36.413 [17] (ASN.1 encoded). |
| NOTE: | Using 3GPP vendor content subtypes allows to describe the nature of the opaque content (e.g. NGAP or 5GS NAS information) without having to rely on metadata in the JSON content. |

See clause 6.1.2.4 for the binary contents supported in the binary body part of multipart messages.

6.1.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [4] shall be applicable.

6.1.2.4 HTTP multipart messages

HTTP multipart messages shall be supported to transfer opaque UE Radio Access Capability Information, in the following service operations (and HTTP messages):

- Resolve Response (GET Response);
- Assign Request (POST);

HTTP multipart message shall include one JSON body part and one or more binary body parts comprising the OCTET STRING of the UE Radio Capability IE (i.e. excluding the IEI, Criticality and octet string length indicator, see also Annex B of 3GPP TS 29.274 [16]) as specified in clause 9.3.1.74 of 3GPP TS 38.413 [15]) and clause 9.2.1.27 of 3GPP TS 36.413 [17], or the UE Radio Access Capability for Paging IE as specified in clause 9.2.1.98 of 3GPP TS 36.413 [17] and as specified in clause 9.3.1.68 of 3GPP TS 38.413 [15].

The JSON body part shall be the "root" body part of the multipart message. It shall be encoded as the first body part of the multipart message. The "Start" parameter does not need to be included.

The multipart message shall include a "type" parameter (see IETF RFC 2387 [10]) specifying the media type of the root body part, i.e. "application/json".

NOTE: The "root" body part (or "root" object) is the first body part the application processes when receiving a multipart/related message, see IETF RFC 2387 [10]. The default root is the first body within the multipart/related message. The "Start" parameter indicates the root body part, e.g. when this is not the first body part in the message.

For each binary body part in a HTTP multipart message, the binary body part shall include a Content-ID header (see IETF RFC 2045 [12]), and the JSON body part shall include an attribute, defined with the RefToBinaryData type, that contains the value of the Content-ID header field of the referenced binary body part.

6.1.3 Resources

6.1.3.1 Overview

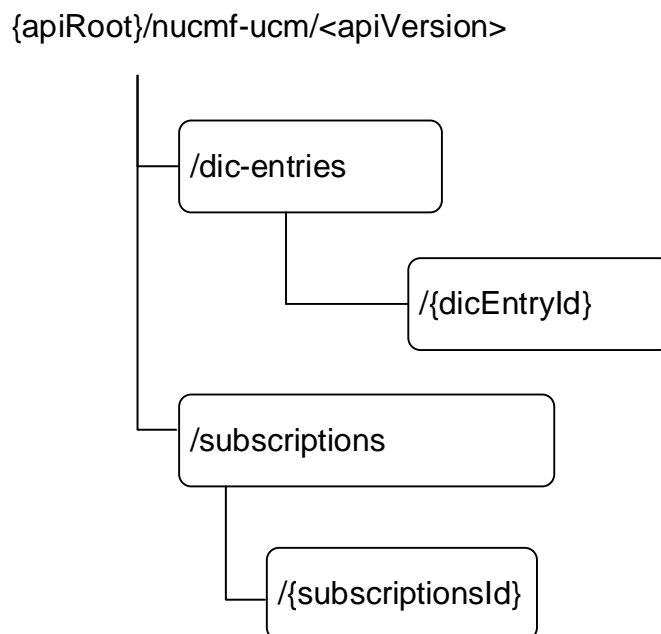


Figure 6.1.3.1-1: Resource URI structure of the Nucmf_UECapabilityManagement API

Table 6.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.1.3.1-1: Resources and methods overview

| Resource name | Resource URI | HTTP method or custom operation | Description |
|-------------------------------|---------------------------------|---------------------------------|--|
| Dictionary Entries collection | /dic-entries | POST | Nucmf_UECapabilityManagement_Assign |
| | | GET | Nucmf_UECapabilityManagement_Resolve |
| Individual Dictionary Entry | /dic-entries/{dicEntryId} | GET | Nucmf_UECapabilityManagement_Resolve |
| Subscriptions collection | /subscriptions | POST | Nucmf_UECapabilityManagement_Subscribe |
| Individual subscription | /subscriptions/{subscriptionId} | DELETE | Nucmf_UECapabilityManagement_Unsubscribe |

6.1.3.2 Resource: Dictionary Entries

6.1.3.2.1 Description

This resource represents the collection of the individual dictionary entries created in the UCMF, where each individual dictionary entry includes the mapping information between UE Radio Capability ID and UE Radio Access Capability Information, Type Allocation Code and Software version of a PEI.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [5]).

6.1.3.2.2 Resource Definition

Resource URI: {apiRoot}/nucmf-ucm/<apiVersion>/dic-entries

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.1.3.2.2-1: Resource URI variables for this resource

| Name | Definition |
|------------|------------------|
| apiRoot | See clause 6.1.1 |
| apiVersion | See clause 6.1.1 |

6.1.3.2.3 Resource Standard Methods

6.1.3.2.3.1 GET

This operation retrieves the UE Radio Access Capability Information from a dictionary entry stored in the UCMF, by querying with a Manufacturer-assigned or PLMN-assigned UE Radio Capability ID, or the TAC and the SVN as part of the IMEI/IMEISV of the UE.

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

Table 6.1.3.2.3.1-1: URI query parameters supported by the GET method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------------------------|-------------------|---|-------------|---|---------------|
| ue-radio-capability-id | UeRadioCapability | M | 1 | PLMN assigned or Manufacturer assigned UE Radio Capability ID used to retrieve a dictionary entry. | |
| rac-format | RacFormat | C | 0..1 | Coding format in which UE Radio Access Capability Information needs to be provided. See the clause 6.1.6.3.4. | |
| supported-features | SupportedFeatures | C | 0..1 | This IE shall be present if at least one feature defined in clause 6.1.8 is supported. | |

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

Table 6.1.3.2.3.1-2: Data structures supported by the GET Request Body on this resource

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a | | | |

Table 6.1.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|---|
| DicEntryData | M | 1 | 200 OK | The response body contains a dictionary entry that is matching the querying parameter. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 400 Bad Request | The response body contains the error reason of the request message. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate the following application error: - NO_DICTIONARY_ENTRY_FOUND - OUT_DATED_VERSION_ID_IN_RAC_ID See table 6.1.7.3-1 for the description of this error. |
| NOTE: The mandatory HTTP error status code for the GET method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply, with response body containing an object of ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). | | | | |

Table 6.1.3.2.3.1-4: 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 on an alternative service instance within the same UCMF or UCMF (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.2.3.1-5: 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 on an alternative service instance within the same UCMF or UCMF (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.2.3.2 POST

This method creates an individual dictionary entry resource in the UCMF unless such dictionary entry already exists.

This method shall support the URI query parameters specified in table 6.1.3.2.3.2-1.

Table 6.1.3.2.3.2-1: URI query parameters supported by the POST method on this resource

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a | | | | |

This method shall support the request data structures specified in table 6.1.3.2.3.2-2 and the response data structures and response codes specified in table 6.1.3.2.3.2-3.

Table 6.1.3.2.3.2-2: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|--------------------|---|-------------|---|
| DicEntryCreateData | M | 1 | Contains UE Radio Access Capability Information and type Allocation Code. |

Table 6.1.3.2.3.2-3: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---------------------|---|-------------|------------------------|---|
| DicEntryCreatedData | M | 1 | 201 Created | The response body contains the assigned UE Radio Capability ID. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 400 Bad Request | The response body contains the error reason of the request message. |

NOTE: 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.

Table 6.1.3.2.3.2-4: 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 on an alternative service instance within the same UCMF or UCMF (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.2.3.2-5: 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 on an alternative service instance within the same UCMF or UCMF (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.2.4 Resource Custom Operations

None.

6.1.3.3 Resource: Individual Dictionary Entry

6.1.3.3.1 Description

This resource represents an individual Dictionary Entry for the mapping information between UE Radio Capability ID(s) and UE Radio Access Capability information, identified by the Dictionary Entry ID.

This resource is modelled as the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

6.1.3.3.2 Resource Definition

Resource URI: {apiRoot}/nucmf-ucm/<apiVersion>/dic-entries/{dicEntryId}

This resource shall support the resource URI variables defined in table 6.1.3.3.2-1.

Table 6.1.3.3.2-1: Resource URI variables for this resource

| Name | Definition |
|------------|----------------------------------|
| apiRoot | See clause 6.1.1 |
| apiVersion | See clause 6.1.1. |
| dicEntryId | Integer with range 1-4294967295. |

6.1.3.3.3 Resource Standard Methods

6.1.3.3.3.1 GET

This operation retrieves an individual dictionary entry resource for the mapping information between UE Radio Capability ID(s) and UE Radio Access Capability information, stored in the UCMF, identified by the dicEntryId.

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

Table 6.1.3.3.3.1-1: URI query parameters supported by the GET method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|--------------------|-------------------|---|-------------|---|---------------|
| rac-format | RacFormat | C | 0..1 | Coding format in which UE Radio Access Capability Information needs to be provided. See the clause 6.1.6.3.4. | |
| supported-features | SupportedFeatures | C | 0..1 | This IE shall be present if at least one feature defined in clause 6.1.8 is supported. | |

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

Table 6.1.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a | | | |

Table 6.1.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|---|
| DicEntryData | M | 1 | 200 OK | The response body contains a dictionary entry for the given Dictionary Entry ID. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate the following application error: - NO_DICTIONARY_ENTRY_FOUND See table 6.1.7.3-1 for the description of this error. |
| NOTE: The mandatory HTTP error status code for the GET method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply, with response body containing an object of ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). | | | | |

Table 6.1.3.3.3.1-4: 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 on an alternative service instance within the same UCMF or UCMF (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.3.3.1-5: 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 on an alternative service instance within the same UCMF or UCMF (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.4 Resource: Subscriptions collection

6.1.3.4.1 Description

This resource represents a collection of subscriptions in the UCMF, created by NF service consumers of Nucmf_UECapabilityManagement service.

This resource is modelled as the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [5]).

6.1.3.4.2 Resource Definition

Resource URI: {apiRoot}/nucmf-ucm/<apiVersion>/subscriptions

This resource shall support the resource URI variables defined in table 6.1.3.4.2-1.

Table 6.1.3.4.2-1: Resource URI variables for this resource

| Name | Definition |
|------------|-------------------|
| apiRoot | See clause 6.1.1 |
| apiVersion | See clause 6.1.1. |

6.1.3.4.3 Resource Standard Methods

6.1.3.4.3.1 POST

This method shall support the URI query parameters specified in table 6.1.3.4.3.1-1.

Table 6.1.3.4.3.1-1: URI query parameters supported by the POST method on this resource

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a | | | | |

This method shall support the request data structures specified in table 6.1.3.4.3.1-2 and the response data structures and response codes specified in table 6.1.3.4.3.1-3.

Table 6.1.3.4.3.1-2: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|--------------------|---|-------------|---|
| CreateSubscription | M | 1 | The Subscription to be created by a NF Service consumer, e.g. an AMF. |

Table 6.1.3.4.3.1-3: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|------------------------|--|
| CreatedSubscription | M | 1 | 201 Created | Represents successful creation of a Subscription in the UCMF |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing a different URI, or the same URI if a request is redirected to the same target resource via a different SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same UCMF or UCMF (service) set. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if a request is redirected to the same target resource via a different SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same UCMF or UCMF (service) set. |
| ProblemDetails | O | 0..1 | 400 Bad Request | The response body contains the error reason of the request message. |
| NOTE: 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, with response body containing an object of ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). | | | | |

Table 6.1.3.4.3.1-4: 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 on an alternative service instance within the same UCMF or UCMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.4.3.1-5: 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 on an alternative service instance within the same UCMF or UCMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.4.4 Resource Custom Operations

None.

6.1.3.5 Resource: Individual subscription

6.1.3.5.1 Description

This resource represents an individual of subscription in the UCMF, created earlier by a NF Service Consumer of Nucmf_UECapabilityManagement service.

This resource is modelled as the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

6.1.3.5.2 Resource Definition

Resource URI: {apiRoot}/nucmf-ucm/<apiVersion>/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 6.1.3.5.2-1.

Table 6.1.3.5.2-1: Resource URI variables for this resource

| Name | Definition |
|----------------|---|
| apiRoot | See clause 6.1.1 |
| apiVersion | See clause 6.1.1. |
| subscriptionId | String identifies an individual subscription in the UCMF. |

6.1.3.5.3 Resource Standard Methods

6.1.3.5.3.2 DELETE

This method shall support the URI query parameters specified in table 6.1.3.5.3.2-1.

Table 6.1.3.5.3.2-1: URI query parameters supported by the DELETE method on this resource

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a | | | | |

This method shall support the request data structures specified in table 6.1.3.5.3.2-2 and the response data structures and response codes specified in table 6.1.3.5.3.2-3.

Table 6.1.3.5.3.2-2: Data structures supported by the DELETE Request Body on this resource

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a | | | |

Table 6.1.3.5.3.2-3: Data structures supported by the DELETE Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|------------------------|--|
| n/a | | | 204 No Content | |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 404 Not Found | Indicates the modification of subscription has failed due to application error. The "cause" attribute may be used to indicate the following application error: - SUBSCRIPTION_NOT_FOUND. |
| NOTE: The mandatory HTTP error status code for the DELETE method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply, with response body containing an object of ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). | | | | |

Table 6.1.3.5.3.2-4: 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 on an alternative service instance within the same UCMF or UCMF (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.5.3.2-5: 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 on an alternative service instance within the same UCMF or UCMF (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.5.4 Resource Custom Operations

None.

6.1.4 Custom Operations without associated resources

None.

6.1.5 Notifications

6.1.5.1 General

Notifications shall comply to clause 6.2 of 3GPP TS 29.500 [4] and clause 4.6.2.3 of 3GPP TS 29.501 [5].

6.1.5.2 UCMF Notification

6.1.5.2.1 Description

The UCMF Notification is used by the UCMF to report one or several observed Events to a NF service consumer that has subscribed to such Notifications via the Individual Notification Subscription Resource.

6.1.5.2.2 Target URI

The Callback URI "{ucmfNotificationUri}" shall be used with the callback URI variables defined in table 6.1.5.2.2-1.

Table 6.1.5.2.2-1: Callback URI variables for this resource

| Name | Definition |
|---------------------|--|
| ucmfNotificationUri | String formatted as URI with the UCMF Callback Uri |

6.1.5.2.3 Standard Methods

6.1.5.2.3.1 POST

This method shall support the request data structures specified in table 6.1.5.2.3.1-1 and the response data structures and response codes specified in table 6.1.5.2.3.1-1.

Table 6.1.5.2.3.1-2: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|------------------|---|-------------|---|
| UcmfNotification | M | 1 | Represents the notification to be delivered |

Table 6.1.5.2.3.1-3: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|------------------------|
| n/a | | | 204 No Content | |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| NOTE: 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. | | | | |

Table 6.1.5.2.3.1-4: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | A URI pointing to the endpoint of the NF service consumer to which the notification should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the notification is redirected |

Table 6.1.5.2.3.1-5: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | A URI pointing to the endpoint of the NF service consumer to which the notification should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the notification is redirected |

6.1.6 Data Model

6.1.6.1 General

This clause specifies the application data model supported by the API.

Table 6.1.6.1-1 specifies the data types defined for the Nucmf_UECapabilityManagement service based interface protocol.

Table 6.1.6.1-1: Nucmf_UECapabilityManagement specific Data Types

| Data type | Clause defined | Description | Applicability |
|---------------------|----------------|---|---------------|
| DicEntryData | 6.1.6.2.2 | A dictionary entry for a UE radio capability ID in the UCMF | |
| DicEntryCreateData | 6.1.6.2.3 | Data for a creating a dictionary entry request | |
| DicEntryCreatedData | 6.1.6.2.4 | Data for a creating a dictionary entry response | |
| UeRadioCapald | 6.1.6.2.5 | UE Radio Capability ID | |
| CreateSubscription | 6.1.6.2.6 | Data for a creating a subscription request | |
| CreatedSubscription | 6.1.6.2.7 | Data for a creating a subscription response | |
| UcmfNotification | 6.1.6.2.8 | Data for a notification request from a UCMF | |
| ManAssOpRequestlist | 6.1.6.2.9 | Manufacturer Assigned operation requested list | |
| EventType | 6.1.6.3.3 | | |
| RacFormat | 6.1.6.3.4 | The encoding type of the UE's Radio Access Capability Information | |

Table 6.1.6.1-2 specifies data types re-used by the Nucmf_UECapabilityManagement 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 N_{<NF>} service based interface.

Table 6.1.6.1-2: Nucmf_UECapabilityManagement re-used Data Types

| Data type | Reference | Comments | Applicability |
|----------------------|---------------------|---|----------------------|
| PlmnAssiUeRadioCapId | 3GPP TS 29.571 [14] | PLMN Assigned UE Radio Capability ID | |
| ManAssiUeRadioCapId | 3GPP TS 29.571 [14] | Manufacturer Assigned UE Radio Capability ID | |
| TypeAllocationCode | 3GPP TS 29.571 [14] | Type Allocation Code | |
| NfInstancelId | 3GPP TS 29.571 [14] | NF Instance ID | |
| DateTime | 3GPP TS 29.571 [14] | A date-time format defined in OpenAPI Specification [6] | |
| SupportedFeatures | 3GPP TS 29.571 [14] | Supported Features | |
| ProblemDetails | 3GPP TS 29.571 [14] | Detailed problems in failure case | |
| RedirectResponse | 3GPP TS 29.571 [14] | Response body of the redirect response message. | |

6.1.6.2 Structured data types

6.1.6.2.1 Introduction

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

6.1.6.2.2 Type: DicEntryData

Table 6.1.6.2.2-1: Definition of type DicEntryData

| Attribute name | Data type | P | Cardinality | Description |
|------------------------|--|---|-------------|--|
| dicEntryId | DicEntryId | C | 0..1 | Identifier of the Dictionary Entry |
| plmnAssiUeRadioCapId | PlmnAssiUeRadioCapId | C | 0..1 | This IE shall include a PLMN Assigned UE Radio Capability ID if allocated in the dictionary entry. |
| manAssiUeRadioCapId | ManAssiUeRadioCapId | C | 0..1 | This IE shall include a Manufacturer Assigned UE Radio Capability ID if available in the dictionary entry. |
| typeAllocationCode | TypeAllocationCode | M | 1 | This IE shall contain the Type Allocation Code in corresponding to the UE Radio Access Capability in the dictionary entry. |
| ueRadioCapability5GS | RefToBinaryData | C | 0..1 | This IE shall be included to contain the UE Radio Access Capability Information encoded either as OCTET STRING of UE Radio Capability IE as specified in clause 9.3.1.74 of 3GPP TS 38.413 [15], when the message is sent to AMF, otherwise it may be included. |
| ueRadioCapabilityEPS | RefToBinaryData | C | 0..1 | This IE shall be included to contain the UE Radio Access Capability Information encoded as OCTET STRING of UE Radio Capability IE as specified in clause 9.2.1.27 of 3GPP TS 36.413 [x], when the message is sent to MME, otherwise it may be included. |
| ueRadioCap5GSForPaging | RefToBinaryData | O | 0..1 | May be present if ueRadioCapability5GS is present. If present it shall contain the UE Radio Access Capability Information for paging encoded as OCTET STRING of UE Radio Capability for Paging IE as specified in clause 9.3.1.68 of 3GPP TS 38.413 [15], when the message is sent to AMF |
| ueRadioCapEPSForPaging | RefToBinaryData | O | 0..1 | May be present if ueRadioCapabilityEPS is present. If present it shall contain the UE Radio Access Capability Information for paging encoded as OCTET STRING of UE Radio Capability for Paging IE as specified in clause 9.2.1.98 of 3GPP TS 36.413 [17], when the message is sent to MME, otherwise it may be included. |
| NOTE: | The information in the dictionary entry which is included as the query parameter(s) or URI variable in the request message shall not be present. | | | |

6.1.6.2.3 Type: DicEntryCreateData

Table 6.1.6.2.3-1: Definition of type DicEntryCreateData

| Attribute name | Data type | P | Cardinality | Description |
|--|--------------------|---|-------------|---|
| typeAllocationCode | TypeAllocationCode | M | 1 | This IE shall contain the Type Allocation Code in corresponding to the UE Radio Access Capability in the dictionary entry. |
| ueRadioCapability5GS | RefToBinaryData | C | 0..1 | This IE shall be included to contain the UE Radio Access Capability Information encoded as OCTET STRING of UE Radio Capability IE specified in clause 9.3.1.74 of 3GPP TS 38.413 [15]. |
| ueRadioCapabilityEPS | RefToBinaryData | C | 0..1 | This IE shall be included to contain the UE Radio Access Capability Information encoded as OCTET STRING of UE Radio Capability IE specified in clause 9.2.1.27 of 3GPP TS 36.413 [17]. (NOTE) |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one feature defined in clause 6.1.8 is supported. |
| ueRadioCap5GSForPaging | RefToBinaryData | O | 0..1 | May be present if ueRadioCapability5GS is present. If present it shall contain the UE Radio Access Capability Information for paging encoded as OCTET STRING of UE Radio Capability for Paging IE as specified in clause 9.3.1.68 of 3GPP TS 38.413 [15]. |
| ueRadioCapEPSForPaging | RefToBinaryData | O | 0..1 | May be present if ueRadioCapabilityEPS is present. If present it shall contain the UE Radio Access Capability Information for paging encoded as OCTET STRING of UE Radio Capability for Paging IE as specified in clause 9.2.1.98 of 3GPP TS 36.413 [17]. |
| NOTE: At least one of ueRadioCapability5GS or ueRadioCapabilityEPS shall be present. | | | | |

6.1.6.2.4 Type: DicEntryCreatedData

Table 6.1.6.2.4-1: Definition of type DicEntryCreatedData

| Attribute name | Data type | P | Cardinality | Description |
|----------------------|----------------------|---|-------------|--|
| plmnAssiUeRadioCapId | PlmnAssiUeRadioCapId | M | 1 | This IE shall include a PLMN Assigned UE Radio Capability ID if allocated. |

6.1.6.2.5 Type: UeRadioCapId

Table 6.1.6.2.5-1: Definition of type UeRadioCapId

| Attribute name | Data type | P | Cardinality | Description |
|--|----------------------|---|-------------|--|
| plmnAssiUeRadioCapId | PlmnAssiUeRadioCapId | C | 0..1 | This IE shall include a PLMN Assigned UE Radio Capability ID. (NOTE) |
| manAssiUeRadioCapId | ManAssiUeRadioCapId | C | 0..1 | This IE shall include a Manufacturer Assigned UE Radio Capability ID. (NOTE) |
| NOTE: Only one of plmnAssiUeRadioCapId and manAssiUeRadioCapId shall be present during retrieving UE Radio Access Capability Information. (See clause 6.1.3.2.3.1) | | | | |

6.1.6.2.6 Type: CreateSubscription

Table 6.1.6.2.6-1: Definition of type CreateSubscription

| Attribute name | Data type | P | Cardinality | Description |
|---------------------|-------------------|---|-------------|--|
| nflid | NflInstanceId | C | 0..1 | This IE shall contain the NF Instance ID of the service consumer, e.g. an AMF, if it is available. |
| ucmfNotificationUri | Uri | M | 1 | This IE shall contain the callback URI on which the subscribed events shall be notified. |
| suggestedExpires | DateTime | O | 0..1 | If present, indicates the point in time at which the subscription expires, which is suggested by the service consumer. |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one feature defined in clause 6.1.8 is supported. |

6.1.6.2.7 Type: CreatedSubscription

Table 6.1.6.2.7-1: Definition of type CreatedSubscription

| Attribute name | Data type | P | Cardinality | Description |
|-------------------|-------------------|---|-------------|--|
| dicEntryId | DicEntryId | M | 1 | This IE shall contain the highest DicEntryId that has been allocated in the UCMF or the value 1 to indicate that the UCMF took the option not to allocate dictionary entry IDs in incremental order of sequence. See clause 5.2.2.4.1. |
| confirmedExpires | DateTime | O | 0..1 | If present, indicates the point in time at which the subscription expires, which is confirmed by the service producer. |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one feature defined in clause 6.1.8 is supported. |

6.1.6.2.8 Type: UcmfNotification

Table 6.1.6.2.8-1: Definition of type UcmfNotification

| Attribute name | Data type | P | Cardinality | Description |
|--|---------------------|---|-------------|---|
| dicEntryId | DicEntryId | M | 1 | This IE shall contain the highest DicEntryId that has been allocated in the UCMF or the value 1 to indicate that the UCMF took the option not to allocate dictionary entry IDs in incremental order of sequence. See clause 5.2.2.4.1. (NOTE) |
| eventType | EventType | M | 1 | This IE shall contain the different events type included in the notification. |
| manAssOpRequestlist | ManAssOpRequestlist | C | 0..1 | This IE shall be present to contain the Manufacturer Assigned operation requested list which includes a list of PLMN Assigned UE Radio Capability IDs or a list of TACs if the event type indicates the deletion of one or more PLMN Assigned UE Radio Capability IDs as specified in 3GPP TS 23.501 [2]. |
| versionId | UInteger | O | 0..1 | UInteger with the range between 0 and 255. This IE may be present if eventType indicates to notify a new version id of PLMN Assigned UE Radio Capability Id(s). |
| newDicEntries | array(DicEntryData) | O | 1..N | List of dictionary entries that have newly been created in the UCMF. May be present if event type indicates the creation of one or more PLMN Assigned UE Radio Capability IDs as specified in 3GPP TS 23.501 [2]. (NOTE) |
| NOTE: When dicEntryId takes a value different from 1 it indicates the highest dictionary entry allocated in the UCMF. This information may be used by the AMF to build up copy of the UCMF's dictionary by retrieving dictionary entries step by step in a background process using the Resolve service operation, see clause 5.2.2.2.2. In this case newDicEntries may be absent. | | | | |

6.1.6.2.9 Type: ManAssOpRequestlist

Table 6.1.6.2.9-1: Definition of type ManAssOpRequestlist

| Attribute name | Data type | P | Cardinality | Description |
|---|-----------------------------|---|-------------|---|
| plmnAssiUeRadioCapId | array(PlmnAssiUeRadioCapId) | C | 0..N | This IE shall contain a list of PLMN Assigned UE Radio Capability IDs. (NOTE) The UCMF shall always provide a complete list (potentially empty) of PLMN Assigned UE Radio Capability IDs to enable the AMF to overwrite the existing list. |
| typeAllocationCode | array (TypeAllocationCode) | C | 0..N | This IE shall contain a list of Type Allocation Codes in corresponding to the PLMN Assigned UE Radio Capability IDs. (NOTE) The UCMF shall always provide a complete list (potentially empty) of Type Allocation Codes to enable the AMF to overwrite the existing list. |
| NOTE: Either plmnAssiUeRadioCapId or typeAllocationCode shall be present, not for both. | | | | |

6.1.6.3 Simple data types and enumerations

6.1.6.3.1 Introduction

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

6.1.6.3.2 Simple data types

The simple data types defined in table 6.1.6.3.2-1 shall be supported.

Table 6.1.6.3.2-1: Simple data types

| Type Name | Type Definition | Description | Applicability |
|------------|-----------------|----------------------------------|---------------|
| DicEntryId | Integer | integer with range 1-4294967295. | |

6.1.6.3.3 Enumeration: EventType

The enumeration EventType represents different type of events included in a notification from the UCMF. It shall comply with the provisions defined in table 6.1.5.3.3-1.

Table 6.1.6.3.3-1: Enumeration EventType

| Enumeration value | Description | Applicability |
|---------------------------------------|---|---------------|
| "CREATION_OF_DICTIONARY_ENTRY" | New dictionary entries are created in the UCMF. | |
| "DELETION_OF_PLMN_ASSIGNED_IDS" | One or more PLMN-assigned UE Radio Capability IDs are deleted. | |
| "NEW_VERSION_ID_OF_PLMN_ASSIGNED_IDS" | Notify a new version id of PLMN Assigned UE Radio Capability Id(s). | |

6.1.6.3.4 Enumeration: RacFormat

The enumeration RacFormat represents the encoding type of the UE's Radio Access Capability Information.

Table 6.1.6.3.4-1: Enumeration racFormat

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| "5GS" | This value indicates UE Radio Access Capability Information shall be encoded as OCTET STRING of UE Radio Capability IE specified in clause 9.3.1.74 of 3GPP TS 38.413 [15]. | |
| "EPS" | This value indicates UE Radio Access Capability Information shall be encoded as OCTET STRING of UE Radio Capability IE specified in clause 9.2.1.27 of 3GPP TS 36.413 [17]. | |

6.1.6.4 Data types describing alternative data types or combinations of data types

None.

6.1.6.5 Binary data

6.1.6.5.1 Introduction

This clause defines the binary data that shall be supported in a binary body part in an HTTP multipart message (see clauses 6.1.2.2.2 and 6.1.2.4).

6.1.6.5.2 UE Radio Capability Information

UeRadioCapability5GS shall be encoded with the OCTET STRING of UE Radio Capability IE (i.e. excluding the IEI, Criticality and octet string length indicator, see also Annex B of 3GPP TS 29.274 [16]) as specified in clause 9.3.1.74 of 3GPP TS 38.413 [15], using the vnd.3gpp.ngap content-type.

UeRadioCapabilityEPS shall be encoded with the OCTET STRING of UE Radio Capability IE (i.e. excluding the IEI, Criticality and octet string length indicator, see also Annex B of 3GPP TS 29.274 [16]) as specified in clause 9.2.1.27 of 3GPP TS 36.413 [17], using the vnd.3gpp.s1ap content-type.

ueRadioCap5GSForPaging shall be encoded as OCTET STRING of UE Radio Capability for Paging IE as specified in clause 9.3.1.68 of 3GPP TS 38.413 [15].

ueRadioCapEPSForPaging shall be encoded as OCTET STRING of UE Radio Capability for Paging IE as specified in clause 9.2.1.98 of 3GPP TS 36.413 [17].

6.1.7 Error Handling

6.1.7.1 General

For the Nucmf_UECapabilityManagement 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 Nucmf_UECapabilityManagement API.

6.1.7.2 Protocol Errors

No specific procedures for the Nucmf_UECapabilityManagement service are specified.

6.1.7.3 Application Errors

The application errors defined for the Nucmf_UECapabilityManagement service are listed in Table 6.1.7.3-1.

Table 6.1.7.3-1: Application errors

| Application Error | HTTP status code | Description |
|--------------------------------|------------------|--|
| NO_DICTIONARY_ENTRY_FOUND | 404 | There is no dictionary entry matching the UE Radio Capability ID in query. |
| OUT_DATED_VERSION_ID_IN_RAC_ID | 404 | The version id in the requested PLMN Assigned UE Radio Capability Id is out-dated. |

6.1.8 Feature negotiation

The features in table 6.1.8-1 are defined for the Nucmf_UECapabilityManagement API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.1.8-1: Supported Features

| Feature number | Feature Name | M/O | Description |
|----------------|--------------|-----|--|
| 1 | ES3XX | M | <p>Extended Support of HTTP 307/308 redirection</p> <p>An NF Service Consumer (e.g. AMF) that supports this feature shall support handling of HTTP 307/308 redirection for any service operation of the UECapabilityManagement service. An NF Service Consumer that does not support this feature does only support HTTP redirection as specified for 3GPP Release 15.</p> |

6.1.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nucmf_UECapabilityManagement 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 Nucmf_UECapabilityManagement 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 Nucmf_UECapabilityManagement service.

The Nucmf_UECapabilityManagement API defines the following scopes for OAuth2 authorization.

Table 6.1.9-1: Oauth2 scopes defined in Nucmf_UECapabilityManagement API

| Scope | Description |
|----------------------------------|--|
| "nucmf-uecm" | Access to the Nucmf_UECapabilityManagement API |
| "nucmf-uecm:dictionary:read" | Access to read dictionaries |
| "nucmf-uecm:dictionary:create" | Access to create dictionary entries |
| "nucmf-uecm:subscription:create" | Access to create subscriptions |
| "nucmf-uecm:subscription:modify" | Access to update subscriptions |

6.1.10 HTTP redirection

An HTTP request may be redirected to a different UCMF service instance, within the same UCMF or a different UCMF of an UCMF set, e.g. when an UCMF service instance is part of an UCMF (service) set or when using indirect communications (see 3GPP TS 29.500 [4]). See also the ES3XX feature in clause 6.1.8.

An SCP that reselects a different UCMF producer instance will return the NF Instance ID of the new UCMF producer instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an UCMF within an UCMF set redirects a service request to a different UCMF of the set using a 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new UCMF towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [4].

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 Nucmf_UECapabilityManagement API

openapi: 3.0.0

info:

```
title: Nucmf_UECapabilityManagement
version: 1.3.0-alpha.2
description: |
  Nucmf_UECapabilityManagement Service.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

externalDocs:

```
description: 3GPP TS 29.673 V19.1.0; 5G System; UE Radio Capability Management Services
url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.673/'
```

servers:

```
- url: '{apiRoot}/nucmf-uecm/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501
```

security:

```
- {}
- oAuth2ClientCredentials:
  - nucmf-uecm
```

paths:

```
/dic-entries:
  get:
    summary: retrieve a dictionary entry matching query parameters
    operationId: RetrieveDictionaryEntry
    tags:
      - Dictionary Entry (Store)
    security:
      - {}
      - oAuth2ClientCredentials:
        - nucmf-uecm
      - oAuth2ClientCredentials:
        - nucmf-uecm
        - nucmf-uecm:dictionary:read
    parameters:
      - name: ue-radio-capability-id
        in: query
        required: true
        description: UE Radio Capability ID, either PLMN Assigned or Manufacturer Assigned
        schema:
```

```

    $ref: '#/components/schemas/UERadioCapaId'
  - name: rac-format
    in: query
    description: Encoding format of RAC Info
    schema:
      $ref: '#/components/schemas/RacFormat'
  - name: supported-features
    in: query
    description: supported features of the NF consumer
    schema:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
responses:
  '200':
    description: Expected response to a valid request
    content:
      multipart/related: # message with binary body part(s)
        schema:
          type: object
          properties: # Request parts
            jsonData:
              $ref: '#/components/schemas/DicEntryData'
            binaryDataUeRadioCapability5GS:
              type: string
              format: binary
            binaryDataUeRadioCapabilityEPS:
              type: string
              format: binary
            binaryDataUeRadioCap5GSForPaging:
              type: string
              format: binary
            binaryDataUeRadioCapEPSForPaging:
              type: string
              format: binary
          encoding:
            jsonData:
              contentType: application/json
            binaryDataUeRadioCapability5GS:
              contentType: application/vnd.3gpp.ngap
            headers:
              Content-Id:
                schema:
                  type: string
            binaryDataUeRadioCapabilityEPS:
              contentType: application/vnd.3gpp.slap
            headers:
              Content-Id:
                schema:
                  type: string
            binaryDataUeRadioCap5GSForPaging:
              contentType: application/vnd.3gpp.ngap
            headers:
              Content-Id:
                schema:
                  type: string
            binaryDataUeRadioCapEPSForPaging:
              contentType: application/vnd.3gpp.slap
            headers:
              Content-Id:
                schema:
                  type: string
  '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'
  '406':
    $ref: 'TS29571_CommonData.yaml#/components/responses/406'
  '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'
'501':
  $ref: 'TS29571_CommonData.yaml#/components/responses/501'
'502':
  $ref: 'TS29571_CommonData.yaml#/components/responses/502'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'

post:
  summary: Create a dictionary entry in the UCMF
  tags:
    - a dictionary entry (Document)
  operationId: CreateDictionaryEntry
  security:
    - {}
    - oAuth2ClientCredentials:
      - nucmf-uecm
    - oAuth2ClientCredentials:
      - nucmf-uecm
      - nucmf-uecm:dictionary:create
  requestBody:
    content:
      multipart/related: # message with binary body part(s)
        schema:
          type: object
          properties: # Request parts
            jsonData:
              $ref: '#/components/schemas/DicEntryCreateData'
            binaryDataUeRadioCapability5GS:
              type: string
              format: binary
            binaryDataUeRadioCapabilityEPS:
              type: string
              format: binary
            binaryDataUeRadioCap5GSForPaging:
              type: string
              format: binary
            binaryDataUeRadioCapEPSForPaging:
              type: string
              format: binary
          encoding:
            jsonData:
              contentType: application/json
            binaryDataUeRadioCapability5GS:
              contentType: application/vnd.3gpp.ngap
            headers:
              Content-Id:
                schema:
                  type: string
            binaryDataUeRadioCapabilityEPS:
              contentType: application/vnd.3gpp.slap
            headers:
              Content-Id:
                schema:
                  type: string
            binaryDataUeRadioCap5GSForPaging:
              contentType: application/vnd.3gpp.ngap
            headers:
              Content-Id:
                schema:
                  type: string
            binaryDataUeRadioCapEPSForPaging:
              contentType: application/vnd.3gpp.slap
            headers:
              Content-Id:
                schema:
                  type: string
  responses:
    '201':
      description: Dictionary Created
      headers:

```

```

    Location:
      description: 'Contains the URI of the newly created resource, according to the
structure: {apiRoot}/nucmf-uecm/<apiVersion>/dic-entries/{dicEntryId}'
      required: true
      schema:
        type: string
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DicEntryCreatedData'
'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'
'501':
  $ref: 'TS29571_CommonData.yaml#/components/responses/501'
'502':
  $ref: 'TS29571_CommonData.yaml#/components/responses/502'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'

/dic-entries/{dicEntryId}:
  get:
    summary: Get an individual dictionary entry via dicEntryId
    operationId: GetDicEntry
    tags:
      - dic Entry Id (Document)
    security:
      - {}
      - oAuth2ClientCredentials:
          - nucmf-uecm
      - oAuth2ClientCredentials:
          - nucmf-uecm
          - nucmf-uecm:dictionary:read
    parameters:
      - name: dicEntryId
        in: path
        description: the ID of a dictionary entry in the UCMF
        required: true
        schema:
          $ref: '#/components/schemas/DicEntryId'
      - name: rac-format
        in: query
        description: Encoding format of of RAC Info
        schema:
          $ref: '#/components/schemas/RacFormat'
      - name: supported-features
        in: query
        description: supported features of the NF consumer
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    responses:
      '200':
        description: Expected response to a valid request
        content:
          multipart/related: # message with binary body part(s)
            schema:
              type: object

```

```

properties: # Request parts
  jsonData:
    $ref: '#/components/schemas/DicEntryData'
  binaryDataUeRadioCapability5GS:
    type: string
    format: binary
  binaryDataUeRadioCapabilityEPS:
    type: string
    format: binary
  binaryDataUeRadioCap5GSForPaging:
    type: string
    format: binary
  binaryDataUeRadioCapEPSForPaging:
    type: string
    format: binary
encoding:
  jsonData:
    contentType: application/json
  binaryDataUeRadioCapability5GS:
    contentType: application/vnd.3gpp.ngap
  headers:
    Content-Id:
      schema:
        type: string
  binaryDataUeRadioCapabilityEPS:
    contentType: application/vnd.3gpp.slap
  headers:
    Content-Id:
      schema:
        type: string
  binaryDataUeRadioCap5GSForPaging:
    contentType: application/vnd.3gpp.ngap
  headers:
    Content-Id:
      schema:
        type: string
  binaryDataUeRadioCapEPSForPaging:
    contentType: application/vnd.3gpp.slap
  headers:
    Content-Id:
      schema:
        type: string
'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'
'406':
  $ref: 'TS29571_CommonData.yaml#/components/responses/406'
'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'
'501':
  $ref: 'TS29571_CommonData.yaml#/components/responses/501'
'502':
  $ref: 'TS29571_CommonData.yaml#/components/responses/502'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'

/subscriptions:
  post:

```

```

summary: Nucmf_UECapabilityManagement Subscribe service Operation
operationId: CreateIndividualSubscription
tags:
  - Subscriptions (Collection)
security:
  - {}
  - OAuth2ClientCredentials:
    - nucmf-uecm
  - OAuth2ClientCredentials:
    - nucmf-uecm
    - nucmf-uecm:subscription:create
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/CreateSubscription'
responses:
  '201':
    description: Success
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/CreatedSubscription'
    headers:
      Location:
        description: 'Contains the URI of the newly created resource, according to the
structure: {apiRoot}/nucmf-uecm/<apiVersion>/subscriptions/{subscriptionId}'
        required: true
        schema:
          type: string
  '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:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
callbacks:
  myNotification:
    '{$request.body#/ucmfNotificationUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/UcmfNotification'
        responses:
          '204':
            description: No Content, Notification was succesfull
          '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'

```

```

/subscriptions/{subscriptionId}:

```

```

  delete:

```

```

    summary: unsubscribe from notifications
    operationId: DeleteIndividualSubscription
    tags:
      - IndividualSubscription (Document)
    security:
      - {}
      - OAuth2ClientCredentials:
          - nucmf-uecm
      - OAuth2ClientCredentials:
          - nucmf-uecm
          - nucmf-uecm:subscription:modify

```

```

    parameters:

```

```

      - name: subscriptionId
        in: path
        description: Event Subscription ID
        required: true
        schema:
          type: string

```

```

    responses:

```

```

      '204':
        description: No Content. Resource was successfully deleted
      '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'
      '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:

```

nucmf-uecm: Access to the Nucmf_UECapabilityManagement API
 nucmf-uecm:dictionary:read: Access to read dictionaries
 nucmf-uecm:dictionary:create: Access to create dictionary entitries
 nucmf-uecm:subscription:create: Access to create subscriptions
 nucmf-uecm:subscription:modify: Access to update subscriptions

schemas:

```

DicEntryData:
  description: A dictionary entry for a UE radio capability ID in the UCMF
  type: object
  required:
    - typeAllocationCode
  properties:
    dicEntryId:
      $ref: '#/components/schemas/DicEntryId'
    typeAllocationCode:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TypeAllocationCode'
    plmnAssiUeRadioCapId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnAssiUeRadioCapId'
    manAssiUeRadioCapId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ManAssiUeRadioCapId'
    ueRadioCapability5GS:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
    ueRadioCapabilityEPS:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
    ueRadioCap5GSForPaging:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
    ueRadioCapEPSForPaging:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'

DicEntryCreateData:
  description: Data for a creating a dictionary entry request
  type: object
  required:
    - typeAllocationCode
  properties:
    typeAllocationCode:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TypeAllocationCode'
    ueRadioCapability5GS:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
    ueRadioCapabilityEPS:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
    supportedFeatures:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    ueRadioCap5GSForPaging:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
    ueRadioCapEPSForPaging:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'

DicEntryCreatedData:
  description: Data for a creating a dictionary entry response
  type: object
  required:
    - plmnAssiUeRadioCapId
  properties:
    plmnAssiUeRadioCapId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnAssiUeRadioCapId'

UeRadioCapaId:
  description: UE Radio Capability ID
  type: object
  properties:
    plmnAssiUeRadioCapId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnAssiUeRadioCapId'
    manAssiUeRadioCapId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ManAssiUeRadioCapId'

CreateSubscription:
  description: Data for a creating a subscription request
  type: object
  required:
    - ucmlNotificationUri
  properties:
    nfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    ucmlNotificationUri:
  
```

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
  suggestedExpires:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  supportedFeatures:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

```

```

CreatedSubscription:
  description: Data for a creating a subscription response
  type: object
  required:
    - dicEntryId
  properties:
    dicEntryId:
      $ref: '#/components/schemas/DicEntryId'
    confirmedExpires:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    supportedFeatures:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

```

```

UcmfNotification:
  description: Data for a notification request from a UCMF
  type: object
  required:
    - dicEntryId
    - eventType
  properties:
    dicEntryId:
      $ref: '#/components/schemas/DicEntryId'
    eventType:
      $ref: '#/components/schemas/EventType'
    manAssOpRequestlist:
      $ref: '#/components/schemas/ManAssOpRequestlist'
    versionId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    newDicEntries:
      type: array
      items:
        $ref: '#/components/schemas/DicEntryData'
      minItems: 1

```

```

ManAssOpRequestlist:
  description: Manufacturer Assigned operation requested list
  type: object
  oneOf:
    - required: [plmnAssiUeRadioCapId]
    - required: [typeAllocationCode]
  properties:
    plmnAssiUeRadioCapId:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnAssiUeRadioCapId'
    typeAllocationCode:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/TypeAllocationCode'

```

```

#
# SIMPLE DATA TYPES
#
DicEntryId:
  type: integer
  minimum: 0
  maximum: 4294967295

```

```

#
# ENUMERATIONS
#

```

```

EventType:
  anyOf:
    - type: string
    enum:
      - CREATION_OF_DICTIONARY_ENTRY
      - DELETION_OF_PLMN_ASSIGNED_IDS
      - NEW_VERSION_ID_OF_PLMN_ASSIGNED_IDS
    - type: string

```

```
RacFormat:  
  anyOf:  
    - type: string  
      enum:  
        - 5GS  
        - EPS  
    - type: string
```

Annex B (informative): Change history

| Change history | | | | | | | |
|----------------|---------|---------------------------|------|-----|-----|--|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2019-09 | CT4#93 | C4-193849 | | | | Initial draft | 0.1.0 |
| 2019-10 | CT4#94 | C4-194356 | | | | Subscribe, Unsubscribe and Notify | 0.2.0 |
| 2019-10 | CT4#94 | C4-194357 | | | | Individual dictionary entry resource | 0.2.0 |
| 2019-11 | CT4#95 | C4-195436 | | | | Data type and openAPI related to Resolve, Assign | 0.3.0 |
| 2019-11 | CT4#95 | C4-195438 | | | | Data type and openAPI related to (un)Subscribe/Notify | 0.3.0 |
| 2019-12 | CT#86 | CP-193069 | | | | TS presented for information | 1.0.0 |
| 2020-03 | CT4#96e | C4-200622 | | | | UcmfNotification for deletion | 1.1.0 |
| 2020-03 | CT4#96e | C4-200623 | | | | Other alignment with stage 2 requirements | 1.1.0 |
| 2020-03 | CT#87e | CP-200067 | | | | TS presented for approval | 2.0.0 |
| 2020-03 | CT#87e | | | | | Approved at CT#87e | 16.0.0 |
| 2020-06 | CT#88e | CP-201279 | 0001 | 2 | B | Multiple RAC Coding Format Support in RACS Operation | 16.1.0 |
| 2020-06 | CT#88e | CP-201035 | 0003 | | F | Storage of YAML files in ETSI Forge | 16.1.0 |
| 2020-06 | CT#88e | CP-201035 | 0004 | | B | New application error at receiving out-dated UE RAC-ID | 16.1.0 |
| 2020-06 | CT#88e | CP-201035 | 0005 | 1 | B | Populating New Version Id via Notification | 16.1.0 |
| 2020-06 | CT#88e | CP-201187 | 0006 | | F | 3GPP TS 29.673 API version update Rel-16 | 16.1.0 |
| 2020-09 | CT#89e | CP-202108 | 0007 | | F | DicEntryId in DicEntryData | 16.2.0 |
| 2020-09 | CT#89e | CP-202108 | 0008 | | F | UE Radio Capability ID retrieval | 16.2.0 |
| 2020-09 | CT#89e | CP-202108 | 0009 | | F | Optionality of ProblemDetails in TS29.673 cleanup | 16.2.0 |
| 2020-09 | CT#89e | CP-202096 | 0010 | | F | 29.673 Rel-16 API version and External doc update | 16.2.0 |
| 2020-12 | CT#90e | CP-203047 | 0011 | 1 | F | TAC is mandatory in DicEntryData | 16.3.0 |
| 2020-12 | CT#90e | CP-203036 | 0012 | | | 29.673 Rel-16 API version and External doc update | 16.3.0 |
| 2021-03 | CT#91e | CP-210043 | 0014 | | F | Storage of YAML files | 17.0.0 |
| 2021-03 | CT#91e | CP-210037 | 0015 | 1 | F | HTTP 3xx redirection | 17.0.0 |
| 2021-03 | CT#91e | CP-210034 | 0016 | 1 | F | OpenAPI Reference | 17.0.0 |
| 2021-03 | CT#91e | CP-210054 | 0018 | | F | 29.673 Rel-16 API version and External doc update | 17.0.0 |
| 2021-06 | CT#92e | CP-211028 | | | | Data Type Description for Nucmf_UECapabilityManagement Service API | 17.1.0 |
| 2021-06 | CT#92e | CP-211028 | 0019 | | F | | |
| 2021-06 | CT#92e | CP-211028 | 0021 | 1 | F | EventType Data Type | 17.1.0 |
| 2021-06 | CT#92e | CP-211059 | 0023 | | A | Redirect Response for Nucmf_UECapabilityManagement | 17.1.0 |
| 2021-06 | CT#92e | CP-211050 | 0024 | | F | 29.673 Rel-17 API version and External doc update | 17.1.0 |
| 2021-09 | CT#93e | CP-212065 | 0027 | 1 | A | Handling of UE Radio Capability for Paging | 17.2.0 |
| 2021-09 | CT#93e | CP-212060 | 0029 | | A | 3xx description correction for SCP | 17.2.0 |
| 2021-09 | CT#93e | CP-212059 | 0030 | | F | 29.673 Rel-17 API version and External doc update | 17.2.0 |
| 2021-12 | CT#94e | CP-213120 | 0034 | | F | 307/308 redirection | 17.3.0 |
| 2021-12 | CT#94e | CP-213130 | 0033 | 1 | A | Binary Information for UE Radio Capability for Paging | 17.3.0 |
| 2021-12 | CT#94e | CP-213121 | 0035 | | F | 29.673 Rel-17 API version and External doc update | 17.3.0 |
| 2022-06 | CT#96e | CP-221051 | 0038 | | F | 29.673 Rel-17 API version and External doc update | 17.4.0 |
| 2022-12 | CT#98 | CP-223028 | 0040 | 1 | F | Missing Mandatory Status Codes in OpenAPI | 18.0.0 |
| 2022-12 | CT#98 | CP-223033 | 0041 | | F | 29.673 Rel-18 API version and External doc update | 18.0.0 |
| 2023-06 | CT#100 | CP-231026 | 0042 | 2 | F | Location header description | 18.1.0 |
| 2023-06 | CT#100 | CP-231027 | 0044 | 1 | B | OAuth2 scopes in the Nucmf API | 18.1.0 |
| 2023-12 | CT#102 | CP-233031 | 0046 | 1 | F | ProblemDetails RFC 7807 obsoleted by 9457 | 18.2.0 |
| 2023-12 | CT#102 | CP-233031 | 0047 | 1 | F | HTTP RFCs obsoleted by IETF RFC 9110, 9111 and 9113 | 18.2.0 |
| 2024-03 | CT#103 | CP-240053 | 0048 | 3 | F | Highest allocated DicEntryId | 18.3.0 |
| 2024-03 | CT#103 | CP-240071 | 0051 | | A | Correction on ManAssOpRequestlist | 18.3.0 |
| 2024-03 | CT#103 | CP-240056 | 0052 | | F | 29.673 Rel-18 API version and External doc update | 18.3.0 |
| 2024-06 | CT#104 | CP-241064 | 0056 | 1 | A | Definition of UcmfNotification | 18.4.0 |
| 2024-06 | CT#104 | CP-241028 | 0057 | | F | The term Payload is replaced with Content due to RFC 9113 | 18.4.0 |
| 2024-06 | CT#104 | CP-241050 | 0059 | | F | Feature negotiation correction | 18.4.0 |
| 2024-06 | CT#104 | CP-241052 | 0060 | | F | 29.673 Rel-18 API version and External doc update | 18.4.0 |
| 2025-06 | CT#108 | CP-251079 | 0063 | | F | 29.673 Rel-19 API version and External doc update | 19.0.0 |
| 2025-09 | CT#109 | CP-252176 | 0064 | | F | API version and External doc update | 19.1.0 |

History

| Document history | | |
|-------------------------|--------------|-------------|
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