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TECHNICAL SPECIFICATION

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In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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where:

x   the first digit:

1   presented to TSG for information;

2   presented to TSG for approval;

3   or greater indicates TSG approved document under change control.

y   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z   the third digit is incremented when editorial only changes have been incorporated in the document.

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

shall   indicates a mandatory requirement to do something

shall not   indicates an interdiction (prohibition) to do something

NOTE 1: The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

NOTE 2: 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

NOTE 3: 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

NOTE 4: The constructions "can" and "cannot" shall not to be used as 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

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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

NOTE 5: The constructions "is" and "is not" do not indicate requirements.

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1 Scope

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

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 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

[12]   IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[13]   IETF RFC 7807: "Problem Details for HTTP APIs".

[14]   IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

[15]   3GPP TS 29.122: "T8 reference point for northbound Application Programming Interfaces (APIs)".

[16]   IETF RFC 7396: "JSON Merge Patch".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

3.2 Symbols

No symbol is defined in the present document.

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].

AF	Application Function
IMEI-TAC	Type Allocation Code part of an IMEI
NEF	Network Exposure Function
NF	Network Function
RACS	Radio Capabilities Signalling optimisation
UCMF	UE radio Capability Management Function

4 UE Radio Capability Provisioning Service

4.1 Service Description

4.1.1 Overview

The UE radio capability provisioning service, as defined in 3GPP TS 23.502 [3], is provided by the UE radio Capability Management Function (UCMF).

This service:

- allows NF service consumers to create, update and delete UCMF dictionary entries for Manufacturer-assigned UE Radio Capability IDs.

4.1.2 Service Architecture

The Service Architecture is defined in 3GPP TS 23.501 [2].

The UE radio capability provisioning service (Nucmf_Provisioning) is part of the Nucmf service-based interface exhibited by the UCMF.

The known NF service consumers of the Nucmf_Provisioning service are:

- Network Exposure Function (NEF); and

- Application Function (AF).

The Nucmf_Provisioning service is provided by the UCMF and consumed by the NEF and the AF, as shown in figure 4.1.2-1 for the SBI representation model and in figure 4.1.2-2 for reference point representation model.
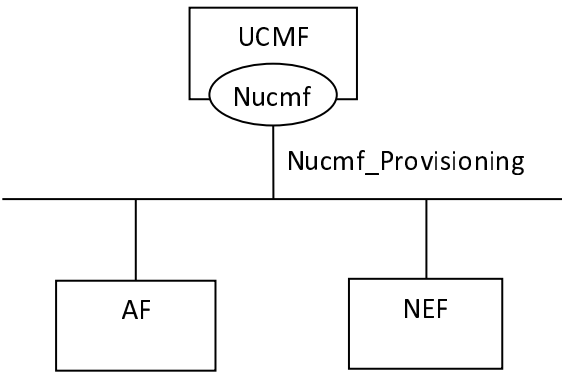
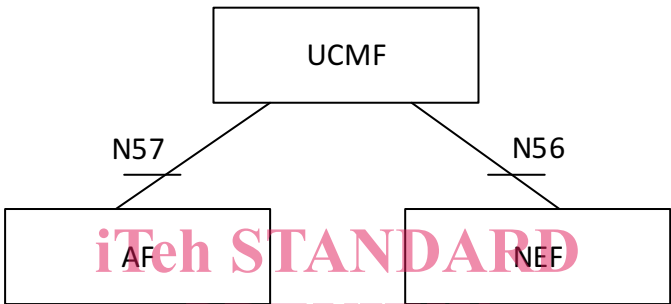**Figure 4.1.2-1: Nucmf_Provisioning service Architecture, SBI representation**

Figure 4.1.2-2: Nucmf_Provisioning service Architecture, reference point representation

4.1.3   Network Functions

4.1.3.1   UCMF

The UCMF is a functional element that provides service to the NF service consumer.

It allows NF consumers to provision (create, update and delete) UCMF dictionary entries for Manufacturer-assigned UE Radio Capability IDs.

4.1.3.2   NF Service Consumers

The Network Exposure Function (NEF):

-    Provision (create, update and delete) UCMF dictionary entries for Manufacturer-assigned UE Radio Capability IDs to the UCMF, if it receives the UE Radio Capability information from the untrusted AF.

The Application Function (AF):

-    As the trusted AF, provision (create, update and delete) UCMF dictionary entries for Manufacturer-assigned UE Radio Capability IDs to the UCMF.

4.2   Service Operations

4.2.1   Introduction

Service operations defined for the Nucmf_Provisioning Service are shown in table 4.2.1-1.

Table 4.2.1-1: Nucmf_Provisioning Service Operations

Service Operation Name	Description	Initiated by
Nucmf_Provisioning_Create	This service operation is used by an NF service consumer to create UE radio capability provisioning resource for Manufacturer-assigned UE Radio Capability IDs.	NF service consumer (e.g. AF, NEF)
Nucmf_Provisioning_Update	This service operation is used by an NF service consumer to modify UE radio capability provisioning resource for Manufacturer-assigned UE Radio Capability IDs.	NF service consumer (e.g. AF, NEF)
Nucmf_Provisioning_Delete	This service operation is used by an NF service consumer to remove a UE radio capability provisioning resource.	NF service consumer (e.g. AF, NEF)

4.2.2 Nucmf_Provisioning_Create service operation

4.2.2.1 General

This service operation is used by an NF service consumer to create UE radio capability provisioning resource for Manufacturer-assigned UE Radio Capability IDs.

The following procedure using the Nucmf_Provisioning_Create service operation is supported:

- creating a UE radio capability provisioning resource.

4.2.2.2 Creating UE radio capability provisioning resource

This procedure is used by the NF service consumer (e.g. NEF) to create a UE radio capability provisioning resource containing UCMF dictionary entries for Manufacturer-assigned UE Radio Capability IDs, as defined in 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3].
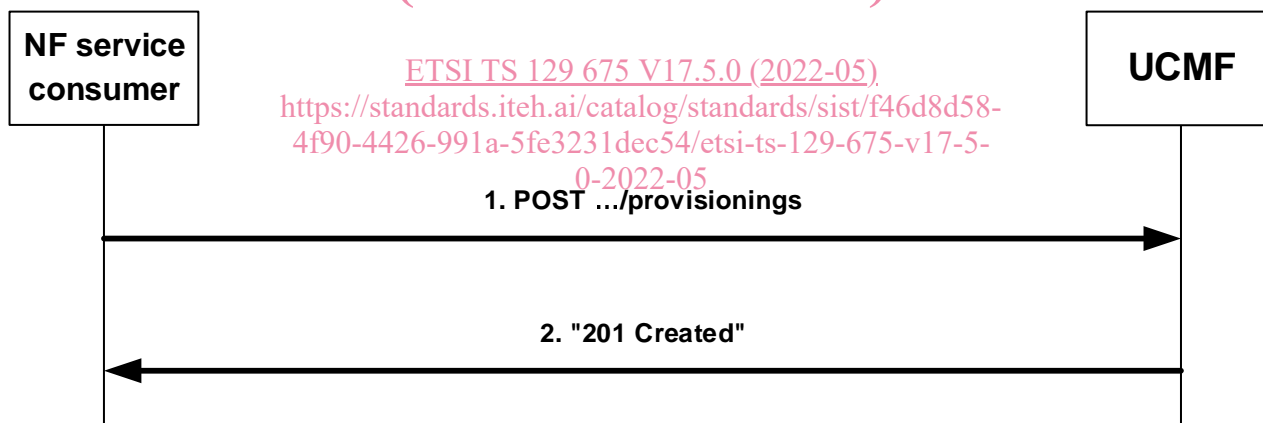
Figure 4.2.2.2-1: Creating new UE radio capability provisioning resource

To create a UE radio capability provisioning resource, the NF service consumer shall send an HTTP POST request to the UCMF with: "{apiRoot}/nucmf-provisioning/<apiVersion>/provisionings" as request URI as shown in step 1 of figure 4.2.2.2-1, and the "RacsData" data structure as request body. The "RacsData" data type shall contain one or more RACS configurations in the "racsConfigs" attribute which include:

- a RACS ID in the "racsId" attribute;

- UE radio capability information in the "racsParamEps" and/or "racsParam5Gs" attributes; and

- the related UE model(s) IMEI-TAC value(s) in the "imeiTacs" attribute.

Upon reception of the HTTP POST message from the NF service consumer requesting to create UCMF dictionary entries, the UCMF shall, for each requested RACS ID, check if there is any existing dictionary entry having the same RACS ID. If yes, the UCMF shall indicate "RACS_ID_DUPLICATED" in the "result" attribute for the requested RACS ID; otherwise if there is no other error the UCMF shall create a UCMF dictionary entry.