# ETSI TS 129 571 V17.9.0 (2023-04)


**5G;**
**5G System;**
**Common Data Types for Service Based Interfaces;**
**Stage 3**
**(3GPP TS 29.571 version 17.9.0 Release 17)**

Reference
RTS/TSGC-0429571vh90

Keywords
5G

***ETSI***

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

# Intellectual Property Rights

## Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

## Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM**® and the GSM logo are trademarks registered and owned by the GSM Association.

# Legal Notice

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

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under https://webapp.etsi.org/key/queryform.asp.

# Modal verbs terminology

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).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

# Contents

# 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:

Version x.y.z

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, 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 common data types that are used or may be expected to be used by multiple Service Based Interface APIs supported by the same or different Network Function(s).

The Principles and Guidelines for Services Definition are specified in 3GPP TS 29.501 [2].

# 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 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[3] OpenAPI: "OpenAPI Specification Version 3.0.0", https://spec.openapis.org/oas/v3.0.0.

[4] IETF RFC 1166: "Internet Numbers".

[5] IETF RFC 5952: "A recommendation for IPv6 address text representation".

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

[7] 3GPP TS 23.003: "Numbering, addressing and identification".

[8] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

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

[10] IETF RFC 3339: "Date and Time on the Internet: Timestamps".

[11] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP) ".

[12] IETF RFC 6901: "JavaScript Object Notation (JSON) Pointer".

[13] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[14] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".

[15] IETF RFC 4122: "A Universally Unique IDentifier (UUID) URN Namespace".

[16] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".

[17] IETF RFC 7042: "IANA Considerations and IETF Protocol and Documentation Usage for IEEE 802 Parameters".

[18] IETF RFC 6733: "Diameter Base Protocol".

[19] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".

[20] 3GPP TS 24.501: "Non-Access-Stratum (NAS) Protocol for 5G System (5GS); Stage 3".

[21] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[22] Void.

[23] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[24] ITU-T Recommendation Q.763 (1999): "Specifications of Signalling System No.7; Formats and codes".

[25] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[26] 3GPP TS 23.015: "Technical Realization of Operator Determined Barring".

[27] 3GPP TR 21.900: "Technical Specification Group working methods".

[28] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[29] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

[30] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS)".

[31] IEEE Std 802.11-2012: "IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".

[32] CableLabs WR-TR-5WWC-ARCH: "5G Wireless Wireline Converged Core Architecture".

[33] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access; Stage 2".

[34] BBF TR-069: "CPE WAN Management Protocol".

[35] BBF TR-369: "User Services Platform (USP)".

[36] 3GPP TS 23.287: "Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services".

[37] BBF TR-470: "5G Wireless Wireline Convergence Architecture".

[38] IEEE "Guidelines for Use of Extended Unique Identifier (EUI), Organizationally Unique Identifier (OUI), and Company ID (CID)", https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/tutorials/eui.pdf

[39] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".

[40] IETF RFC 5580: "Carrying Location Objects in RADIUS and Diameter".

[41] BBF TR-456: "AGF Functional Requirements".

[42] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".

[43] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[44] ECMA-262: "ECMAScript® Language Specification", https://www.ecma-international.org/ecma-262/5.1/.

[45] 3GPP TS 33.246: "Security of Multimedia Broadcast/Multicast Service (MBMS)".

[46] 3GPP TS 33.501: "Security architecture and procedures for 5G system; Stage 2".

[47] IETF RFC 7542: "The Network Access Identifier".

[48] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".

[49] 3GPP TS 23.558: "Architecture for enabling Edge Applications (EA)".

[50] 3GPP TS 33.503: "Security Aspects of Proximity based Services (ProSe) in the 5G System (5GS)".

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 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 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].

| | |
|---|---|
| 5GC | 5G Core Network |
| DNAI | Data Network Access Identifier |
| EUI | Extended Unique Identifier |
| GEO | Geosynchronous Orbit |
| GPSI | Generic Public Subscription Identifier |
| GUAMI | Globally Unique AMF Identifier |
| HFC | Hybrid Fiber Coax |
| LEO | Low Earth Orbit |
| MEO | Medium Earth Orbit |
| N5GC | Non-5G Capable |
| NSSAA | Network Slice- Specific Authentication and Authorization |
| PEI | Permanent Equipment Identifier |
| SBI | Service Based Interface |
| SUPI | Subscription Permanent Identifier |

# 4 Overview

For the different 5GC SBI API, data types shall be defined. Data types identified as common data types shall be defined in this Technical specification and should be referenced from individual 5GC SBI API specifications.

Data types applicable or intended to be applicable to several 5GC SBI API specifications should be interpreted as common data types.

# 5 Common Data Types

## 5.1 Introduction

In the following clauses, common data types for the following areas are defined:

- Data types for generic usage;
- Data types for Subscription, Identification and Numbering;
- Data types related to 5G Network;

- Data types related to 5G QoS;
- Data types related to 5G Trace;
- Data types related to 5G ODBs.

# 5.2 Data Types for Generic Usage

## 5.2.1 Introduction

This clause defines common data types for generic usage.

## 5.2.1A Re-used Data Types

This clause specifies the re-used data types from other specifications.

**Table 5.2.1A-1: Re-used Data Types**

| Data Type | Reference | Comments |
|---|---|---|
| NFType | 3GPP TS 29.510 [29] | |
| ServiceName | 3GPP TS 29.510 [29] | |
| DataSetId | 3GPP TS 29.510 [29] | |
| PlmnSnssai | 3GPP TS 29.510 [29] | |
| GeographicArea | 3GPP TS 29.572 [43] | |
| CivicAddress | 3GPP TS 29.572 [43] | |

## 5.2.2 Simple Data Types

This clause specifies common simple data types.

**Table 5.2.2-1: Simple Data Types**

| Type Name | Type Definition | Description |
|---|---|---|
| Binary | string | String with format "binary" as defined in OpenAPI Specification [3] |
| BinaryRm | string | This data type is defined in the same way as the "Binary" data type, but with the OpenAPI "nullable: true" property. |
| Bytes | string | String with format "byte" as defined in OpenAPI Specification [3], i.e, base64-encoded characters, |
| BytesRm | string | This data type is defined in the same way as the "Bytes" data type, but with the OpenAPI "nullable: true" property. |
| Date | string | String with format "date" as defined in OpenAPI Specification [3] |
| DateRm | string | This data type is defined in the same way as the "Date" data type, but with the OpenAPI "nullable: true" property. |
| DateTime | string | String with format "date-time" as defined in OpenAPI Specification [3] |
| DateTimeRm | string | This data type is defined in the same way as the "DateTime" data type, but with the OpenAPI "nullable: true" property. |
| DiameterIdentity | Fqdn | String containing a Diameter Identity (FQDN), according to clause 4.3 of IETF RFC 6733 [18].<br>DiameterIdentity is defined as a simple data type because Fqdn is also a simple data type (string). |
| DiameterIdentityRm | FqdnRm | This data type is defined in the same way as the "DiameterIdentity" data type, but with the OpenAPI "nullable: true" property.<br>DiameterIdentityRm is defined as a simple data type because FqdnRm is also a simple data type (either a string or null). |
| Double | number | Number with format "double" as defined in OpenAPI Specification [3] |
| DoubleRm | number | This data type is defined in the same way as the "Double" data type, but with the OpenAPI "nullable: true" property. |
| DurationSec | integer | Unsigned integer identifying a period of time in units of seconds. |
| DurationSecRm | integer | This data type is defined in the same way as the "DurationSec" data type, but with the OpenAPI "nullable: true" property. |
| Float | number | Number with format "float" as defined in OpenAPI Specification [3] |
| FloatRm | number | This data type is defined in the same way as the "Float" data type, but with the OpenAPI "nullable: true" property. |
| Uint16 | integer | Integer where the allowed values correspond to the value range of an unsigned 16-bit integer, i.e. 0 to 65535.<br>Minimum = 0. Maximum = 65535. |
| Uint16Rm | integer | This data type is defined in the same way as the "Uint16" data type, but with the OpenAPI "nullable: true" property. |
| Int32 | integer | Integer with format "int32" as defined in OpenAPI Specification [3] |
| Int32Rm | integer | This data type is defined in the same way as the "Int32" data type, but with the OpenAPI "nullable: true" property. |
| Int64 | integer | Integer with format "int64" as defined in OpenAPI Specification [3] |
| Int64Rm | integer | This data type is defined in the same way as the "Int64" data type, but with the OpenAPI "nullable: true" property. |
| Ipv4Addr | string | String identifying a IPv4 address formatted in the "dotted decimal" notation as defined in IETF RFC 1166 [4].<br>Pattern: '^(([0-9]\|[1-9][0-9]\|1[0-9][0-9]\|2[0-4][0-9]\|25[0-5])\.){3}([0-9]\|[1-9][0-9]\|1[0-9][0-9]\|2[0-4][0-9]\|25[0-5])$' |
| Ipv4AddrRm | string | This data type is defined in the same way as the "Ipv4Addr" data type, but with the OpenAPI "nullable: true" property. |
| Ipv4AddrMask | string | String identifying a IPv4 address mask formatted in the "dotted decimal" notation as defined in IETF RFC 1166 [4].<br>Pattern: '^(([0-9]\|[1-9][0-9]\|1[0-9][0-9]\|2[0-4][0-9]\|25[0-5])\.){3}([0-9]\|[1-9][0-9]\|1[0-9][0-9]\|2[0-4][0-9]\|25[0-5])(\/([0-9]\|[1-2][0-9]\|3[0-2]))$' |
| Ipv4AddrMaskRm | string | This data type is defined in the same way as the "Ipv4AddrMask" data type, but with the OpenAPI "nullable: true" property. |
| Ipv6Addr | string | String identifying an IPv6 address formatted according to clause 4 of IETF RFC 5952 [5]. The mixed IPv4 IPv6 notation according to clause 5 of IETF RFC 5952 [5] shall not be used.<br>Pattern: '^((:\|(0?\|([1-9a-f][0-9a-f]{0,3})):)((0?\|([1-9a-f][0-9a-f]{0,3})):){0,6}(:\|(0?\|([1-9a-f][0-9a-f]{0,3})))$'<br>and<br>Pattern: '^((([^:]+:){7}([^:]+))\|((([^:]+:)*[^:]+)?::(([^:]+:)*[^:]+)?))$' |

| | | |
|---|---|---|
| Ipv6AddrRm | string | This data type is defined in the same way as the "Ipv6Addr" data type, but with the OpenAPI "nullable: true" property. |
| Ipv6Prefix | string | String identifying an IPv6 address prefix formatted according to clause 4 of IETF RFC 5952 [5]. IPv6Prefix data type may contain an individual /128 IPv6 address.<br>Pattern: '^((:\|(0?\|([1-9a-f][0-9a-f]{0,3})):)((0?\|([1-9a-f][0-9a-f]{0,3})):){0,6}(:\|(0?\|([1-9a-f][0-9a-f]{0,3})))(\/(([0-9])\|([0-9]{2})\|(1[0-1][0-9])\|(12[0-8])))$'<br>and<br>Pattern:<br>'^((([^:]+:){7}([^:]+))\|((([^:]+:)*[^:]+)?::(([^:]+:)*[^:]+)?))(\/.+)$' |
| Ipv6PrefixRm | string | This data type is defined in the same way as the "Ipv6Prefix" data type, but with the OpenAPI "nullable: true" property. |
| MacAddr48 | string | String identifying a MAC address formatted in the hexadecimal notation according to clause 1.1 and clause 2.1 of IETF RFC 7042 [17].<br>Pattern: '^([0-9a-fA-F]{2})((-[0-9a-fA-F]{2}){5})$' |
| MacAddr48Rm | string | This data type is defined in the same way as the "MacAddr48" data type, but with the OpenAPI "nullable: true" property. |
| SupportedFeatures | string | A string used to indicate the features supported by an API that is used as defined in clause 6.6 in 3GPP TS 29.500 [25].<br>The string shall contain a bitmask indicating supported features in hexadecimal representation:<br>Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent the support of 4 features as described in table 5.2.2-3. The most significant character representing the highest-numbered features shall appear first in the string, and the character representing features 1 to 4 shall appear last in the string. The list of features and their numbering (starting with 1) are defined separately for each API. If the string contains a lower number of characters than there are defined features for an API, all features that would be represented by characters that are not present in the string are not supported. |
| Uinteger | integer | Unsigned Integer, i.e. only value 0 and integers above 0 are permissible.<br>Minimum = 0. |
| UintegerRm | integer | This data type is defined in the same way as the "Uinteger" data type, but with the OpenAPI "nullable: true" property. |
| Uint16 | integer | Integer where the allowed values correspond to the value range of an unsigned 16-bit integer, i.e. 0 to 65535.<br>Minimum = 0. Maximum = 65535. |
| Uint16Rm | integer | This data type is defined in the same way as the "UInt32" data type, but with the OpenAPI "nullable: true" property. |
| Uint32 | integer | Integer where the allowed values correspond to the value range of an unsigned 32-bit integer, i.e. 0 to $(2^{\wedge 32})$-1.<br>Minimum = 0. Maximum = 4294967295. |
| Uint32Rm | integer | This data type is defined in the same way as the "UInt32" data type, but with the OpenAPI "nullable: true" property. |
| Uint64 | integer | Integer where the allowed values correspond to the value range of an unsigned 64-bit integer, i.e. 0 to $(2^{\wedge 64})$-1.<br>Minimum = 0. Maximum = 18446744073709551615. |
| Uint64Rm | integer | This data type is defined in the same way as the "Uint64" data type, but with the OpenAPI "nullable: true" property. |
| Uri | string | String providing an URI formatted according to IETF RFC 3986 [6]. |
| UriRm | string | This data type is defined in the same way as the "Uri" data type, but with the OpenAPI "nullable: true" property. |
| VarUeId | string | String represents the SUPI or GPSI.<br>Pattern: "^(imsi-[0-9]{5,15}\|nai-.+\|msisdn-[0-9]{5,15}\|extid-[^@]+@[^@]+\|gci-.+\|gli-.+\|.+)$". |
| VarUeIdRm | string | This data type is defined in the same way as the "VarUeId" data type, but with the OpenAPI "nullable: true" property. |

| | | |
|---|---|---|
| TimeZone | string | String with format "<time-numoffset>" optionally appended by "<daylightSavingTime>", where:<br><br>- <time-numoffset> shall represent the time zone adjusted for daylight saving time and be encoded as time-numoffset as defined in clause 5.6 of IETF RFC 3339 [10];<br><br>- <daylightSavingTime> shall represent the adjustment that has been made and shall be encoded as "+1" or "+2" for a +1 or +2 hours adjustment.<br><br>Example: "-08:00+1" (for 8 hours behind UTC, +1 hour adjustment for Daylight Saving Time). |
| TimeZoneRm | string | This data type is defined in the same way as the "TimeZone" data type, but with the OpenAPI "nullable: true" property. |
| StnSr | string | String representing the STN-SR as defined in clause 18.6 of 3GPP TS 23.003 [7]. |
| StnSrRm | string | This data type is defined in the same way as the "StnSr" data type, but with the OpenAPI "nullable: true" property. |
| CMsisdn | string | String representing the C-MSISDN as defined in clause 18.7 of 3GPP TS 23.003 [7]).<br>Pattern: "^[0-9]{5,15}$". |
| CMsisdnRm | string | This data type is defined in the same way as the "CMsisdn" data type, but with the OpenAPI "nullable: true" property. |
| DayOfWeek | integer | Integer between and including 1 and 7 denoting a weekday. "1" shall indicate "Monday", and the subsequent weekdays shall be indicated with the next higher numbers. "7" shall indicate "Sunday". |
| TimeOfDay | string | String with format "partial-time" or "full-time" as defined in clause 5.6 of IETF RFC 3339 [10].<br>Examples: "20:15:00", "20:15:00-08:00" (for 8 hours behind UTC). |
| EmptyObject | object | Empty JSON object: { }<br>It is defined with the keyword: "additionalProperties: false". |
| Fqdn | string | Fully Qualified Domain Name<br><br>Pattern: '^([0-9A-Za-z]([-0-9A-Za-z]{0,61}[0-9A-Za-z])?\.)+[A-Za-z]{2,63}\.?$'<br><br>minLength: 4<br>maxLength: 253 |
| FqdnRm | string | This data type is defined in the same way as the "Fqdn" data type, but it also allows the null value. |

**Table 5.2.2-2: Reused OpenAPI data types**

| Type Name | Description |
|---|---|
| boolean | As defined in OpenAPI Specification [3] |
| integer | As defined in OpenAPI Specification [3] |
| number | As defined in OpenAPI Specification [3] |
| string | As defined in OpenAPI Specification [3] |
| object | As defined in OpenAPI Specification [3] |
| array | As defined in OpenAPI Specification [3] |
| NOTE Data types defined in OpenAPI Specification [3] do not follow the UpperCamel convention for data types in 3GPP TS 29.501 [2] | |

**Table 5.2.2-3: Meaning of a Hexadecimal Character in SupportedFeatures Type**

| Character | Feature n+3 supported | Feature n+2 supported | Feature n+1 supported | Feature n supported |
|---|---|---|---|---|
| "0" | no | no | no | no |
| "1" | no | no | no | yes |
| "2" | no | no | yes | no |
| "3" | no | no | yes | yes |
| "4" | no | yes | no | no |
| "5" | no | yes | no | yes |
| "6" | no | yes | yes | no |
| "7" | no | yes | yes | yes |
| "8" | yes | no | no | no |
| "9" | yes | no | no | yes |
| "A" | yes | no | yes | no |
| "B" | yes | no | yes | yes |
| "C" | yes | yes | no | no |
| "D" | yes | yes | no | yes |
| "E" | yes | yes | yes | no |
| "F" | yes | yes | yes | yes |
| NOTE 1 "n" shall be i * 4 + 1, where "i" is zero or a natural number, i.e permissible values of "n" are 1, 5, 9, …<br>NOTE 2 In this table if a feature is not defined, it shall also be indicated with value "no". | | | | |

For example, if only the first feature defined in the feature list is set to 1, the corresponding SupportedFeatures attribute would have a hexadecimal character value of "1", or a string of hexadecimal characters with value of "001" (any amount of 0's to the left of the 1 would result into an equivalent feature list). If we have 32 features defined, and only the last feature in a feature list is set to 1, the corresponding SupportedFeatures attribute would have a string of hexadecimal characters with value of "80000000"(see the description of the SupportedFeatures encoding in Table 5.2.2-1).

## 5.2.3 Enumerations

### 5.2.3.1 Enumeration: PatchOperation

**Table 5.2.3.1-1: Enumeration PatchOperation**

| Enumeration value | Description |
|---|---|
| "add" | Add operation as defined in IETF RFC 6902 [14]. |
| "copy" | Copy operation as defined in IETF RFC 6902 [14]. |
| "move" | Move operation as defined in IETF RFC 6902 [14]. |
| "remove" | Remove operation as defined in IETF RFC 6902 [14]. |
| "replace" | Replace operation as defined in IETF RFC 6902 [14]. |
| "test" | Test operation as defined in IETF RFC 6902 [14]. |

### 5.2.3.2 Enumeration: UriScheme

**Table 5.2.3.2-1: Enumeration UriScheme**

| Enumeration value | Description |
|---|---|
| "http" | HTTP URI scheme |
| "https" | HTTPS URI scheme |

### 5.2.3.3 Enumeration: ChangeType

**Table 5.2.3.3-1: Enumeration ChangeType**

| Enumeration value | Description |
|---|---|
| "ADD" | This value indicates new attribute has been added to the resourceThe "ADD" operation performs one of the following functions, depending upon what the target location references:<br><br>-If the target location specifies an array index, a new value is inserted into the array at the specified index.<br><br>-If the target location specifies an object member that does not already exist, a new member is added to the object.<br><br>-If the target location specifies an object member that does exist, that member's value is replaced.<br><br>The operation object shall contain a "value" member whose content specifies the value to be added. For example:<br><br>{ "op": "ADD", "path": "/a/b/c", "value": [ "foo", "bar" ] }<br><br>When the operation is applied, the target location shall reference one of:<br><br>-The root of the target document - whereupon the specified value becomes the entire content of the target document.<br><br>-A member to add to an existing object - whereupon the supplied value is added to that object at the indicated location. If the member already exists, it is replaced by the specified value.<br><br>-An element to add to an existing array - whereupon the supplied value is added to the array at the indicated location. Any elements at or above the specified index are shifted one position to the right. The specified index shall not be greater than the number of elements in the array. If the "-" character is used to index the end of the array (see IETF RFC 6901 [12]), this has the effect of appending the value to the array.<br><br>Because this operation is designed to add to existing objects and arrays, its target location will often not exist. Although the pointer's error handling algorithm will thus be invoked, this specification defines the error handling behavior for "ADD" pointers to ignore that error and add the value as specified.<br><br>However, the object itself or an array containing it does need to exist, and it remains an error for that not to be the case. For example, an "ADD" with a target location of "/a/b" starting with this document:<br><br>{ "a": { "foo": 1 } }<br><br>is not an error, because "a" exists, and "b" will be added to its value. It is an error in this document:<br><br>{ "q": { "bar": 2 } }<br><br>because "a" does not exist. |

| | |
|---|---|
| "MOVE" | This value indicates existing attribute has been moved to a different path in the resource.<br>The "MOVE" operation removes the value at a specified location and adds it to the target location.<br><br>The operation object shall contain a "from" member, which is a string containing a JSON Pointer value that references the location in the target document to move the value from.<br><br>The "from" location shall exist for the operation to be successful.<br><br>For example:<br><br>{ "op": "MOVE", "from": "/a/b/c", "path": "/a/b/d" }<br><br>This operation is functionally identical to a "REMOVE" operation on the "from" location, followed immediately by an "ADD" operation at the target location with the value that was just removed.<br><br>The "from" location shall not be a proper prefix of the "path" location; i.e., a location cannot be moved into one of its children. |
| "REMOVE" | This value indicates existing attribute has been deleted from the resource.<br>The "REMOVE" operation removes the value at the target location.<br><br>The target location shall exist for the operation to be successful.<br><br>For example:<br><br>{ "op": "REMOVE", "path": "/a/b/c" }<br><br>If removing an element from an array, any elements above the specified index are shifted one position to the left. |
| "REPLACE" | This value indicates existing attribute has been updated with new value.<br>The "REPLACE" operation replaces the value at the target location with a new value. The operation object shall contain a "value" member whose content specifies the replacement value.<br><br>The target location shall exist for the operation to be successful.<br><br>For example:<br><br>{ "op": "REPLACE", "path": "/a/b/c", "value": 42 }<br><br>This operation is functionally identical to a "REMOVE" operation for a value, followed immediately by an "ADD" operation at the same location with the replacement value. |

### 5.2.3.4 Enumeration: HttpMethod

**Table 5.2.3.4-1: Enumeration HttpMethod**

| Enumeration value | Description |
|---|---|
| "GET" | HTTP GET method. |
| "POST" | HTTP POST method. |
| "PUT" | HTTP PUT method. |
| "DELETE" | HTTP DELETE method. |
| "PATCH" | HTTP PATCH method. |
| "OPTIONS" | HTTP OPTIONS method. |
| "HEAD" | HTTP HEAD method. |
| "CONNECT" | HTTP CONNECT method. |
| "TRACE" | HTTP TRACE method. |

### 5.2.3.5 Enumeration: NullValue

**Table 5.2.3.5-1: Enumeration NullValue**

| Enumeration value | Description |
|---|---|
| null | JSON's null value |

### 5.2.3.6 Enumeration: MatchingOperator

**Table 5.2.3.6-1: Enumeration MatchingOperator**

| Enumeration value | Description | Applicability |
|---|---|---|
| FULL_MATCH | Indicates a full match between the string against which the matching applies and the provided matching string. | |
| MATCH_ALL | Indicate a match for any string | |
| STARTS_WITH | Indicates a match when the string against which the matching applies starts with the provided matching string (e.g. the string "smartmeter-01.company.com" matches the matching string "smartmeter-"). | |
| NOT_START_WITH | Indicates a match when the string against which the matching applies does not start with the provided matching string (e.g. the string "smartmeter-01.company.com" matches the matching string "metersmart-"). | |
| ENDS_WITH | Indicates a match when the string against which the matching applies ends with the matching string (e.g. the string "somehost.company.com" matches the matching string "company.com"). | |
| NOT_END_WITH | Indicates a match when the string against which the matching applies does not end with the matching string (e.g. the string "somehost.company.com" matches the matching string "company.se"). | |
| CONTAINS | Indicates a match when the string against which the matching applies contains the matching string (e.g. the string "media.news.com" matches the matching string "media"). | |
| NOT_CONTAIN | Indicates a match when the string against which the matching applies does not contain the matching string (e.g. the string "media.news.com" matches the matching string "aidem"). | |

## 5.2.4 Structured Data Types

### 5.2.4.1 Type: ProblemDetails

**Table 5.2.4.1-1: Definition of type ProblemDetails**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| type | Uri | O | 0..1 | A URI reference according to IETF RFC 3986 [6] that identifies the problem type. |
| title | string | O | 0..1 | A short, human-readable summary of the problem type. It should not change from occurrence to occurrence of the problem. |
| status | integer | O | 0..1 | The HTTP status code for this occurrence of the problem. |
| detail | string | O | 0..1 | A human-readable explanation specific to this occurrence of the problem. |
| instance | Uri | O | 0..1 | A URI reference that identifies the specific occurrence of the problem. |
| cause | string | C | 0..1 | A machine-readable application error cause specific to this occurrence of the problem<br>This IE should be present and provide application-related error information, if available. |
| invalidParams | array(InvalidParam) | O | 1..N | Description of invalid parameters, for a request rejected due to invalid parameters. |
| supportedFeatures | SupportedFeatures | C | 0..1 | Features supported by the NF Service Producer.<br><br>This IE shall be present when rejecting a request due to an unsupported query parameter, if at least one feature is defined for the corresponding service in the version of the specification that the NF Service Producer implements (see clause 5.2.9 of 3GPP TS 29.500 [25]).<br><br>When present, this IE shall indicate the features supported by the NF Service Producer; if the NF Service Producer supports no features, this IE shall be set to the character "0". |
| accessTokenError | AccessTokenErr | C | 0..1 | This IE should be present if an SCP request to get an access token was rejected by the NRF.<br>When present, it should contain the Access Token Error payload received from the NRF. |
| accessTokenRequest | AccessTokenReq | O | 0..1 | This IE may be present if an SCP request to get an access token was rejected by the NRF.<br>When present, it shall contain the Access Token Request that was sent by the SCP. |
| nrfId | Fqdn | O | 0..1 | This IE may be present if an SCP request to get an access token was rejected by the NRF.<br>When present, it shall contain the Identity (i.e. FQDN) of the NRF that rejected the access token request. |
| NOTE 1: See IETF RFC 7807 [9] for detailed information and guidance for each attribute, and 3GPP TS 29.501 [2] for guidelines on error handling support by 5GC SBI APIs.<br>NOTE 2: Additional attributes may be defined per API. | | | | |

### 5.2.4.2 Type: Link

**Table 5.2.4.2-1: Definition of type link**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| href | Uri | M | 1 | It contains the URI of the linked resource. |

### 5.2.4.3 Type PatchItem

**Table 5.2.4.3-1: Definition of type PatchItem**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| op | PatchOperation | M | 1 | This IE indicates the patch operation as defined in IETF RFC 6902 [14] to be performed on resource. | |
| path | string | M | 1 | This IE contains a JSON pointer value (as defined in IETF RFC 6901 [12]) that references a location of a resource on which the patch operation shall be performed. | |
| from | string | C | 0..1 | This IE indicates the path of the source JSON element (according to JSON Pointer syntax) being moved or copied to the location indicated by the "path" attribute.<br>It shall be present if the patch operation is "move" or "copy". | |
| value | Any type | C | 0..1 | This IE indicates a new value for the resource specified in the path attribute.<br>It shall be present if the patch operation is "add", "replace" or "test".<br>The data type of this attribute shall be the same as the type of the resource on which the patch operation shall be performed. The null value shall be allowed. | |

### 5.2.4.4 Type: LinksValueSchema

**Table 5.2.4.4-1: Definition of type LinksValueSchema as a list of mutually exclusive alternatives**

| Data type | Cardinality | Description |
|---|---|---|
| array(Link) | 1..N | Array of links |
| Link | 1 | link |

### 5.2.4.5 Type: SelfLink

**Table 5.2.4.5-1: Definition of type SelfLink**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| self | Link | M | 1 | It contains the URI of the linked resource. |

### 5.2.4.6 Type: InvalidParam

**Table 5.2.4.6-1: Definition of type InvalidParam**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| param | string | M | 1 | If the invalid parameter is an attribute in a JSON body, this IE shall contain the attribute's name and shall be encoded as a JSON Pointer.<br><br>If the invalid parameter is an HTTP header, this IE shall be formatted as the concatenation of the string "header: " plus the name of such header.<br><br>If the invalid parameter is a query parameter, this IE shall be formatted as the concatenation of the string "query: " plus the name of such query parameter.<br><br>If the invalid parameter is a variable part in the path of a resource URI, this IE shall contain the name of the variable, including the symbols "{" and "}" used in OpenAPI specification as the notation to represent variable path segments. |
| reason | string | O | 0..1 | A human-readable reason, e.g. "must be a positive integer".<br>In cases involving failed operations in a PATCH request, the reason string should identify the operation that failed using the operation's array index to assist in correlation of the invalid parameter with the failed operation, e.g." Replacement value invalid for attribute [failed operation index: 4]". |

### 5.2.4.7 Type: LinkRm

This data type is defined in the same way as the "Link" data type, but with the OpenAPI "nullable: true" property.

### 5.2.4.8 Type ChangeItem

**Table 5.2.4.8-1: Definition of type ChangeItem**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| op | ChangeType | M | 1 | This IE indicates the operation to be performed on the resource. | |
| path | string | M | 1 | This IE contains a JSON pointer value (as defined in IETF RFC 6901 [12]) that references a target location within the resource on which the change has been applied.<br>(See Note) | |
| from | string | C | 0..1 | This IE indicates the path of the source JSON element (according to JSON Pointer syntax) being moved or copied to the location indicated by the "path" attribute.<br>It shall be present if the "op" attribute is of value "MOVE". | |
| origValue | Any type | O | 0..1 | This IE indicates the original value at the target location within the resource specified in the path attribute. This attribute only applies when the "op" attribute is of value "REMOVE", "REPLACE" or "MOVE"<br>Based on the use case, this attribute may be included. | |
| newValue | Any type | C | 0..1 | This IE indicates a new value at the target location within the resource specified in the path attribute.<br>It shall be present if the "op" attribute is of value "ADD", "REPLACE".<br>The data type of this attribute shall be the same as the type of the resource on which the change has happened.<br>The null value shall be allowed. | |
| NOTE: As described in IETF RFC 6901 [12], the value "" (empty JSON string) is the JSON Pointer expression to represent "the whole JSON document"; therefore, when the attribute "path" takes value "" and attribute "op" takes values "ADD" or "REMOVE", this shall be interpreted as the creation or deletion respectively of the resource to which this "ChangeItem" refers to. | | | | | |

### 5.2.4.9 Type NotifyItem

**Table 5.2.4.9-1: Definition of type NotifyItem**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| resourceId | Uri | M | 1 | This IE contains the URI of the resource which has been changed. | |
| changes | array(ChangeItem) | M | 1..N | This IE contains the changes which have been applied on the resource identified by the resourceId attribute.<br>See NOTE. | |
| NOTE: There may be more than one way to express a given modification of a resource's representation. E.g. removing one attribute from an object can be done by<br>a) a change item with op set to "REMOVE" and path pointing to the attribute to be removed, or<br>b) a change item with op set to "REPLACE" and path pointing to the object, and a newValue of the object i.e. without the attribute that has been removed.<br>It is up to sending nodes decision to select one of the available ways to express the modification and the receiving node shall support all possible ways. | | | | | |

### 5.2.4.10 Type: ComplexQuery

**Table 5.2.4.10-1: Definition of type ComplexQuery as a list of mutually exclusive alternatives**

| Data type | Cardinality | Description |
|---|---|---|
| Cnf | 1 | A conjunctive normal form |
| Dnf | 1 | A disjunctive normal form |

The ComplexQuery data type is either a conjunctive normal form or a disjunctive normal form. The attribute names "cnfUnits" and "dnfUnits" (see clause 5.2.4.11 and clause 5.2.4.12) serve as discriminator.

### 5.2.4.11 Type: Cnf

**Table 5.2.4.11-1: Definition of type Cnf**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| cnfUnits | array(CnfUnit) | M | 1..N | During the processing of cnfUnits attribute, all the members in the array shall be interpreted as logically concatenated with logical "AND". | |

### 5.2.4.12 Type: Dnf

**Table 5.2.4.12-1: Definition of type Dnf**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| dnfUnits | array(DnfUnit) | M | 1..N | During the processing of dnfUnits attribute, all the members in the array shall be interpreted as logically concatenated with logical "OR". | |

### 5.2.4.13 Type: CnfUnit

**Table 5.2.4.13-1: Definition of type CnfUnit**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| cnfUnit | array(Atom) | M | 1..N | During the processing of cnfUnit attribute, all the members in the array shall be interpreted as logically concatenated with logical "OR". | |

### 5.2.4.14 Type: DnfUnit

**Table 5.2.4.14-1: Definition of type DnfUnit**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| dnfUnit | array(Atom) | M | 1..N | During the processing of dnfUnit attribute, all the members in the array shall be interpreted as logically concatenated with logical "AND". | |

### 5.2.4.15 Type: Atom

**Table 5.2.4.15-1: Definition of type Atom**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| attr | string | M | 1 | This attribute contains the name of a defined query parameter. | |
| value | any type | M | 1 | This attribute contains the value of the query parameter as indicated by attr attribute. | |
| negative | boolean | O | 0..1 | This attribute indicates whether the negative condition applies for the query condition. | |

### 5.2.4.16 Void

### 5.2.4.17 Type: PatchResult

**Table 5.2.4.17-1: Definition of type PatchResult**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| report | array(ReportItem) | M | 1..N | The execution report contains an array of report items. Each report item indicates one failed modification. | |

### 5.2.4.18 Type: ReportItem

**Table 5.2.4.18-1: Definition of type ReportItem**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| path | string | M | 1 | This attribute contains a JSON pointer value (as defined in IETF RFC 6901 [12]) that references a location of a resource to which the modification is subject. | |
| reason | string | O | 0..1 | A human-readable reason providing details on the reported modification failure.<br>The reason string should identify the operation that failed using the operation's array index to assist in correlation of the invalid parameter with the failed operation, e.g. "Replacement value invalid for attribute [failed operation index: 4]". | |

### 5.2.4.19 Type: HalTemplate

**Table 5.2.4.19-1: Definition of type HalTemplate**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| title | string | O | 0..1 | A human-readable string that can be used to identify this template. |
| method | HttpMethod | M | 1 | The HTTP method that should be applied for the corresponding link. If the value is not understood, the value shall be treated as an HTTP GET. |
| contentType | string | O | 0..1 | The media type that should be used for the corresponding request. If the attribute is missing, or contains an unrecognized value, the client should act as if the contentType is set to "application/json". |
| properties | array(Property) | O | 1..N | The properties that should be included in the body of the corresponding request. If the contentType attribute is set to "application/json", then this attribute describes the attributes of the JSON object of the body. |

### 5.2.4.20 Type: Property

**Table 5.2.4.20-1: Definition of type Property**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| name | string | M | 1 | The name of the property. |
| required | boolean | O | 0..1 | Indicates whether the property is required:<br>- true: required<br>- false(default): not required |
| regex | string | O | 0..1 | A regular expression string to be applied to the value of the property. |
| value | string | O | 0..1 | The property value. When present, it shall be a valid JSON string. |

### 5.2.4.21 Type: RedirectResponse

**Table 5.2.4.21-1: Definition of type RedirectResponse**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| cause | string | C | 0..1 | A machine-readable cause string, specific to this occurrence of the redirection.<br>If the redirection is initiated by an SCP towards another SCP, this IE shall be present and set to "SCP_REDIRECTION".<br>If the redirection is initiated by an SEPP towards another SEPP, this IE shall be present and set to "SEPP_REDIRECTION". |
| targetScp | Uri | O | 0..1 | ApiRoot of the SCP towards which an HTTP request is redirected (see clause 6.10.9 of 3GPP TS 29.500 [25]). |
| targetSepp | Uri | O | 0..1 | ApiRoot of the SEPP towards which an HTTP request is redirected (see clause 6.10.9 of 3GPP TS 29.500 [25]). |

### 5.2.4.22 Type: TunnelAddress

**Table 5.2.4.22-1: Definition of type TunnelAddress**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| ipv4Addr | Ipv4Addr | C | 0..1 | IPv4 address (NOTE) | |
| Ipv6Addr | Ipv6Addr | C | 0..1 | IPv6 address (NOTE) | |
| portNumber | Uinteger | M | 1 | UDP Port | |
| NOTE: At least one of these IEs shall be present. | | | | | |

### 5.2.4.23 Type: FqdnPatternMatchingRule

**Table 5.2.4.23-1: Definition of type FqdnPatternMatchingRule**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| regex | string | C | 0..1 | One FQDN pattern, defined as a regular expression according to the ECMA-262 dialect [44].<br><br>(NOTE) |
| stringMatchingRule | StringMatchingRule | C | 0..1 | One FQDN pattern, described as a string match rule.<br><br>(NOTE) |
| NOTE: When provisioning an FQDN pattern, the StringMatchingRule shall be preferred over regular expression and used whenever possible (i.e. if the pattern can be described by a string matching rule) to optimize the matching process and reduce the processing load, since the use of regular expressions can be more computing intensive than using string matching rule. Either the regex or the stringMatchingRule shall be present. | | | | |

EXAMPLE 1: A FQDN pattern described by a string matching rule matching all FQDNs with "smartmeter-{factoryID}.company.com" where "*{factoryID}*" can be any string
JSON: {"stringMatchingRule": {stringMatchingConditions:[{"matchingString": "smartmeter-","matchingOperator": "STARTS_WITH"},{"matchingString": ".company.com","matchingOperator": "ENDS_WITH"}]}}

EXAMPLE 2: A FQDN pattern described by a regular expression matching all FQDNs with "smartmeter-{factoryID}.company.com" where "*{factoryID}*" can be any string.
JSON: {"regex": "^smartmeter-.+\.company\.com$"}

### 5.2.4.24 Type: StringMatchingRule

**Table 5.2.4.24-1: Definition of type StringMatchingRule**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| stringMatchingConditions | array(StringMatchingCondition) | M | 1..N | Contains a list of conditions which shall be evaluated for string matching. |
| NOTE: The conditions in the stringMatchingConditions array shall be evaluated as "and" logical relationship. | | | | |

#### 5.2.4.25 Type: StringMatchingCondition

**Table 5.2.4.25-1: Definition of type StringMatchingCondition**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| matchingString | string | C | 0..1 | This IE shall be present to identify the string against which the matching is performed except when the matchingOperator is MATCH_ALL. |
| matchingOperator | MatchingOperator | M | 1 | Identifies the matching operation. |

## 5.3 Data Types related to Subscription, Identification and Numbering

### 5.3.1 Introduction

This clause defines common data types related to subscription, identification and numbering information.

### 5.3.2 Simple Data Types

This clause specifies common simple data types.

**Table 5.3.2-1: Simple Data Types**

| Type Name | Type Definition | Description |
|---|---|---|
| Dnn | string | String representing a Data Network as defined in clause 9A of 3GPP TS 23.003 [7]; it shall contain either a DNN Network Identifier, or a full DNN with both the Network Identifier and Operator Identifier, as specified in 3GPP TS 23.003 [7] clause 9.1.1 and 9.1.2. It shall be coded as string in which the labels are separated by dots (e.g. "Label1.Label2.Label3"). See NOTE 2. |
| DnnRm | string | This data type is defined in the same way as the "Dnn" data type, but with the OpenAPI "nullable: true" property. |
| WildcardDnn | string | String representing the Wildcard DNN.<br>It shall contain the string "*".<br>Pattern: '^[*]$' |
| WildcardDnnRm | string | This data type is defined in the same way as the "WildcardDnn" data type, but with the OpenAPI "nullable: true" property. |
| Gpsi | string | String identifying a Gpsi shall contain either an External Id or an MSISDN. It shall be formatted as follows:<br>-External Identifier: "extid-<extid>, where <extid> shall be formatted according to clause 19.7.2 of 3GPP TS 23.003 [7] that describes an External Identifier.<br>-MSISDN: "msisdn-<msisdn>, where <msisdn> shall be formatted according to clause 3.3 of 3GPP TS 23.003 [7] that describes an MSISDN.<br>Pattern: '^(msisdn-[0-9]{5,15}\|extid-.+@.+\|.+)$' |
| GpsiRm | string | This data type is defined in the same way as the "Gpsi" data type, but with the OpenAPI "nullable: true" property. |
| GroupId | string | String identifying a group of devices network internal globally unique ID which identifies a set of IMSIs, as specified in clause 19.9 of 3GPP TS 23.003 [7].<br><br>Pattern: '^[A-Fa-f0-9]{8}-[0-9]{3}-[0-9]{2,3}-([A-Fa-f0-9][A-Fa-f0-9]){1,10}$'. |
| GroupIdRm | string | This data type is defined in the same way as the "GroupId" data type, but with the OpenAPI "nullable: true" property. |
| ExternalGroupId | string | String identifying External Group Identifier that identifies a group made up of one or more subscriptions associated to a group of IMSIs, as specified in clause 19.7.3 of 3GPP TS 23.003 [7].<br><br>Pattern: "^extgroupid-[^@]+@[^@]+$" |
| ExternalGroupIdRm | string | This data type is defined in the same way as the "ExternalGroupId" data type, but with the OpenAPI "nullable: true" property. |
| Pei | string | String representing a Permanent Equipment Identifier that may contain:<br>- an IMEI or IMEISV, as specified in clause 6.2 of 3GPP TS 23.003 [7];<br>- a MAC address for a 5G-RG or FN-RG via wireline access, with an indication that this address cannot be trusted for regulatory purpose if this address cannot be used as an Equipment Identifier of the FN-RG, as specified in clause 4.7.7 of 3GPP TS 23.316 [30].<br>- an IEEE Extended Unique Identifier (EUI-64), for UEs not supporting any 3GPP access technologies, as defined in IEEE "Guidelines for Use of Extended Unique Identifier (EUI), Organizationally Unique Identifier (OUI), and Company ID (CID)" [38].<br><br>Pattern: '^(imei-[0-9]{15}\|imeisv-[0-9]{16}\|mac((-[0-9a-fA-F]{2}){6})(-untrusted)?\|eui((-[0-9a-fA-F]{2}){8})\|.+)$'. See NOTE 1.<br><br>Examples:<br>imei-012345678901234<br>imeisv-0123456789012345<br>mac-00-00-5E-00-53-00<br>mac-00-00-5E-00-53-00-untrusted<br>eui-AC-DE-48-23-45-67-01-9F |

| | | |
|---|---|---|
| PeiRm | string | This data type is defined in the same way as the "Pei" data type, but with the OpenAPI "nullable: true" property. |
| Supi | string | String identifying a Supi that shall contain either an IMSI, a network specific identifier, a Global Cable Identifier (GCI) or a Global Line Identifier (GLI) as specified in clause 2.2A of 3GPP TS 23.003 [7].<br>It shall be formatted as follows:<br>- for an IMSI "imsi-<imsi>", where <imsi> shall be formatted according to clause 2.2 of 3GPP TS 23.003 [7] that describes an IMSI.<br>- for a network specific identifier "nai-<nai>, where <nai> shall be formatted according to clause 28.7.2 of 3GPP TS 23.003 [7] that describes an NAI.<br>- for a GCI: "gci-<gci>", where <gci> shall be formatted according to clause 28.15.2 of 3GPP TS 23.003 [7].<br>- for a GLI: "gli-<gli>", where <gli> shall be formatted according to clause 28.16.2 of 3GPP TS 23.003 [7].<br>To enable that the value is used as part of an URI, the string shall only contain characters allowed according to the "lower-with-hyphen" naming convention defined in 3GPP TS 29.501 [2].<br>Pattern: '^(imsi-[0-9]{5,15}\|nai-.+\| gci-.+\|gli-.+\|.+)$'<br>(NOTE 1). |
| SupiRm | string | This data type is defined in the same way as the "Supi" data type, but with the OpenAPI "nullable: true" property. |
| NfInstanceId | string | String uniquely identifying a NF instance. The format of the NF Instance ID shall be a Universally Unique Identifier (UUID) version 4, as described in IETF RFC 4122 [15].<br>(NOTE 3) |
| AmfId | string | String identifying the AMF ID composed of AMF Region ID (8 bits), AMF Set ID (10 bits) and AMF Pointer (6 bits) as specified in clause 2.10.1 of 3GPP TS 23.003 [7].<br>It is encoded as a string of 6 hexadecimal characters (i.e., 24 bits).<br>Pattern: '^[A-Fa-f0-9]{6}$' |
| AmfRegionId | string | String identifying the AMF Region ID (8 bits), as specified in clause 2.10.1 of 3GPP TS 23.003 [7].<br>It is encoded as a string of 2 hexadecimal characters (i.e. 8 bits).<br>Pattern: '^[A-Fa-f0-9]{2}$' |
| AmfSetId | string | String identifying the AMF Set ID (10 bits) as specified in clause 2.10.1 of 3GPP TS 23.003 [7].<br>It is encoded as a string of 3 hexadecimal characters where the first character is limited to values 0 to 3 (i.e. 10 bits).<br>Pattern: '^[0-3][A-Fa-f0-9]{2}$' |
| RfspIndex | integer | Unsigned integer representing the "Subscriber Profile ID for RAT/Frequency Priority" as specified in 3GPP TS 36.413 [16].<br>Minimum = 1. Maximum = 256. |
| RfspIndexRm | integer | This data type is defined in the same way as the "RfspIndex" data type, but with the OpenAPI "nullable: true" property. |
| NfGroupId | string | Identifier of a group of NFs |
| MtcProviderInformation | string | String uniquely identifying MTC provider information. |
| CagId | string | String containing a Closed Access Group Identifier.<br>Pattern: "^[A-Fa-f0-9]{8}$" |
| SupiOrSuci | string | String identifying a SUPI or a SUCI.<br>Pattern: "^(imsi-[0-9]{5,15}\|nai-.+\|gli-.+\|gci-.+\|suci-(0-[0-9]{3}-[0-9]{2,3}\|[1-7]-.+)-[0-9]{1,4}-(0-0-.*\|[a-fA-F1-9]-([1-9]\|[1-9][0-9]\|1[0-9]{2}\|2[0-4][0-9]\|25[0-5])-[a-fA-F0-9]+)\|.+)$" |

NOTE 1: The encoding of 3GPP defined identifiers (e.g. IMSI, NAI, IMEI, GCI, GLI) shall be prefixed with its corresponding prefix (e.g. 'imsi-','nai-', 'imei-', 'gci-', 'gli-').
NOTE 2: Whether the Dnn data type contains just the DNN Network Identifier, or the Network Identifier plus the Operator Identifier, shall be documented in each API where this data type is used.
NOTE 3: NFs shall be able to receive a NF Instance Id in any UUID format.

### 5.3.3 Enumerations

For Data Types related to Subscription, Identification and Numbering, no Enumerations data types are defined in this version of the specification.

### 5.3.4 Structured Data Types

#### 5.3.4.1 Type: Guami

**Table 5.3.4.1-1: Definition of type Guami**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| plmnId | PlmnIdNid | M | 1 | PLMN Identity and Network Identity |
| amfId | AmfId | M | 1 | AMF Identity |

#### 5.3.4.2 Type: NetworkId

**Table 5.3.4.2-1: Definition of type NetworkId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| mcc | Mcc | C | 0..1 | Mobile Country Code |
| mnc | Mnc | C | 0..1 | Mobile Network Code |
| NOTE: At least one MNC or MCC shall be included. | | | | |

#### 5.3.4.3 Type: GuamiRm

This data type is defined in the same way as the "Guami" data type, but with the OpenAPI "nullable: true" property.

## 5.4 Data Types related to 5G Network

### 5.4.1 Introduction

This clause defines common data types related to 5G Network (other than related to 5G QoS).

### 5.4.2 Simple Data Types

This clause specifies common simple data types.

**Table 5.4.2-1: Simple Data Types**

| Type Name | Type Definition | Description |
|---|---|---|
| ApplicationId | string | String providing an application identifier. |
| ApplicationIdRm | string | This data type is defined in the same way as the "ApplicationId" data type, but with the OpenAPI "nullable: true" property. |
| PduSessionId | integer | Unsigned integer identifying a PDU session, within the range 0 to 255, as specified in clause 11.2.3.1b, bits 1 to 8, of 3GPP TS 24.007 [13]. If the PDU Session ID is allocated by the Core Network for UEs not supporting N1 mode, reserved range 64 to 95 is used. PDU Session ID within the reserved range is only visible in the Core Network (NOTE). |
| Mcc | string | Mobile Country Code part of the PLMN, comprising 3 digits, as defined in clause 9.3.3.5 of 3GPP TS 38.413 [11].<br><br>Pattern: '^[0-9]{3}$' |
| MccRm | string | This data type is defined in the same way as the "Mcc" data type, but with the OpenAPI "nullable: true" property. |
| Mnc | string | Mobile Network Code part of the PLMN, comprising 2 or 3 digits, as defined in clause 9.3.3.5 of 3GPP TS 38.413 [11].<br><br>Pattern: '^[0-9]{2,3}$' |
| MncRm | string | This data type is defined in the same way as the "Mnc" data type, but with the OpenAPI "nullable: true" property. |
| Tac | string | 2 or 3-octet string identifying a tracking area code as specified in clause 9.3.3.10 of 3GPP TS 38.413 [11], in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the TAC shall appear first in the string, and the character representing the 4 least significant bit of the TAC shall appear last in the string.<br><br>Examples:<br>A legacy TAC 0x4305 shall be encoded as "4305".<br>An extended TAC 0x63F84B shall be encoded as "63F84B" |
| TacRm | string | This data type is defined in the same way as the "Tac" data type, but with the OpenAPI "nullable: true" property. |
| EutraCellId | string | 28-bit string identifying an E-UTRA Cell Id as specified in clause 9.3.1.9 of 3GPP TS 38.413 [11], in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the Cell Id shall appear first in the string, and the character representing the 4 least significant bit of the Cell Id shall appear last in the string.<br><br>Pattern: '^[A-Fa-f0-9]{7}$'<br><br>Example:<br>An E-UTRA Cell Id 0x5BD6007 shall be encoded as "5BD6007". |
| EutraCellIdRm | string | This data type is defined in the same way as the "EutraCellId" data type, but with the OpenAPI "nullable: true" property. |
| NrCellId | string | 36-bit string identifying an NR Cell Id as specified in clause 9.3.1.7 of 3GPP TS 38.413 [11], in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the Cell Id shall appear first in the string, and the character representing the 4 least significant bit of the Cell Id shall appear last in the string.<br><br>Pattern: '^[A-Fa-f0-9]{9}$'<br><br>Example:<br>An NR Cell Id 0x225BD6007 shall be encoded as "225BD6007". |
| NrCellIdRm | string | This data type is defined in the same way as the "NrCellId" data type, but with the OpenAPI "nullable: true" property. |
| Dnai | string | DNAI (Data network access identifier), see clause 5.6.7 of 3GPP TS 23.501 [8]. |
| DnaiRm | string | This data type is defined in the same way as the "Dnai" data type, but with the OpenAPI "nullable: true" property. |

| | | |
|---|---|---|
| 5GMmCause | Uinteger | This represents the 5GMM cause code values as specified in 3GPP TS 24.501 [20]. |
| AreaCodeRm | string | This data type is defined in the same way as the "AreaCode" data type, but with the OpenAPI "nullable: true" property. |
| AmfName | Fqdn | FQDN (Fully Qualified Domain Name) of the AMF as defined in clause 28.3.2.5 of 3GPP TS 23.003 [7]. |
| AreaCode | string | Values are operator specific. |
| N3IwfId | string | This represents the identifier of the N3IWF ID as specified in clause 9.3.1.57 of 3GPP TS 38.413 [11] in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the N3IWF ID shall appear first in the string, and the character representing the 4 least significant bit of the N3IWF ID shall appear last in the string.<br>Pattern: '^[A-Fa-f0-9]+$'<br><br>Example:<br>The N3IWF Id 0x5BD6 shall be encoded as "5BD6". |
| WAgfId | string | This represents the identifier of the W-AGF ID as specified in clause 9.3.1.162 of 3GPP TS 38.413 [11] in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the W-AGF ID shall appear first in the string, and the character representing the 4 least significant bit of the W-AGF ID shall appear last in the string.<br>Pattern: '^[A-Fa-f0-9]+$'<br><br>Example:<br>The W-AGF Id 0x5BD6 shall be encoded as "5BD6". |
| TngfId | string | This represents the identifier of the TNGF ID as specified in clause 9.3.1.161 of 3GPP TS 38.413 [11] in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the TNGF ID shall appear first in the string, and the character representing the 4 least significant bit of the TNGF ID shall appear last in the string.<br>Pattern: '^[A-Fa-f0-9]+$'<br><br>Example:<br>The TNGF Id 0x5BD6 shall be encoded as "5BD6". |
| NgeNbId | string | This represents the identifier of the ng-eNB ID as specified in clause 9.3.1.8 of 3GPP TS 38.413 [11].<br><br>The string shall be formatted with following pattern:<br>Pattern: '^('MacroNGeNB-[A-Fa-f0-9]{5}\|<br>LMacroNGeNB-[A-Fa-f0-9]{6}\|<br>SMacroNGeNB-[A-Fa-f0-9]{5})$'<br><br>The value of the ng-eNB ID shall be encoded in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The padding 0 shall be added to make multiple nibbles, so the most significant character representing the padding 0 if required together with the 4 most significant bits of the ng-eNB ID shall appear first in the string, and the character representing the 4 least significant bit of the ng-eNB ID (to form a nibble) shall appear last in the string.<br><br>Examples:<br>" SMacroNGeNB-34B89" indicates a Short Macro NG-eNB ID with value 0x34B89. |
| Nid | string | This represents the Network Identifier, which together with a PLMN ID is used to identify an SNPN (see 3GPP TS 23.003 [7] and 3GPP TS 23.501 [8] clause 5.30.2.1).<br>Pattern: '^[A-Fa-f0-9]{11}$' |

| | | |
|---|---|---|
| NidRm | string | This data type is defined in the same way as the "Nid" data type, but with the OpenAPI "nullable: true" property. |
| NfSetId | string | NF Set Identifier (see clause 28.12 of 3GPP TS 23.003 [7]), formatted as the following string:<br><br>" set<Set ID>.<nftype>set.5gc.mnc<MNC>.mcc<MCC>", or "set<SetID>.<NFType>set.5gc.nid<NID>.mnc<MNC>.mcc<MCC>"<br><br>with<br><MCC> encoded as defined in clause 5.4.2 ("Mcc" data type definition)<br><br><MNC> encoding the Mobile Network Code part of the PLMN, comprising 3 digits. If there are only 2 significant digits in the MNC, one "0" digit shall be inserted at the left side to fill the 3 digits coding of MNC. Pattern: '^[0-9]{3}$<br><br><NFType> encoded as a value defined in Table 6.1.6.3.3-1 of 3GPP TS 29.510 [29] but with lower case characters<br><br><Set ID> encoded as a string of characters consisting of alphabetic characters (A-Z and a-z), digits (0-9) and/or the hyphen (-) and that shall end with either an alphabetic character or a digit.<br>Pattern: '^([A-Za-z0-9\-]*[A-Za-z0-9])$'<br><br>Examples:<br>"setxyz.smfset.5gc.mnc012.mcc345"<br>"set12.pcfset.5gc.mnc012.mcc345" |
| NfServiceSetId | string | NF Service Set Identifier (see clause 28.12 of 3GPP TS 23.003 [7]) formatted as the following string:<br><br>" set<Set ID>.sn<Service Name>.nfi<NF Instance ID>.5gc.mnc<MNC>.mcc<MCC>">", or "set<SetID>.sn<ServiceName>.nfi<NFInstanceID>.5gc.nid<NID>.mnc<MNC>.mcc<MCC>"<br><br>with<br><MCC> encoded as defined in clause 5.4.2 ("Mcc" data type definition)<br><br><MNC> encoding the Mobile Network Code part of the PLMN, comprising 3 digits. If there are only 2 significant digits in the MNC, one "0" digit shall be inserted at the left side to fill the 3 digits coding of MNC. Pattern: '^[0-9]{3}$'<br><br><NID> encoded as defined in clause 5.4.2 ("Nid" data type definition)<br><br><NFInstanceId> encoded as defined in clause 5.3.2<br><br><ServiceName> encoded as defined in 3GPP TS 29.510 [29]<br><br><Set ID> encoded as a string of characters consisting of alphabetic characters (A-Z and a-z), digits (0-9) and/or the hyphen (-) and that shall end with either an alphabetic character or a digit.<br>Pattern: '^([A-Za-z0-9\-]*[A-Za-z0-9])$<br><br>Examples:<br>"setxyz.snnsmf-pdusession.nfi54804518-4191-46b3-955c-ac631f953ed8.5gc.mnc012.mcc345"<br>"set2.snnpcf-smpolicycontrol.nfi54804518-4191-46b3-955c-ac631f953ed8.5gc.mnc012.mcc345" |

| | | |
|---|---|---|
| PlmnAssiUeRadioCapId | Bytes | String with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, encoding the "UE radio capability ID" IE as specified in clause 9.11.3.68 of 3GPP TS 24.501 [20] (starting from octet 1). |
| ManAssiUeRadioCapId | Bytes | String with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, encoding the "UE radio capability ID" IE as specified in clause 9.11.3.68 of 3GPP TS 24.501 [20] (starting from octet 1). |
| TypeAllocationCode | string | Type Allocation Code (TAC) of the UE, comprising the initial eight-digit portion of the 15-digit IMEI and 16-digit IMEISV codes. See clause 6.2 of 3GPP TS 23.003 [7].<br><br>Pattern: '^[0-9]{8}$' |
| HfcNId | string | This IE represents the identifier of the HFC node Id as specified in CableLabs WR-TR-5WWC-ARCH [32]. It is provisioned by the wireline operator as part of wireline operations and may contain up to six characters. |
| HfcNIdRm | string | This data type is defined in the same way as the "HfcNId" data type, but with the OpenAPI "nullable: true" property. |
| ENbId | string | This represents the identifier of the eNB ID as specified in clause 9.2.1.37 of 3GPP TS 36.413 [16].<br><br>The string shall be formatted with following pattern:<br>Pattern: '^('MacroeNB-[A-Fa-f0-9]{5}\|LMacroeNB-[A-Fa-f0-9]{6}\|SMacroeNB-[A-Fa-f0-9]{5}\|HomeeNB-[A-Fa-f0-9]{7})$'<br><br>The value of the eNB ID shall be encoded in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The padding 0 shall be added to make multiple nibbles, so the most significant character representing the padding 0 if required together with the 4 most significant bits of the eNB ID shall appear first in the string, and the character representing the 4 least significant bit of the eNB ID (to form a nibble) shall appear last in the string.<br><br>Examples:<br>"SMacroeNB-34B89" indicates a Short Macro eNB ID with value 0x34B89. |
| Gli | Bytes | Global Line Identifier uniquely identifying the line connecting the 5G-BRG or FN-BRG to the 5GS. See clause 28.16.3 of 3GPP TS 23.003 [7].<br><br>This shall be encoded as a string with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, representing the GLI value (up to 150 bytes) encoded as specified in BBF WT-470 [37]. |
| Gci | string | Global Cable Identifier uniquely identifying the connection between the 5G-CRG or FN-CRG to the 5GS. See clause 28.15.4 of 3GPP TS 23.003 [7].<br><br>This shall be encoded as a string per clause 28.15.4 of 3GPP TS 23.003 [7], and compliant with the syntax specified in clause 2.2 of IETF RFC 7542 [47] for the username part of a NAI. The GCI value is specified in CableLabs WR-TR-5WWC-ARCH [32]. |
| NsSrg | string | String representing Network Slice Simultaneous Registration Group (see clause 5.15.12 of 3GPP TS 23.501 [8]) |
| NsSrgRm | string | This data type is defined in the same way as the " NsSrg" data type, but with the OpenAPI "nullable: true" property. |

| | | |
|---|---|---|
| RelayServiceCode | integer | Relay Service Code to identify a connectivity service provided by the UE-to-Network relay.<br><br>Integer type as defined in OpenAPI Specification [3], with value range from 0 to 16777215 (decimal).<br><br>Minimum = 0. Maximum = 16777215. |
| 5GPrukId | string | Prose Remote User Key ID over Control Plane<br><br>A string carrying the CP-PRUK ID of the remote UE as specified in 3GPP TS 33.503 [50].<br><br>The CP-PRUK ID is a string in NAI format as specified in clause 28.7.11 of 3GPP TS 23.003 [7].<br><br>pattern: "^rid[0-9]{1,4}\.pid[0-9a-fA-F]+\@prose-cp\.5gc\.mnc[0-9]{2,3}\.mcc[0-9]{3}\.3gppnetwork\.org$" |
| NsagId | integer | Containing a Network Slice AS Group ID, see 3GPP TS 38.413 [11].<br>Values between 0 and 255 are allowed for this data type in this release. |
| NsagIdRm | integer | This data type is defined in the same way as the "NsagId" data type, but with the OpenAPI "nullable: true" property. |
| NOTE: For a PDN connection established via MME, the PDU Session ID value is set to 64 plus the EPS bearer ID of the default EPS bearer of the PDN connection; for a PDN connection established via ePDG, the PDU Session ID value is set to 80 plus the EPS bearer ID of the default EPS bearer of the PDN connection. | | |

## 5.4.3 Enumerations

### 5.4.3.1 Enumeration: AccessType

**Table 5.4.3.1-1: Enumeration AccessType**

| Enumeration value | Description |
|---|---|
| "3GPP_ACCESS" | 3GPP access |
| "NON_3GPP_ACCESS" | Non-3GPP access |

### 5.4.3.2 Enumeration: RatType

**Table 5.4.3.2-1: Enumeration RatType**

| Enumeration value | Description |
|---|---|
| "NR" | New Radio |
| "EUTRA" | (WB) Evolved Universal Terrestrial Radio Access |
| "WLAN" | Untrusted Wireless LAN (IEEE 802.11) access |
| "VIRTUAL" | Virtual (see NOTE 1) |
| "NBIOT" | NB IoT |
| "WIRELINE" | Wireline access |
| "WIRELINE_CABLE" | Wireline Cable access |
| "WIRELINE_BBF" | Wireline BBF access |
| "LTE-M" | LTE-M (see NOTE 2) |
| "NR_U" | New Radio in unlicensed bands |
| "EUTRA_U" | (WB) Evolved Universal Terrestrial Radio Access in unlicensed bands |
| "TRUSTED_N3GA" | Trusted Non-3GPP access |
| "TRUSTED_WLAN" | Trusted Wireless LAN (IEEE 802.11) access |
| "UTRA" | UMTS Terrestrial Radio Access |
| "GERA" | GSM EDGE Radio Access Network |
| "NR_LEO" | NR (LEO) satellite access type |
| "NR_MEO" | NR (MEO) satellite access type |
| "NR_GEO" | NR (GEO) satellite access type |
| "NR_OTHER_SAT" | NR (OTHERSAT) satellite access type |
| "NR_REDCAP" | NR RedCap access type |
| NOTE 1: Virtual shall be used if the N3IWF does not know the access technology used for an untrusted non-3GPP access.<br>NOTE 2: This RAT type value is used only in the Core Network; it shall be used when a Category M UE using E-UTRA has provided a Category M indication to the NG-RAN. | |

### 5.4.3.3 Enumeration: PduSessionType

The enumeration PduSessionType indicates the type of a PDU session. It shall comply with the provisions defined in table 5.4.3.3-1.

**Table 5.4.3.3-1: Enumeration PduSessionType**

| Enumeration value | Description |
|---|---|
| "IPV4" | IPv4 |
| "IPV6" | IPv6 |
| "IPV4V6" | IPv4v6 (see clause 5.8.2.2.1 of 3GPP TS 23.501 [8]) |
| "UNSTRUCTURED" | Unstructured |
| "ETHERNET" | Ethernet |

### 5.4.3.4 Enumeration: UpIntegrity

The enumeration UpIntegrity indicates whether UP integrity protection is required, preferred or not needed for all the traffic on the PDU Session. It shall comply with the provisions defined in table 5.4.3.4-1.

**Table 5.4.3.4-1: Enumeration UpIntegrity**

| Enumeration value | Description |
|---|---|
| "REQUIRED" | UP integrity protection shall apply for all the traffic on the PDU Session. |
| "PREFERRED" | UP integrity protection should apply for all the traffic on the PDU Session. |
| "NOT_NEEDED" | UP integrity protection shall not apply on the PDU Session. |

### 5.4.3.5 Enumeration: UpConfidentiality

The enumeration UpConfidentiality indicates whether UP confidentiality protection is required, preferred or not needed for all the traffic on the PDU Session. It shall comply with the provisions defined in table 5.4.3.5-1.

**Table 5.4.3.5-1: Enumeration UpConfidentiality**

| Enumeration value | Description |
|---|---|
| "REQUIRED" | UP confidentiality protection shall apply for all the traffic on the PDU Session. |
| "PREFERRED" | UP confidentiality protection should apply for all the traffic on the PDU Session. |
| "NOT_NEEDED" | UP confidentiality protection shall not apply on the PDU Session. |

### 5.4.3.6 Enumeration: SscMode

The enumeration SscMode represents the service and session continuity mode.

**Table 5.4.3.6-1: Enumeration SscMode**

| Enumeration value | Description |
|---|---|
| "SSC_MODE_1" | see 3GPP TS 23.501 [8] |
| "SSC_MODE_2" | see 3GPP TS 23.501 [8] |
| "SSC_MODE_3" | see 3GPP TS 23.501 [8] |

### 5.4.3.7 Enumeration: DnaiChangeType

The enumeration DnaiChangeType represents the type of a DNAI change. A NF service consumer may subscribe to "EARLY", "LATE" or "EARLY_LATE" types of DNAI change. The types of observed DNAI change the SMF may notify are "EARLY" or "LATE". The DnaiChangeType data type shall comply with the provisions defined in table 5.4.3.7-1.

**Table 5.4.3.7-1: Enumeration DnaiChangeType**

| Enumeration value | Description | Applicability |
|---|---|---|
| EARLY | Early notification of UP path reconfiguration. | |
| EARLY_LATE | Early and late notification of UP path reconfiguration. This value shall only be present in the subscription to the DNAI change event. | |
| LATE | Late notification of UP path reconfiguration. | |

### 5.4.3.8 Enumeration: RestrictionType

**Table 5.4.3.8-1: Enumeration RestrictionType**

| Enumeration value | Description |
|---|---|
| "ALLOWED_AREAS" | This value indicates that areas are allowed. |
| "NOT_ALLOWED_AREAS" | This value indicates that areas are not allowed. |

### 5.4.3.9 Enumeration: CoreNetworkType

**Table 5.4.3.9-1: Enumeration CoreNetworkType**

| Enumeration value | Description |
|---|---|
| "5GC" | 5G Core |
| "EPC" | Evolved Packet Core |

#### 5.4.3.10 Enumeration: AccessTypeRm

This enumeration is defined in the same way as the "AccessType" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.11 Enumeration: RatTypeRm

This enumeration is defined in the same way as the "RatType" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.12 Enumeration: PduSessionTypeRm

This enumeration is defined in the same way as the "PduSessionType" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.13 Enumeration: UpIntegrityRm

This enumeration is defined in the same way as the "UpIntegrity" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.14 Enumeration: UpConfidentialityRm

This enumeration is defined in the same way as the "UpConfidentiality" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.15 Enumeration: SscModeRm

This data type is defined in the same way as the "SscMode" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.17 Enumeration: DnaiChangeTypeRm

This data type is defined in the same way as the "DnaiChangeType" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.18 Enumeration: RestrictionTypeRm

This data type is defined in the same way as the "RestrictionType" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.19 Enumeration: CoreNetworkType

This data type is defined in the same way as the "CoreNetworkType" enumeration, but with the OpenAPI "nullable: true" property.

### 5.4.3.20 Enumeration: PresenceState

**Table 5.4.3.20-1: Enumeration PresenceState**

| Enumeration value | Description |
|---|---|
| "IN_AREA" | Indicates that the UE is inside or enters the presence reporting area. |
| "OUT_OF_AREA" | Indicates that the UE is outside or leaves the presence reporting area. |
| "UNKNOWN" | Indicates it is unknown whether the UE is in the presence reporting area or not. |
| "INACTIVE" | Indicates that the presence reporting area is inactive in the serving node. |

### 5.4.3.21 Enumeration: StationaryIndication

**Table 5.4.3.21-1: Enumeration StationaryIndication**

| Enumeration value | Description |
|---|---|
| "STATIONARY" | Identifies the UE is stationary |
| "MOBILE" | Identifies the UE is mobile |

### 5.4.3.22 Enumeration: StationaryIndicationRm

This enumeration is defined in the same way as the "StationaryIndication" enumeration, but with the OpenAPI "nullable: true" property.

### 5.4.3.23 Enumeration: ScheduledCommunicationType

**Table 5.4.3.23-1: Enumeration ScheduledCommunicationType**

| Enumeration value | Description |
|---|---|
| "DOWNLINK_ONLY" | Downlink only |
| "UPLINK_ONLY" | Uplink only |
| "BIDIRECTIONAL" | Bi-directional |

### 5.4.3.24 Enumeration: ScheduledCommunicationTypeRm

This enumeration is defined in the same way as the "ScheduledCommunicationType" enumeration, but with the OpenAPI "nullable: true" property.

### 5.4.3.25 Enumeration: TrafficProfile

**Table 5.4.3.25-1: Enumeration TrafficProfile**

| Enumeration value | Description |
|---|---|
| "SINGLE_TRANS_UL" | Uplink single packet transmission. |
| "SINGLE_TRANS_DL" | Downlink single packet transmission. |
| "DUAL_TRANS_UL_FIRST" | Dual packet transmission, firstly uplink packet transmission with subsequent downlink packet transmission. |
| "DUAL_TRANS_DL_FIRST" | Dual packet transmission, firstly downlink packet transmission with subsequent uplink packet transmission. |
| "MULTI_TRANS" | Multiple packet transmission. |

### 5.4.3.26 Enumeration: TrafficProfileRm

This enumeration is defined in the same way as the "TrafficProfile" enumeration, but with the OpenAPI "nullable: true" property.

### 5.4.3.27 Enumeration: LcsServiceAuth

**Table 5.4.3.27-1: Enumeration LcsServiceAuth**

| Enumeration value | Description |
|---|---|
| "LOCATION_ALLOWED_WITH_NOTIFICATION" | Location allowed with notification |
| "LOCATION_ALLOWED_WITHOUT_NOTIFICATION" | Location allowed without notification |
| "LOCATION_ALLOWED_WITHOUT_RESPONSE" | Location with notification and privacy verification; location allowed if no response |
| "LOCATION_RESTRICTED_WITHOUT_RESPONSE" | Location with notification and privacy verification; location restricted if no response |
| "NOTIFICATION_ONLY" | Notification only |
| "NOTIFICATION_AND_VERIFICATION_ONLY" | Notification and privacy verification only |

### 5.4.3.28 Enumeration: UeAuth

**Table 5.4.3.28-1: Enumeration UeAuth**

| Enumeration value | Description |
|---|---|
| "AUTHORIZED" | Indicates that the UE is authorized. |
| "NOT_AUTHORIZED" | Indicates that the UE is not authorized. |

### 5.4.3.29 Enumeration: DlDataDeliveryStatus

**Table 5.4.3.29-1: Enumeration DddStatus**

| Enumeration value | Description |
|---|---|
| "BUFFERED" | The first downlink data is buffered with extended buffering matching the source of the downlink traffic. |
| "TRANSMITTED" | The first downlink data matching the source of the downlink traffic is transmitted after previous buffering or discarding of corresponding packet(s) because the UE of the PDU Session becomes ACTIVE, and buffered data can be delivered to UE. |
| "DISCARDED" | The first downlink data matching the source of the downlink traffic is discarded because the Extended Buffering time, as determined by the SMF, expires or the amount of downlink data to be buffered is exceeded. |

### 5.4.3.30 Enumeration: DlDataDeliveryStatusRm

This enumeration is defined in the same way as the "DlDataDeliveryStatus" enumeration, but with the OpenAPI "nullable: true" property.

### 5.4.3.31 Void

### 5.4.3.32 Enumeration: AuthStatus

**Table 5.4.3.32-1: Enumeration AuthStatus**

| Enumeration value | Description |
|---|---|
| "EAP_SUCCESS" | The NSSAA status is EAP-Success. |
| "EAP_FAILURE" | The NSSAA status is EAP-Failure. |
| "PENDING" | The NSSAA status is Pending, i.e. the NSSAA procedure is ongoing. |

### 5.4.3.33 Enumeration: LineType

**Table 5.4.3.33-1: Enumeration LineType**

| Enumeration value | Description |
|---|---|
| "DSL" | DSL line |
| "PON" | PON line |

### 5.4.3.34 Enumeration: LineTypeRm

This enumeration is defined in the same way as the "LineType" enumeration, but with the OpenAPI "nullable: true" property.

### 5.4.3.35 Void

### 5.4.3.36 Void

### 5.4.3.37 Enumeration: NotificationFlag

**Table 5.4.3.37-1: Enumeration NotificationFlag**

| Enumeration value | Description | Applicability |
|---|---|---|
| ACTIVATE | The event notification is activated. | |
| DEACTIVATE | The event notification is deactivated and shall be muted. The available event(s) shall be stored. | |
| RETRIEVAL | The event notification shall be sent to the NF service consumer(s), after that, is muted again. (See NOTE) | |
| NOTE: The value "RETRIEVAL" shall not be provided during the creating subscription procedure. | | |

### 5.4.3.38 Enumeration: TransportProtocol

**Table 5.4.3.38-1: Enumeration TransportProtocol**

| Enumeration value | Description |
|---|---|
| "UDP" | User Datagram Protocol |
| "TCP" | Transmission Control Protocol |

### 5.4.3.39 Enumeration: SatelliteBackhaulCategory

**Table 5.4.3.39-1: Enumeration SatelliteBackhaulCategory**

| Enumeration value | Description |
|---|---|
| "GEO" | Indicates Geostationary satellite backhaul category. |
| "MEO" | Indicates Medium Earth Orbit satellite backhaul category. |
| "LEO" | Indicates Low Earth Orbit satellite backhaul category. |
| "OTHER_SAT" | Indicates other satellite backhaul category. |
| "NON_SATELLITE" | Indicates non satellite backhaul. (NOTE) |
| NOTE: This value indicates that there is no longer any satellite backhaul towards the 5G AN currently serving the UE. | |

### 5.4.3.40 Enumeration: SatelliteBackhaulCategoryRm

This data type is defined in the same way as the "SatelliteBackhaulCategory" data type, but with the OpenAPI "nullable: true" property.

## 5.4.4 Structured Data Types

### 5.4.4.1 Type: SubscribedDefaultQos

**Table 5.4.4.1-1: Definition of type SubscribedDefaultQos**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| 5qi | 5Qi | M | 1 | Default 5G QoS identifier see 3GPP TS 23.501 [8] clause 5.7.2.7. |
| arp | Arp | M | 1 | Default Allocation and Retention Priority see 3GPP TS23.501 [8] clause 5.7.2.7. |
| priorityLevel | 5QiPriorityLevel | O | 0..1 | Defines the 5QI Priority Level. When present, it contains the 5QI Priority Level value that overrides the standardized or pre-configured value as described in 3GPP TS 23.501 [8]. |

### 5.4.4.2 Type: Snssai

**Table 5.4.4.2-1: Definition of type Snssai**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| sst | Uinteger | M | 1 | Unsigned integer, within the range 0 to 255, representing the Slice/Service Type. It indicates the expected Network Slice behaviour in terms of features and services.<br>Values 0 to 127 correspond to the standardized SST range. Values 128 to 255 correspond to the Operator-specific range. See clause 28.4.2 of 3GPP TS 23.003 [7].<br>Standardized values are defined in clause 5.15.2.2 of 3GPP TS 23.501 [8]. |
| sd | string | O | 0..1 | 3-octet string, representing the Slice Differentiator, in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the SD shall appear first in the string, and the character representing the 4 least significant bit of the SD shall appear last in the string.<br><br>This is an optional parameter that complements the Slice/Service type(s) to allow to differentiate amongst multiple Network Slices of the same Slice/Service type. This IE shall be absent if no SD value is associated with the SST.<br><br>Pattern: '^[A-Fa-f0-9]{6}$' |

When Snssai needs to be converted to string (e.g. when used in maps as key), the string shall be composed of one to three digits "sst" optionally followed by "-" and 6 hexadecimal digits "sd", and shall match the following pattern:

^([0-9]|[1-9][0-9]|1[0-9][0-9]|2([0-4][0-9]|5[0-5]))(-[A-Fa-f0-9]{6})?$

Example 1: "255-19CDE0"

Example 2: "29"

### 5.4.4.3 Type: PlmnId

**Table 5.4.4.3-1: Definition of type PlmnId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| mcc | Mcc | M | 1 | Mobile Country Code |
| mnc | Mnc | M | 1 | Mobile Network Code |

When PlmnId needs to be converted to string (e.g. when used in maps as key), the string shall be composed of three digits "mcc" followed by "-" and two or three digits "mnc", and shall match the following pattern:

^[0-9]{3}-[0-9]{2,3}$

Example 1: "262-01"

Example 2: "302-720"

### 5.4.4.4 Type: Tai

**Table 5.4.4.4-1: Definition of type Tai**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| plmnId | PlmnId | M | 1 | PLMN Identity |
| tac | Tac | M | 1 | Tracking Area Code |
| nid | Nid | O | 0..1 | Network Identifier, shall be present in case of SNPN, PlmnId together with Nid indicates the identity of the SNPN to which the TA belongs to. |

NOTE: The "nid" attribute is used to convey the Network Identifier (NID) of the SNPN as part of the "Tai" JSON object data type definition; this is a protocol aspect that does not imply any change on the system-wide definition of the TAI, as described in 3GPP 23.003 [7].

### 5.4.4.5 Type: Ecgi

**Table 5.4.4.5-1: Definition of type Ecgi**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| plmnId | PlmnId | M | 1 | PLMN Identity |
| eutraCellId | EutraCellId | M | 1 | E-UTRA Cell Identity |
| nid | Nid | O | 0..1 | Network Identifier |

NOTE: The "nid" attribute is used to convey the Network Identifier (NID) of the SNPN as part of the "Ecgi" JSON object data type definition; this is a protocol aspect that does not imply any change on the system-wide definition of the ECGI, as described in 3GPP 23.003 [7].

### 5.4.4.6 Type: Ncgi

**Table 5.4.4.6-1: Definition of type Ncgi**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| plmnId | PlmnId | M | 1 | PLMN Identity |
| nrCellId | NrCellId | M | 1 | NR Cell Identity |
| nid | Nid | C | 0..1 | Network Identifier, shall be present in case of SNPN, PlmnId together with Nid indicates the identity of the SNPN to which the NR cell belongs to. |

NOTE: The "nid" attribute is used to convey the Network Identifier (NID) of the SNPN as part of the "Ncgi" JSON object data type definition; this is a protocol aspect that does not imply any change on the system-wide definition of the NCGI, as described in 3GPP 23.003 [7].

### 5.4.4.7 Type: UserLocation

**Table 5.4.4.7-1: Definition of type UserLocation**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| eutraLocation | EutraLocation | C | 0..1 | E-UTRA user location (see NOTE). |
| nrLocation | NrLocation | C | 0..1 | NR user location (see NOTE). |
| n3gaLocation | N3gaLocation | C | 0..1 | Non-3GPP access user location (see NOTE). |
| utraLocation | UtraLocation | C | 0..1 | UTRAN access user location (see NOTE). |
| geraLocation | GeraLocation | C | 0..1 | GERAN access user location (see NOTE). |
| NOTE: At least one of eutraLocation, nrLocation, n3gaLocation, utraLocation and geraLocation shall be present. Several of them may be present. | | | | |

### 5.4.4.8 Type: EutraLocation

**Table 5.4.4.8-1: Definition of type EutraLocation**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| tai | Tai | M | 1 | Tracking Area Identity.<br>The TAC of the TAI shall be set to one reserved value (e.g. 0x0000, see clause 19.4.2.3 of 3GPP TS 23.003 [7]) if the TAI information is not available. |
| ignoreTai | boolean | O | 0..1 | This flag when present shall indicate that the Tai shall be ignored.<br>When present, it shall be set as follows:<br>- true: tai shall be ignored.<br>- false (default): tai shall not be ignored. |
| ecgi | Ecgi | M | 1 | E-UTRA Cell Identity |
| ignoreEcgi | boolean | O | 0..1 | This flag when present shall indicate that the Ecgi shall be ignored.<br>When present, it shall be set as follows:<br>- true: ecgi shall be ignored.<br>- false (default): ecgi shall not be ignored. |
| ageOfLocationInformation | integer | O | 0 1 | The value represents the elapsed time in minutes since the last network contact of the mobile station.<br>Value "0" indicates that the location information was obtained after a successful paging procedure for Active Location Retrieval when the UE is in idle mode or after a successful NG-RAN location reporting procedure with the eNB when the UE is in connected mode.<br>Any other value than "0" indicates that the location information is the last known one.<br>See 3GPP TS 29.002 [21] clause 17.7.8. |
| ueLocationTimestamp | DateTime | O | 0..1 | The value represents the UTC time when the UeLocation information was acquired. |
| geographicalInformation | string | O | 0..1 | Refer to geographical Information.<br>See 3GPP TS 23.032 [23] clause 7.3.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used.<br>Allowed characters are 0-9 and A-F; |
| geodeticInformation | string | O | 0..1 | Refers to Calling Geodetic Location.<br>See ITU-T Recommendation Q.763 (1999) [24] clause 3.88.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used.<br>Allowed characters are 0-9 and A-F. |
| globalNgenbId | GlobalRanNodeId | O | 0..1 | It indicates the global identity of the ng-eNodeB in which the UE is currently located.<br>See 3GPP TS 38.413 [11] clause 9.3.1.8. |
| globalENbId | GlobalRanNodeId | O | 0..1 | It indicates the global identity of the eNodeB in which the UE is currently located.<br>See 3GPP TS 36.413 [16] clause 9.2.1.37. |
| NOTE: Either the "globalNgenbId" attribute or the "globalENbId" attribute shall be included in the "EutraLocation" data type. | | | | |

### 5.4.4.9 Type: NrLocation

**Table 5.4.4.9-1: Definition of type NrLocation**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| tai | Tai | M | 1 | Tracking Area Identity |
| ncgi | Ncgi | M | 1 | NR Cell Identity |
| ignoreNcgi | boolean | O | 0..1 | This flag when present shall indicate that the Ncgi shall be ignored.<br>When present, it shall be set as follows:<br>- true: ncgi shall be ignored.<br>- false (default): ncgi shall not be ignored. |
| ageOfLocationInformation | integer | O | 0 1 | The value represents the elapsed time in minutes since the last network contact of the mobile station. Value "0" indicates that the location information was obtained after a successful paging procedure for Active Location Retrieval when the UE is in idle mode or after a successful NG-RAN location reporting procedure with the gNB when the UE is in connected mode.<br>Any other value than "0" indicates that the location information is the last known one.<br>See 3GPP TS 29.002 [21] clause 17.7.8. |
| ueLocationTimestamp | DateTime | O | 0..1 | The value represents the UTC time when the UeLocation information was acquired. |
| geographicalInformation | string | O | 0..1 | Refer to geographical Information.<br>See 3GPP TS 23.032 [23] clause 7.3.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used.<br>Allowed characters are 0-9 and A-F; |
| geodeticInformation | string | O | 0..1 | Refers to Calling Geodetic Location.<br>See ITU-T Recommendation Q.763 (1999) [24] clause 3.88.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used.<br>Allowed characters are 0-9 and A-F. |
| globalGnbId | GlobalRanNodeId | O | 0..1 | It indicates the global identity of the gNodeB in which the UE is currently located.<br>See 3GPP TS 38.413 [11] clause 9.3.1.6. |

### 5.4.4.10 Type: N3gaLocation

**Table 5.4.4.10-1: Definition of type N3gaLocation**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| n3gppTai | Tai | C | 0..1 | This IE shall be present over the 3GPP PLMN internal interfaces, but it shall not be present over the N5 interface. When present, it shall contain the TAI reported by the N3IWF, TNGF or W-AGF for the non-3GPP access. |
| n3IwfId | string | C | 0..1 | This IE shall contain the N3IWF identifier received over NGAP and shall be encoded as a string of hexadecimal characters. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the N3IWF ID shall appear first in the string, and the character representing the 4 least significant bit of the N3IWF ID shall appear last in the string.<br><br>Pattern: '^[A-Fa-f0-9]+$'<br><br>Example:<br>The N3IWF Id 0x5BD6 shall be encoded as "5BD6".<br><br>It shall be present over the 3GPP PLMN internal interfaces if the UE is accessing the 5GC via an untrusted non-3GPP access, but shall not be present over the N5 interface. |
| ueIpv4Addr | Ipv4Addr | C | 0..1 | UE/N5CW device local IPv4 address (used to reach the N3IWF, TNGF or TWIF).<br>The ueIPv4Addr or the ueIPv6Addr shall be present if the UE is accessing the 5GC via a trusted or untrusted non-3GPP access and the information is available. |
| ueIpv6Addr | Ipv6Addr | C | 0..1 | UE/N5CW device local IPv6 address (used to reach the N3IWF, TNGF or TWIF).<br>The ueIPv4Addr or the ueIPv6Addr shall be present if the UE is accessing the 5GC via a trusted or untrusted non-3GPP access and the information is available. |
| portNumber | Uinteger | C | 0..1 | UDP or TCP source port number. It shall be present if the UE is accessing the 5GC via a trusted or untrusted non-3GPP access and NAT is detected. |
| protocol | TransportProtocol | O | 0..1 | This IE may be present if portNumber is present.<br><br>When present, this IE shall indicate the transport protocol used by the UE to access the core network via a trusted or untrusted non-3GPP access and NAT is detected.<br><br>The absence of this IE indicates that the transport protocol used by the UE to access the core network via a trusted or untrusted non-3GPP access is not specified, i.e. could be UDP or TCP. |
| tnapId | TnapId | C | 0..1 | This IE shall contain the TNAP Identifier, see clause 5.6.2 of 3GPP TS 23.501 [8]. |
| twapId | TwapId | C | 0..1 | In the scenario of accessing 5GC from N5CW device, this IE shall contain the TWAP Identifier, see clause 4.2.8.5.3 of 3GPP TS 23.501 [8].<br>In the scenario of interworking between ePDG/EPC and 5GS, this IE shall contain the WLAN location information, see clause 4.5.7.2.8 of 3GPP TS 23.402 [48]. |
| hfcNodeId | HfcNodeId | C | 0..1 | This IE shall contain the HFC Node Identifier received over NGAP. It shall be present for a 5G-CRG/FN-CRG accessing the 5GC via wireline access network. |
| gli | Gli | C | 0..1 | This IE shall contain the Global Line Identifier. It shall be present for a 5G-BRG/FN-BRG accessing the 5GC via wireline access network. |

| | | | | |
|---|---|---|---|---|
| w5gbanLineType | LineType | O | 0..1 | This IE may be present for a 5G-BRG/FN-BRG accessing the 5GC via wireline access network. When present, it shall indicate the type of the wireline (DSL or PON). |
| gci | Gci | C | 0..1 | This IE shall contain the Global Cable Identifier. It shall be present for the N5GC device accessing the 5GC via wireline access network. See clause 4.10a of 3GPP TS 23.316 [30] |

### 5.4.4.11 Type: UpSecurity

**Table 5.4.4.11-1: Definition of type UpSecurity**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| upIntegr | UpIntegrity | M | 1 | This IE shall indicate whether UP integrity protection is required, preferred or not needed for all the traffic on the PDU Session. |
| upConfid | UpConfidentiality | M | 1 | This IE shall indicate whether UP confidentiality protection is required, preferred or not needed for all the traffic on the PDU Session. |

### 5.4.4.12 Type: NgApCause

**Table 5.4.4.12-1: Definition of type NgApCause**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| group | Uinteger | M | 1 | This IE shall indicate the group of the NGAP cause. The value of this IE shall equal to the ASN.1 value of the specified NGAP cause group.<br><br>NGAP supports following cause groups defined as separate enumerations, as specified in clause 9.4.5 of 3GPP TS 38.413 [11], with following values:<br><br>0 – radioNetwork<br>1 – transport<br>2 – nas<br>3 – protocol<br>4 – misc |
| value | Uinteger | M | 1 | This IE shall carry the NG AP cause value in specific cause group identified by the "group" attribute, as specified in clause 9.4.5 of 3GPP TS 38.413 [11]. |

### 5.4.4.13 Type: BackupAmfInfo

**Table 5.4.4.13-1: Definition of type BackupAmfInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| backupAmf | AmfName | M | 1 | This IE shall contain the AMF name of the backup AMF that can serve the specific GUAMI(s) supported by the primary AMF (see clause 5.21.2.3 of 3GPP TS 23.501 [8]). |
| guamiList | array(Guami) | C | 1..N | If present, this IE shall contain the list of GUAMI(s) (supported by the primary AMF) which the backup AMF can serve.<br><br>If this IE is absent, it indicates that the backup AMF can serve all the GUAMI(s) supported by the primary AMF. |

### 5.4.4.14 Type: RefToBinaryData

**Table 5.4.4.14-1: Definition of type RefToBinaryData**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| contentId | string | M | 1 | This IE shall contain the value of the Content-ID header of the referenced binary body part. |

### 5.4.4.15 Type RouteToLocation

**Table 5.4.4.15-1: Definition of type RouteToLocation**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| dnai | Dnai | M | 1 | Identifies the location of the application. |
| routeInfo | RouteInformation | C | 0..1 | Includes the traffic routing information. |
| routeProfId | string | C | 0..1 | Identifies the routing profile Id. |
| NOTE: At least one of the "routeInfo" attribute and the "routeProfId" attribute shall be included in the "RouteToLocation" data type.. | | | | |

### 5.4.4.16 Type RouteInformation

**Table 5.4.4.16-1: Definition of type RouteInformation**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ipv4Addr | Ipv4Addr | C | 0..1 | Ipv4address of the tunnel end point in the data network. |
| ipv6Addr | Ipv6Addr | C | 0..1 | Ipv6 address of the tunnel end point in the data network. |
| portNumber | Uinteger | M | 1 | UDP port number of the tunnel end point in the data network. |
| NOTE: At least one of the "ipv4Addr" attribute and the "ipv6Addr" attribute shall be included in the "RouteInformation" data type. | | | | |

### 5.4.4.17 Type: Area

**Table 5.4.4.17-1: Definition of type Area**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| tacs | array(Tac) | C | 1..N | List of TACs; shall be present if and only if areaCode is absent. |
| areaCode | AreaCode | C | 0..1 | Area Code; shall be present if and only if tacs is absent. |

### 5.4.4.18 Type: ServiceAreaRestriction

**Table 5.4.4.18-1: Definition of type ServiceAreaRestriction**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| restrictionType | RestrictionType | C | 0..1 | string<br>"ALLOWED_AREAS" or<br>"NOT_ALLOWED_AREAS"<br>shall be present if and only if the areas attribute is present |
| areas | array(Area) | O | 0..N<br>(NOTE) | A list of Areas.<br>These areas are:<br>- allowed areas if RestrictionType is "ALLOWED_AREAS"<br>- not allowed areas if RestrictionType is "NOT_ALLOWED_AREAS" |
| maxNumOfTAs | Uinteger | C | 0..1 | Maximum number of allowed tracking areas for use when restrictionType indicates "ALLOWED_AREAS".<br>This attribute shall be absent when attribute "restrictionType" takes the value "NOT_ALLOWED_AREAS". |
| maxNumOfTAsForNotAllowedAreas | Uinteger | C | 0..1 | Maximum number of allowed tracking areas for use when restrictionType indicates "NOT_ALLOWED_AREAS".<br>This attribute shall be absent when attribute "restrictionType" takes the value "ALLOWED_AREAS". |
| NOTE: The empty array is used when service is allowed/restricted nowhere. | | | | |

### 5.4.4.19 Type: PlmnIdRm

This data type is defined in the same way as the "PlmnId" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.20 Type: TaiRm

This data type is defined in the same way as the "Tai" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.21 Type: EcgiRm

This data type is defined in the same way as the "Ecgi" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.22 Type: NcgiRm

This data type is defined in the same way as the "Ncgi" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.23 Type: EutraLocationRm

This data type is defined in the same way as the "EutraLocation" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.24 Type: NrLocationRm

This data type is defined in the same way as the "NrLocation" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.25 Type: UpSecurityRm

This data type is defined in the same way as the "UpSecurity" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.26 Type: RefToBinaryDataRm

This data type is defined in the same way as the " RefToBinaryData " data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.27 Type: PresenceInfo

**Table 5.4.4.27-1: Definition of type PresenceInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| praId | string | C | 0..1 | Represents an identifier of the Presence Reporting Area (see clause 28.10 of 3GPP TS 23.003 [7]). This IE shall be present if the Area of Interest subscribed or reported is a Presence Reporting Area or a Set of Core Network predefined Presence Reporting Areas.<br><br>When present, it shall be encoded as a string representing an integer in the following ranges:<br>0 to 8 388 607 for UE-dedicated PRA<br>8 388 608 to 16 777 215 for Core Network predefined PRA.<br>Examples:<br>PRA ID 123 is encoded as "123"<br>PRA ID 11 238 660 is encoded as "11238660" |
| additionalPraId | string | C | 0..1 | This IE may be present if the praId IE is present and if it contains a PRA identifier referring to a set of Core Network predefined Presence Reporting Areas.<br><br>When present, this IE shall contain a PRA Identifier of an individual PRA within the Set of Core Network predefined Presence Reporting Areas indicated by the praId IE. |
| presenceState | PresenceState | C | 0..1 | Indicates whether the UE is inside or outside of the area of interest (e.g presence reporting area or the LADN area), or if the presence reporting area is inactive in the serving node. (NOTE) |
| trackingAreaList | array(Tai) | C | 1..N | Represents the list of tracking areas that constitutes the area. This IE shall be present if the subscription or the event report is for tracking UE presence in the tracking areas. For non 3GPP access the TAI shall be the N3GPP TAI. |
| ecgiList | array(Ecgi) | C | 1..N | Represents the list of EUTRAN cell Ids that constitutes the area. This IE shall be present if the Area of Interest subscribed is a list of EUTRAN cell Ids. |
| ncgiList | array(Ncgi) | C | 1..N | Represents the list of NR cell Ids that constitutes the area. This IE shall be present if the Area of Interest subscribed is a list of NR cell Ids. |
| globalRanNodeIdList | array(GlobalRanNodeId) | C | 1..N | Represents the list of NG RAN node identifiers that constitutes the area. This IE shall be present if the Area of Interest subscribed is a list of NG RAN node identifiers. |
| globalENbIdList | array(GlobalRanNodeId) | C | 1..N | Represents the list of eNodeB identifiers that constitutes the area. This IE shall be present if the Area of Interest subscribed is a list of eNodeB identifiers. |
| NOTE: If the additionalPraId IE is present, this IE shall state the presence information of the UE for the individual PRA identified by the additionalPraId IE; If the additionalPraId IE is not present, this IE shall state the presence information of the UE for the PRA identified by the praId IE. | | | | |

### 5.4.4.28 Type: GlobalRanNodeId

**Table 5.4.4.28-1: Definition of type GlobalRanNodeId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| plmnId | PlmnId | M | 1 | Indicates the identity of the PLMN that the RAN node belongs to. |
| n3IwfId | N3IwfId | C | 0..1 | This IE shall be included if the AN node represents a N3IWF. When present, this IE shall contain the identifier of the N3IWF. (NOTE 1). |
| gNbId | GNbId | C | 0..1 | This IE shall be included if the RAN Node Id represents a gNB. When present, this IE shall contain the identifier of the gNB. (NOTE 1). |
| ngeNbId | NgeNbId | C | 0..1 | This IE shall be included if the RAN Node Id represents a NG-eNB. When present, this IE shall contain the identifier of an NG-eNB. (NOTE 1). |
| wagfId | WAgfId | C | 0..1 | This IE shall be included if the AN node represents a W-AGF. When present, this IE shall contain the identifier of the W-AGF. (NOTE 1). |
| tngfId | TngfId | C | 0..1 | This IE shall be included if the AN node represents a TNGF. When present, this IE shall contain the identifier of the TNGF. (NOTE 1). |
| nid | Nid | O | 0..1 | Network Identifier shall be present in case of SNPN, PlmnId together with Nid indicates the identity of the SNPN to which the RanNode belongs to. |
| eNbId | ENbId | C | 0..1 | This IE shall be included if the RAN Node Id represents an eNB. When present, this IE shall contain the identifier of an eNB. (NOTE 1, NOTE 2). |
| NOTE 1: One of the six attributes n3IwfId, gNbIdm, ngeNbId, wagfId, tngfId, eNbId shall be present.<br>NOTE 2: For UEs with 5GS subscription but without 5G NAS support, eNbId is used on N7 instead of n3IwfId, gNbIdm, ngeNbId. | | | | |

### 5.4.4.29 Type: GNbId

**Table 5.4.4.29-1: Definition of type GNbId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| bitLength | integer | M | 1 | Unsigned integer representing the bit length of the gNB ID as defined in clause 9.3.1.6 of 3GPP TS 38.413 [11], within the range 22 to 32 |
| gNBValue | string | M | 1 | This represents the identifier of the gNB.<br><br>The string shall be formatted with following pattern: '^[A-Fa-f0-9]{6,8}$'<br><br>The value of the gNB ID shall be encoded in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The padding 0 shall be added to make multiple nibbles, the most significant character representing the padding 0 if required together with the 4 most significant bits of the gNB ID shall appear first in the string, and the character representing the 4 least significant bit of the gNB ID shall appear last in the string.<br><br>Examples:<br>A 30 bit value "382A3F47" indicates a gNB ID with value 0x382A3F47<br>A 22 bit value "2A3F47" indicates a gNB ID with value 0x2A3F47 |

### 5.4.4.30 Type: PresenceInfoRm

This data type is defined in the same way as the "PresenceInfo" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.31 Void

### 5.4.4.32 Type: AtsssCapability

**Table 5.4.4.32-1: Definition of type AtsssCapability**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| atsssLL | boolean | C | 0..1 | Indicates the ATSSS-LL capability to support procedures related to Access Traffic Steering, Switching, Splitting (see clauses 4.2.10, 5.32 of 3GPP TS 23.501 [8]).<br>true: Supported<br>false (default): Not Supported |
| mptcp | boolean | C | 0..1 | Indicates the MPTCP capability to support procedures related to Access Traffic Steering, Switching, Splitting (see clauses 4.2.10, 5.32 of 3GPP TS 23.501 [8]).<br>true: Supported<br>false (default): Not Supported |
| rttWithoutPmf | boolean | C | 0..1 | This IE is only used by the UPF to indicate whether the UPF supports RTT measurement without PMF (see clauses 5.32.2, 6.3.3.3 of 3GPP TS 23.501 [8]). If this attribute is present and set to true, the mptcp attribute shall also be present and set to true.<br><br>true: Supported<br>false (default): Not Supported. |

### 5.4.4.33 Type: PlmnIdNid

**Table 5.4.4.33-1: Definition of type PlmnIdNid**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| mcc | Mcc | M | 1 | Mobile Country Code |
| mnc | Mnc | M | 1 | Mobile Network Code |
| nid | Nid | C | 0..1 | Network Identity; Shall be present if PlmnIdNid identifies an SNPN (see clauses 5.30.2.3, 5.30.2.9, 6.3.4, and 6.3.8 in 3GPP TS 23.501 [2]). Otherwise, this attribute shall be absent. |

When PlmnIdNid needs to be converted to string (e.g. when used in maps as key), the string shall be composed of three digits "mcc" followed by "-" and two or three digits "mnc" followed by "-" and 11 digits "nid", and shall match the following pattern:

^[0-9]{3}-[0-9]{2,3}-[A-Fa-f0-9]{11}$

Example 1: "262-01-000007ed9d5"

Example 2: "302-720-000007ed9d5"

### 5.4.4.34 Type: PlmnIdNidRm

This data type is defined in the same way as the "PlmnIdNid" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.35 Type: SmallDataRateStatus

**Table 5.4.4.35-1: Definition of type SmallDataRateStatus**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| remainPacketsUl | integer | C | 0..1 | This IE shall be included if available.<br>When present, it shall contain the number of packets the UE is allowed to send uplink in the given time unit for the given PDU session (see clause 5.31.14.3 of 3GPP TS 23.501 [8]). |
| remainPacketsDl | integer | C | 0..1 | This IE shall be included if available.<br>When present it shall contain the number of packets the AF is allowed to send downlink in the given time unit for the given PDU session (see clause 5.31.14.3 of 3GPP TS 23.501 [8]). |
| validityTime | DateTime | C | 0..1 | This IE shall be included if available.<br>When present, it shall indicate the period of time during which the small data rate control status will remain valid (see clause 5.31.14.3 of 3GPP TS 23.501 [8]). |
| remainExReportsUl | integer | C | 0..1 | This IE shall be included if available.<br>When present, it shall indicate number of additional exception reports the UE is allowed to send uplink in the given time unit for the given PDU session (see clause 5.31.14.3 of 3GPP TS 23.501 [8]). |
| remainExReportsDl | integer | C | 0..1 | This IE shall be included if available.<br>When present, it shall indicate number of additional exception reports the AF is allowed to send downlink in the given time unit for the given PDU session (see clause 5.31.14.3 in 3GPP TS 23.501 [8]). |

### 5.4.4.36 Type: HfcNodeId

**Table 5.4.4.36-1: Definition of type HfcNodeId**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| hfcNId | HfcNId | M | 1 | HFC Node Id. | |

### 5.4.4.37 Type: HfcNodeIdRm

This data type is defined in the same way as the "HfcNodeId" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.38 Type: WirelineArea

**Table 5.4.4.38-1: Definition of type WirelineArea**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| globalLineIds | array(Gli) | C | 1..N | List of Global Line Identifiers, for a 5G-BRG accessing the 5GC via wireline access network. | |
| hfcNIds | array(HfcNId) | C | 1..N | List of HFC Node Ids, for a 5G-CRG/FN-CRG is accessing the 5GC via wireline access network. | |
| areaCodeB | AreaCode | C | 0..1 | Area Code for for 5G-BRG accessing via wireline access network | |
| areaCodeC | AreaCode | C | 0..1 | Area Code for 5G-CRG/FN-CRG is accessing via wireline access network | |
| NOTE: One and only one of the "globLineIds", "hfcNIds", "areaCodeB" and "areaCodeC" attributes shall be included in a WirelineArea data structure. | | | | | |

### 5.4.4.39 Type: WirelineServiceAreaRestriction

**Table 5.4.4.39-1: Definition of type WirelineServiceAreaRestriction**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| restrictionType | RestrictionType | C | 0..1 | string<br>"ALLOWED_AREAS" or<br>"NOT_ALLOWED_AREAS"<br>(NOTE 1) |
| areas | array(WirelineArea) | C | 0..N | A list of Areas.<br>These areas are:<br>- allowed areas if RestrictionType is "ALLOWED_AREAS"<br>- not allowed areas if RestrictionType is "NOT_ALLOWED_AREAS"<br>(NOTE 1) (NOTE 2) |
| NOTE 1: The "restrictionType" attribute and the "areas" attribute shall be either both present or absent.<br>NOTE 2: The empty array is used when service is allowed/restricted nowhere. | | | | |

### 5.4.4.40 Type: ApnRateStatus

**Table 5.4.4.40-1: Definition of type ApnRateStatus**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| remainPacketsUl | integer | C | 0..1 | This IE shall be included if available.<br>When present, it shall contain the number of packets the UE is allowed to send uplink in the given time unit for the given APN (all PDN connections of the UE to this APN see clause 4.7.7.3 in 3GPP TS 23.401 [33]). |
| remainPacketsDl | integer | C | 0..1 | This IE shall be included if available.<br>When present, it shall contain the number of packets, which the UE is allowed to send downlink for the given time unit period of time and for the given APN (all PDN connections of the UE to this APN, see clause 4.7.7.3 in 3GPP TS 23.401 [33]). |
| validityTime | DateTime | C | 0..1 | This IE shall be included if available.<br>When present, it shall indicate the period of time during which the APN rate control status will remain valid. |
| remainExReportsUl | integer | C | 0..1 | This IE shall be included if available.<br>When present, it shall indicate the number of additional exception reports the UE is allowed to send uplink in the given time unit for the given APN (all PDN connections of the UE to this APN, see clause 4.7.7.3 in 3GPP TS 23.401 [33]). |
| remainExReportsDl | integer | C | 0..1 | This IE shall be included if available.<br>When present, it shall indicate the number of additional exception reports the AF is allowed to send downlink in the given time unit for the given APN (all PDN connections of the UE to this APN, see clause 4.7.7.3 in 3GPP TS 23.401 [33]). |

### 5.4.4.41 Type: ScheduledCommunicationTime

**Table 5.4.4.41-1: Definition of type ScheduledCommunicationTime**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| daysOfWeek | array(DayOfWeek) | O | 1..6 | Identifies the day(s) of the week. If absent, it indicates every day of the week. |
| timeOfDayStart | TimeOfDay | O | 0..1 | Identifies the start time of the day. |
| timeOfDayEnd | TimeOfDay | O | 0..1 | Identifies the end time of the day. |

### 5.4.4.42 Type: ScheduledCommunicationTimeRm

This data type is defined in the same way as the "ScheduledCommunicationTime" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.43 Type: BatteryIndication

**Table 5.4.4.43-1: Definition of type BatteryIndication**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| batteryInd | boolean | O | 0..1 | When present, this IE shall indicate whether the UE is battery powered or not.<br>true: the UE is battery powered;<br>false or absent: the UE is not battery powered. |
| replaceableInd | boolean | O | 0..1 | When present, this IE shall indicate whether the battery of the UE is replaceable or not.<br>true: the battery of the UE is replaceable;<br>false or absent: the battery of the UE is not replaceable. |
| rechargeableInd | boolean | O | 0..1 | When present, this IE shall indicate whether the battery of the UE is rechargeable or not.<br>true: the battery of UE is rechargeable;<br>false or absent: the battery of the UE is not rechargeable. |
| NOTE: Parameters "replaceableInd" and "rechargeableInd" are only included if the value of Parameter "batteryInd" is true. | | | | |

### 5.4.4.44 Type: BatteryIndicationRm

This data type is defined in the same way as the "BatteryIndication" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.45 Type: AcsInfo

**Table 5.4.4.45-1: Definition of type AcsInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| acsUrl | Uri | O | 0..1 | This IE may contain the URL of the ACS, see BBF TR-069 [34] or BBF TR-369 [35]. (NOTE) |
| acsIpv4Addr | Ipv4Addr | O | 0..1 | This IE may contain the IPv4 address of the ACS, see BBF TR-069 [34] or BBF TR-369 [35]. (NOTE) |
| acsIpv6Addr | Ipv6Addr | O | 0..1 | This IE may contain the IPv6 address of the ACS, see BBF TR-069 [34] or BBF TR-369 [35]. (NOTE) |
| NOTE: At least one of acsUrl, acsIpv4Addr, acsIpv6Addr shall be included. | | | | |

### 5.4.4.46 Type: AcsInfoRm

This data type is defined in the same way as the "AcsInfo" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.47 Type: NrV2xAuth

**Table 5.4.4.47-1: Definition of type NrV2xAuth**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| vehicleUeAuth | UeAuth | C | 0..1 | This IE shall be present if available. When present, it shall indicate whether the UE is authorized as Vehicle UE. |
| pedestrianUeAuth | UeAuth | C | 0..1 | This IE shall be present if available. When present, it shall indicate whether the UE is authorized as Pedestrian UE. |

### 5.4.4.48 Type: LteV2xAuth

**Table 5.4.4.48-1: Definition of type LteV2xAuth**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| vehicleUeAuth | UeAuth | C | 0..1 | This IE shall be present if available. When present, it shall indicate whether the UE is authorized as Vehicle UE. |
| pedestrianUeAuth | UeAuth | C | 0..1 | This IE shall be present if available. When present, it shall indicate whether the UE is authorized as Pedestrian UE. |

### 5.4.4.49 Type: Pc5QoSPara

**Table 5.4.4.49-1: Definition of type Pc5QoSPara**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| pc5QosFlowList | array(Pc5QosFlowItem) | M | 1..N | This IE shall contain the set of PC5 flow(s). |
| pc5LinkAmbr | BitRate | C | 0..1 | This IE shall be present if available. When present, it shall represent the PC5 Link Aggregated Bit Rates for all the Non-GBR QoS Flows (see clause 5.4.2.3 of 3GPP TS 23.287 [36]). |

### 5.4.4.50 Type: Pc5QosFlowItem

**Table 5.4.4.50-1: Definition of type Pc5QosFlowItem**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| pqi | 5Qi | M | 1 | PQI is a special 5QI (see clause 5.4.2.1 of 3GPP TS 23.287 [36]). |
| pc5FlowBitRates | Pc5FlowBitRates | C | 0..1 | This IE shall be present if available. When present, it shall represent the PC5 Flow Bit Rates (see clause 5.4.2.2 of 3GPP TS 23.287 [36]). |
| range | Uinteger | C | 0..1 | This IE shall be present if available. When present, it shall represent the Range in the unit of meters (see clause 5.4.2.4 of 3GPP TS 23.287 [36]). |

### 5.4.4.51 Type: Pc5FlowBitRates

**Table 5.4.4.51-1: Definition of type Pc5FlowBitRates**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| guaFbr | BitRate | C | 0..1 | This IE shall be present if available. When present, it shall contain the guaranteed Bit Rate for the PC5 QoS flow. |
| maxFbr | BitRate | C | 0..1 | This IE shall be present if available. When present, it shall contain the maximum Bit Rate for the PC5 QoS flow. |

### 5.4.4.52 Type: UtraLocation

**Table 5.4.4.52-1: Definition of type UtraLocation**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| cgi | CellGlobalId | O | 0..1 | Cell Global Identification. See 3GPP TS 23.003 [7], clause 4.3.1<br>(NOTE 1) |
| sai | ServiceAreaId | O | 0..1 | Service Area Identifier. See 3GPP TS 23.003 [7], clause 12.5<br>(NOTE 1) |
| lai | LocationAreaId | O | 0..1 | Location area identification. See 3GPP TS 23.003 [7], clause 4.1<br>(NOTE 1) |
| rai | RoutingAreaId | O | 0..1 | Routing Area Identification. See 3GPP TS 23.003 [7], clause 4.2 |
| ageOfLocationInformation | integer | O | 0 1 | The value represents the elapsed time in minutes since the last network contact of the mobile station. Value "0" indicates that the location information was obtained after a successful paging procedure for Active Location Retrieval when the UE is in idle mode or after a successful location reporting procedure the UE is in connected mode. Any other value than "0" indicates that the location information is the last known one. See 3GPP TS 29.002 [21] clause 17.7.8. |
| ueLocationTimestamp | DateTime | O | 0..1 | The value represents the UTC time when the UeLocation information was acquired. |
| geographicalInformation | string | O | 0..1 | Refer to geographical Information. See 3GPP TS 23.032 [23] clause 7.3.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used. Allowed characters are 0-9 and A-F; |
| geodeticInformation | string | O | 0..1 | Refers to Calling Geodetic Location. See ITU-T Recommendation Q.763 (1999) [24] clause 3.88.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used. Allowed characters are 0-9 and A-F. |
| NOTE 1: Exactly one of cgi, sai or lai shall be present. | | | | |

### 5.4.4.53 Type: GeraLocation

**Table 5.4.4.53-1: Definition of type GeraLocation**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| locationNumber | string | O | 0..1 | Location number within the PLMN. See 3GPP TS 23.003 [7], clause 4.5. |
| cgi | CellGlobalId | O | 0..1 | Cell Global Identification. See 3GPP TS 23.003 [7], clause 4.3.1<br>(NOTE 1) |
| rai | RoutingAreaId | O | 0..1 | Routing Area Identification. See 3GPP TS 23.003 [7], clause 4.2<br>(NOTE 1) |
| sai | ServiceAreaId | O | 0..1 | Service Area Identifier. See 3GPP TS 23.003 [7], clause 12.5<br>(NOTE 1) |
| lai | LocationAreaId | O | 0..1 | Location Area identification. See 3GPP TS 23.003 [7], clause 4.1<br>(NOTE 1) |
| vlrNumber | string | O | 0..1 | VLR number. See 3GPP TS 23.003 [7] clause 5.1. |
| mscNumber | string | O | 0..1 | MSC number. See 3GPP TS 23.003 [7] clause 5.1. |
| ageOfLocationInformation | integer | O | 0 1 | The value represents the elapsed time in minutes since the last network contact of the mobile station. Value "0" indicates that the location information was obtained after a successful paging procedure for Active Location Retrieval when the UE is in idle mode or after a successful location reporting procedure the UE is in connected mode. Any other value than "0" indicates that the location information is the last known one. See 3GPP TS 29.002 [21] clause 17.7.8. |
| ueLocationTimestamp | DateTime | O | 0..1 | The value represents the UTC time when the UeLocation information was acquired. |
| geographicalInformation | string | O | 0..1 | Refer to geographical Information. See 3GPP TS 23.032 [23] clause 7.3.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used. Allowed characters are 0-9 and A-F; |
| geodeticInformation | string | O | 0..1 | Refers to Calling Geodetic Location. See ITU-T Recommendation Q.763 (1999) [24] clause 3.88.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used. Allowed characters are 0-9 and A-F. |
| NOTE 1: Exactly one of cgi, rai, sai or lai shall be present. | | | | |

### 5.4.4.54 Type: CellGlobalId

**Table 5.4.4.54-1: Definition of type CellGlobalId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| plmnId | PlmnId | M | 1 | PLMN Identity |
| lac | string | M | 1 | Location Area Code<br><br>Pattern: '^[A-Fa-f0-9]{4}$' |
| cellId | string | M | 1 | Cell Identity<br><br>Pattern: '^[A-Fa-f0-9]{4}$' |

### 5.4.4.55 Type: ServiceAreaId

**Table 5.4.4.55-1: Definition of type ServiceAreaId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| plmnId | PlmnId | M | 1 | PLMN Identity |
| lac | string | M | 1 | Location Area Code<br><br>Pattern: '^[A-Fa-f0-9]{4}$' |
| sac | string | M | 1 | Service Area Code<br><br>Pattern: '^[A-Fa-f0-9]{4}$' |

### 5.4.4.56 Type: LocationAreaId

**Table 5.4.4.56-1: Definition of type LocationAreaId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| plmnId | PlmnId | M | 1 | PLMN Identity |
| lac | string | M | 1 | Location Area Code<br><br>Pattern: '^[A-Fa-f0-9]{4}$' |

### 5.4.4.57 Type: RoutingAreaId

**Table 5.4.4.57-1: Definition of type RoutingAreaId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| plmnId | PlmnId | M | 1 | PLMN Identity |
| lac | string | M | 1 | Location Area Code<br><br>Pattern: '^[A-Fa-f0-9]{4}$' |
| rac | string | M | 1 | Routing Area Code<br><br>Pattern: '^[A-Fa-f0-9]{2}$' |

### 5.4.4.58 Type: DddTrafficDescriptor

**Table 5.4.4.58-1: Definition of type DddTrafficDescriptor**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ipv4Addr | Ipv4Addr | C | 0..1 | Ipv4 address of the source of downlink data. |
| ipv6Addr | Ipv6Addr | C | 0..1 | Ipv6 address of the source of downlink data. |
| portNumber | Uinteger | O | 0..1 | Port number of the source of downlink data. |
| macAddr | MacAddr48 | C | 0..1 | Source MAC address. |
| NOTE: Either IP address (at least one of the "ipv4Addr" attribute or the "ipv6Addr" attribute) or MAC address (the "macAddr" attribute) shall be included. | | | | |

### 5.4.4.59 Type: MoExpDataCounter

**Table 5.4.4.59-1: Definition of type MoExpDataCounter**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| counter | integer | M | 1 | Unsigned integer identifying the MO Exception Data Counter, as specified in clause 5.31.14.3 of 3GPP TS 23.501 [8]. |
| timeStamp | DateTime | O | 0..1 | UTC time indicating the time at which the counter value increased from 0 to 1. |

### 5.4.4.60 Type: NssaaStatus

**Table 5.4.4.60-1: Definition of type NssaaStatus**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| snssai | Snssai | M | 1 | Subscribed S-NSSAI |
| status | AuthStatus | M | 1 | This flag when present shall indicate the NSSAA status of the related Snssai. |

### 5.4.4.61 Type: NssaaStatusRm

This data type is defined in the same way as the "NssaaStatus" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.62 Type: TnapId

**Table 5.4.4.62-1: Definition of type TnapId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ssId | string | C | 0..1 | This IE shall be present if the UE is accessing the 5GC via a trusted WLAN access network.<br>When present, it shall contain the SSID of the access point to which the UE is attached, that is received over NGAP, see IEEE Std 802.11-2012 [31]. |
| bssId | string | C | 0..1 | This IE shall be present if available.<br>When present, it shall contain the BSSID of the access point to which the UE is attached, that is received over NGAP, see IEEE Std 802.11-2012 [31]. |
| civicAddress | Bytes | C | 0..1 | This IE shall be present if available.<br>When present, it shall contain the civic address information of the TNAP to which the UE is attached, including the Location-Information Attribute and / or Location-Data Attribute as defined in IETF RFC 5580 [40]. |

### 5.4.4.63 Type: TnapIdRm

This data type is defined in the same way as the "TnapId" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.64 Type: TwapId

**Table 5.4.4.64-1: Definition of type TwapId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ssId | string | M | 1 | This IE shall contain the SSID of the access point to which the UE is attached, that is received over NGAP, see IEEE Std 802.11-2012 [31]. |
| bssId | string | C | 0..1 | This IE shall be present if available.<br>When present, it shall contain the BSSID of the access point to which the UE is attached, for trusted WLAN access, see IEEE Std 802.11-2012 [31]. |
| civicAddress | Bytes | C | 0..1 | This IE shall be present if available.<br>When present, it shall contain the civic address information of the TWAP to which the UE is attached, for trusted WLAN access. This IE shall include the Location-Information Attribute and / or Location-Data Attribute as defined in IETF RFC 5580 [40]. |

### 5.4.4.65 Type: TwapIdRm

This data type is defined in the same way as the "TwapId" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.66 Type: SnssaiExtension

**Table 5.4.4.66-1: Definition of type SnssaiExtension**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| sdRanges | array(SdRange) | C | 1..N | When present, it shall contain the range(s) of Slice Differentiator values supported for the Slice/Service Type value indicated in the sst attribute of the Snssai data type (see clause 5.4.4.2). |
| wildcardSd | boolean | C | 0..1 | When present, it shall be set to true, to indicate that all SD values are supported for the Slice/Service Type value indicated in the sst attribute of the Snssai data type (see clause 5.4.4.2). |
| NOTE: sdRanges and wildcardSd shall not be present simultaneously. | | | | |

### 5.4.4.67 Type: SdRange

**Table 5.4.4.67-1: Definition of type SdRange**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| start | string | M | 1 | First value identifying the start of an SD range.<br><br>This string shall be formatted as specified for the sd attribute of the Snssai data type in clause 5.4.4.2. |
| end | string | M | 1 | Last value identifying the end of an SD range.<br><br>This string shall be formatted as specified for the sd attribute of the Snssai data type in clause 5.4.4.2. |

EXAMPLE: SD range from 023400 to 023499 (hexadecimal)
JSON: { "start": "023400", "end": "023499" }

### 5.4.4.68 Type: ProseServiceAuth

**Table 5.4.4.68-1: Definition of type ProseServiceAuth**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| proseDirectDiscoveryAuth | UeAuth | C | 0..1 | This IE shall be present if available. When present, it shall indicate whether the UE is authorized to use ProSe Direct Discovery. |
| proseDirectCommunicationAuth | UeAuth | C | 0..1 | This IE shall be present if available. When present, it shall indicate whether the UE is authorized to use ProSe Direct Communication. |
| proseL2RelayAuth | UeAuth | C | 0..1 | This IE shall be present if available. When present, it shall indicate whether the UE is authorized to act as 5G ProSe Layer-2 UE-to-Network Relay. |
| proseL3RelayAuth | UeAuth | C | 0..1 | This IE shall be present if available. When present, it shall indicate whether the UE is authorized to act as 5G ProSe Layer-3 UE-to-Network Relay. |
| proseL2RemoteAuth | UeAuth | C | 0..1 | This IE shall be present if available. When present, it shall indicate whether the UE is authorized to act as 5G ProSe Layer-2 Remote UE. |
| proseL3RemoteAuth | UeAuth | C | 0..1 | This IE shall be present if available. When present, it shall indicate whether the UE is authorized to act as 5G ProSe Layer-3 Remote UE. |

### 5.4.4.69 Type: EcsServerAddr

**Table 5.4.4.69-1: Definition of type EcsServerAddr**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ecsFqdnList | array(Fqdn) | C | 1..N | This IE shall be included if available.<br>When present, it shall contain the list of FQDN(s) of Edge Configuration Server(s). |
| ecsIpAddressList | array(IpAddr) | C | 1..N | This IE shall be included if available.<br>When present, it shall contain the list of IP Address (es) of Edge Configuration Server(s). |
| ecsUriList | array(Uri) | C | 1..N | This IE shall be included if available.<br>When present, it shall contain the list of URI(s) of the Edge Configuration Server(s). |
| ecsProviderId | string | C | 0..1 | This IE shall be included if available.<br>When present, it shall contain the identifier of the Edge Configuration Server Provider. |

### 5.4.4.70 Type: EcsServerAddrRm

This data type is defined in the same way as the "EcsServerAddr" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.71 Type: IpAddr

**Table 5.4.4.71-1: Definition of type IpAddr**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ipv4Addr | Ipv4Addr | C | 0..1 | When present, it shall contain the IPv4 address. |
| ipv6Addr | Ipv6Addr | C | 0..1 | When present, it shall contain the IPv6 address. |
| ipv6Prefix | Ipv6Prefix | C | 0..1 | When present, it shall contain the IPv6 Prefix. |
| NOTE: Either ipv4Addr, or ipv6Addr, or ipv6Prefix shall be present. | | | | |

### 5.4.4.72 Type: SACInfo

**Table 5.4.4.72-1: Definition of type SACInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| numericValNumUes | Integer | C | 0..1 | This attribute may be present in the following cases:<br>- to configure the monitoring threshold for the reporting of the number of registered UEs for a network slice identified by an S-NSSAI;<br>- to report the network slice status for the current number of registered UEs.<br><br>When used to configure the monitoring threshold for an S-NSSAI, it shall contain the configured event monitoring threshold value for monitoring the number of registered UEs expressed in a numerical value.<br><br>When used to report the network slice status for an S-NSSAI, it shall contain the current number of registered UEs in the concerned network slice expressed in a numerical value.<br>For threshold based reporting and the threshold value for the number of registered UEs in the concerned network slice was previously configured in the form of a numerical value, this attribute shall contain the current number of registered UEs in the concerned network slice expressed in a numerical value. |
| numericValNumPduSess | Integer | C | 0..1 | This attribute may be present in the following cases:<br>- to configure the monitoring threshold for the reporting of the number established PDU session for a network slice identified by an S-NSSAI;<br>- to report the network slide status for the number of established PDU sessions.<br><br>When used to configure the monitoring threshold for an S-NSSAI, it shall contain the configured event monitoring threshold value for monitoring the number of established PDU sessions expressed in a numerical value.<br><br>When used to report the network slice status for an S-NSSAI, it shall contain the current number of established PDU sessions in the concerned network slice expressed in a numerical value.<br>For threshold based reporting and the threshold value for the number of established PDU sessions in the concerned network slice was previously configured in the form of a numerical value,, this attribute shall contain the current number of established PDU sessions in the concerned network slice expressed in a numerical value. |

| | | | | |
|---|---|---|---|---|
| percValueNumUes | Integer | C | 0..1 | This attribute may be present in the following cases:<br>- to configure the monitoring threshold for the reporting of the number of registered UEs for a network slice identified by an S-NSSAI;<br>- to report the network slice status for the number of registered UEs .<br><br>When used to configure the monitoring threshold for an S-NSSAI, it shall contain an unsigned integer indicating the event monitoring threshold value for the number of registered UEs expressed in percentage format.<br><br>When used to report the network slice status for an S-NSSAI, it shall contain the current number of registered UEs in the concerned network slice expressed as a percentage. For threshold based reporting and the threshold value for the number of registered UEs in the concerned network slice was previously configured as a percentage, this attribute shall contain the current number of registered UEs in the concerned network slice expressed as a percentage.<br><br>Minimum = 0. Maximum = 100. |
| percValueNumPduSess | Integer | C | 0..1 | This IE may be present in the following cases:<br>- to configure the monitoring threshold for the reporting of the number of established PDU sessions for a network slice identified by an S-NSSAI;<br>- to report the network slice status for the number of established PDU sessions.<br><br>When used to configure the monitoring threshold for an S-NSSAI, it shall contain an unsigned integer indicating the event monitoring threshold value for the number of established PDU sessions expressed in percentage format.<br><br>When used to report the status of an S-NSSAI, it shall contain the current number of established PDU sessions in the concerned network slice expressed as a percentage.<br>For threshold based reporting and the threshold value for the number of established PDU sessions in the concerned network slice was previously configured as a percentage, this attribute shall contain the current number of established PDU sessions in the concerned network slice expressed as a percentage.<br><br>Minimum = 0. Maximum = 100. |

### 5.4.4.73 Type: SACEventStatus

**Table 5.4.4.73-1: Definition of type SACEventStatus**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| reachedNumUes | SACInfo | O | 0..1 | Contains a confirmation that the requested threshold for the number of registered UEs in the concerned network slice was reached, when threshold based reporting is used, or the current number of registered UEs in the concerned network slice, when periodic reporting / immediate reporting is used. |
| reachedNumPduSess | SACInfo | O | 0..1 | Contains a confirmation that the requested threshold for the number of established PDU session in the concerned network slice was reached, when threshold based reporting is used, or the current number of established PDU sessions in the concerned network slice, when periodic reporting / immediate reporting is used. |

### 5.4.4.74 Type: SpatialValidityCond

**Table 5.4.4.74-1: Definition of type SpatialValidityCond**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| trackingAreaList | array(Tai) | C | 1..N | This IE shall be included if available.<br>When present, it shall contain the list of tracking areas identities. |
| countries | array(Mcc) | O | 1..N | When present, it shall contain the list of Mobile Country Codes. |
| geographicalServiceArea | GeoServiceArea | O | 0..1 | Geographical Service Area; see 3GPP TS 23.558 [49] clause 7.3.3.3 |

### 5.4.4.75 Type: SpatialValidityCondRm

This data type is defined in the same way as the "SpatialValidityCond" data type, but with the OpenAPI "nullable: true" property.

### 5.4.4.76 Type: ServerAddressingInfo

**Table 5.4.4.76 -1: Definition of type ServerAddressingInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ipv4Addresses | array(Ipv4Addr) | C | 1..N | IPv4 address(es) of the server (NOTE). |
| ipv6Addresses | array(Ipv6Addr) | C | 1..N | IPv6 address(es) of the server (NOTE). |
| fqdnList | array(Fqdn) | C | 1..N | List of FQDNs (Fully Qualified Domain Names) of the server (NOTE). |
| NOTE: At least one of the addressing parameters (ipv4addresses, ipv6adresses or fqdnList) shall be included in the ServerAddressingInfo; all addressing parameters in this data type shall be understood as referring to a same sever. | | | | |

### 5.4.4.77 Type PcfUeCallbackInfo

**Table 5.4.4.77-1: Definition of type PcfUeCallbackInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| callbackUri | Uri | M | 1 | This IE shall contain the Callback URI on the PCF for a UE to receive the SM Policy Association Establishment and Termination Event Notifications from the PCF for a PDU session. | |
| bindingInfo | string | O | 0..1 | This IE shall be present, if available.<br><br>When present, this IE shall contain the Binding indications of the Callback URI on the PCF for a UE indicated by callbackUri IE and set to the value of the 3gpp-Sbi-Binding header defined in clause 5.2.3.2.6 of 3GPP TS 29.500 [25], without the header name. | |

### 5.4.4.78 Type PduSessionInfo

**Table 5.4.4.78-1: Definition of type PduSessionInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| snssai | Snssai | M | 1 | This IE shall indicate the S-NSSAI in the serving PLMN of a PDU session. | |
| dnn | Dnn | M | 1 | This IE shall Indicate the DNN of a PDU session.<br><br>If DNN replacement if applicable for the PDU session, this IE shall indicate the DNN of the PDU session after DNN replacement. | |

### 5.4.4.79 Type EasIpReplacementInfo

**Table 5.4.4.79-1: Definition of type EasIpReplacementInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| source | EasServerAddress | M | 1 | Address of the source EAS, i.e., address that shall be used for the traffic on the N3 side of the UPF(s). | |
| target | EasServerAddress | M | 1 | Address of the target EAS, i.e., address that shall be used for the traffic on the N6 side of the UPF(s). | |

### 5.4.4.80 Type EasServerAddress

**Table 5.4.4.80-1: Definition of type EasServerAddress**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| ip | IpAddr | M | 1 | IP address information. | |
| port | Uinteger | M | 1 | IP port number. | |

#### 5.4.4.81 Type RoamingRestrictions

**Table 5.4.4.81-1: Definition of type RoamingRestrictions**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| accessAllowed | boolean | C | 0..1 | Indicates if access is allowed to a given serving network, e.g. a PLMN (MCC, MNC) or an SNPN (MCC, MNC, NID). NOTE | |
| NOTE: The actual query determines if the 'accessAllowed' attribute refers to an SNPN or to a PLMN. | | | | | |

#### 5.4.4.82 Type: GeoServiceArea

**Table 5.4.4.82-1: Definition of type GeoServiceArea**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| geographicAreaList | array(Geographic Area) | O | 1..N | Identifies a list of geographic area specified by different shapes. |
| civicAddressList | Array(CivicAddress) | O | 1..N | Identifies a list of civic address. |

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

#### 5.4.5.1 Type: ExtSnssai

**Table 5.4.5.1-1: Definition of type ExtSnssai as a list of to be combined data types**

| Data type | Cardinality | Description |
|---|---|---|
| Snssai | 1 | Common data type defined in clause 5.4.4.2. |
| SnssaiExtension | 1 | Extensions to the Snssai common data type defined in clause 5.4.4.66. |
| NOTE: The sdRanges and wildcardSd attributes shall be exclusive from each other. If one of these attributes is present, the sd attribute shall also be present and it shall contain one Slice Differentiator value within the range of SD (if the sdRanges attribute is present) or with any value (if the wildcardSd attribute is present). | | |

## 5.5 Data Types related to 5G QoS

### 5.5.1 Introduction

This clause defines common data types related to 5G QoS.

### 5.5.2 Simple Data Types

This clause specifies common simple data types.

**Table 5.5.2-1: Simple Data Types**

| Type Name | Type Definition | Description |
|---|---|---|
| Qfi | integer | Unsigned integer identifying a QoS flow, within the range 0 to 63. |
| QfiRm | integer | This data type is defined in the same way as the "Qfi" data type, but with the OpenAPI "nullable: true" property. |
| 5Qi | integer | Unsigned integer representing a 5G QoS Identifier (see clause 5.7.2.1 of 3GPP TS 23.501 [8]), within the range 0 to 255. |
| 5QiRm | integer | This data type is defined in the same way as the "5Qi" data type, but with the OpenAPI "nullable: true" property. |
| BitRate | string | String representing a bit rate that shall be formatted as follows:<br><br>Pattern: '^\d+(\.\d+)? (bps\|Kbps\|Mbps\|Gbps\|Tbps)$'<br><br>(NOTE)<br><br>Examples:<br>"125 Mbps", "0.125 Gbps", "125000 Kbps" |
| BitRateRm | string | This data type is defined in the same way as the "BitRate" data type, but with the OpenAPI "nullable: true" property. |
| ArpPriorityLevel | integer | Unsigned integer indicating the ARP Priority Level (see clause 5.7.2.2 of 3GPP TS 23.501 [8]), within the range 1 to 15. Values are ordered in decreasing order of priority, i.e. with 1 as the highest priority and 15 as the lowest priority. |
| ArpPriorityLevelRm | integer | This data type is defined in the same way as the "ArpPriorityLevel" data type, but with the OpenAPI "nullable: true" property. |
| 5QiPriorityLevel | integer | Unsigned integer indicating the 5QI Priority Level (see clauses 5.7.3.3 and 5.7.4 of 3GPP TS 23.501 [8]), within the range 1 to 127.<br>Values are ordered in decreasing order of priority, i.e. with 1 as the highest priority and 127 as the lowest priority. |
| 5QiPriorityLevelRm | integer | This data type is defined in the same way as the "5QiPriorityLevel" data type, but with the OpenAPI "nullable: true" property. |
| PacketDelBudget | Integer | Unsigned integer indicating Packet Delay Budget (see clauses 5.7.3.4 and 5.7.4 of 3GPP TS 23.501 [8])), expressed in milliseconds.<br>Minimum = 1. |
| PacketDelBudgetRm | integer | This data type is defined in the same way as the "PacketDelBudget" data type, but with the OpenAPI "nullable: true" property. |
| PacketErrRate | string | String representing Packet Error Rate (see clause 5.7.3.5 and 5.7.4 of 3GPP TS 23.501 [8]), expressed as a "*scalar* x 10-k" where the scalar and the *exponent k are each encoded as one decimal digit*.<br>Pattern: '^([0-9]E-[0-9])$'<br><br>Examples:<br>Packer Error Rate $4x10^{-6}$ shall be encoded as "4E-6".<br>Packer Error Rate $10^{-2}$ shall be encoded as "1E-2". |
| PacketErrRateRm | string | This data type is defined in the same way as the "PacketErrRate" data type, but with the OpenAPI "nullable: true" property. |
| PacketLossRate | Integer | Unsigned integer indicating Packet Loss Rate (see clauses 5.7.2.8 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in tenth of percent.<br>Minimum = 0. Maximum = 1000. |
| PacketLossRateRm | Integer | This data type is defined in the same way as the "PacketLossRate" data type, but with the OpenAPI "nullable: true" property. |
| AverWindow | Integer | Unsigned integer indicating Averaging Window (see clause 5.7.3.6 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in milliseconds.<br>Minimum = 1. Maximum = 4095. Default = 2000.. |
| AverWindowRm | integer | This data type is defined in the same way as the "AverWindow" data type, but with the OpenAPI "nullable: true" property. |
| MaxDataBurstVol | Integer | Unsigned integer indicating Maximum Data Burst Volume (see clauses 5.7.3.7 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in Bytes.<br>Minimum = 1. Maximum = 4095. |

| | | |
|---|---|---|
| MaxDataBurstVolRm | Integer | This data type is defined in the same way as the "MaxDataBurstVol" data type, but with the OpenAPI "nullable: true" property. |
| SamplingRatio | Integer | Unsigned integer indicating Sampling Ratio (see clauses 4.15.1 of 3GPP TS 23.502 [28], expressed in percent.<br>Minimum = 1. Maximum = 100 |
| SamplingRatioRM | Integer | This data type is defined in the same way as the "SamplingRatio" data type, but with the OpenAPI "nullable: true" property. |
| RgWirelineCharacteristics | Bytes | RG Level Wireline Access Characteristics (see BBF TR-456 [41] and BBF TR-470 [37]). It shall be encoded as a string with format "byte" as defined in OpenAPI Specification [3], i.e. base64 encoded characters, representing the RG-Level Wireline Access Characteristics encoded as specified in clause 7.5 of BBF TR-470 [37]. |
| RgWirelineCharacteristicsRm | Bytes | This data type is defined in the same way as the "RgWirelineCharacteristics" data type, but with the OpenAPI "nullable: true" property. |
| ExtMaxDataBurstVol | Integer | Unsigned integer indicating Maximum Data Burst Volume (see clauses 5.7.3.7 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in Bytes.<br>Minimum = 4096. Maximum = 2000000. |
| ExtMaxDataBurstVolRm | Integer | This data type is defined in the same way as the "ExtMaxDataBurstVol" data type, but with the OpenAPI "nullable: true" property. |
| ExtPacketDelBudget | Integer | Unsigned integer indicating Packet Delay Budget (see clauses 5.7.3.4 and 5.7.4 of 3GPP TS 23.501 [8])), expressed in 0.01 milliseconds.<br>Minimum = 1. |
| ExtPacketDelBudgetRm | Integer | This data type is defined in the same way as the "ExtPacketDelBudget" data type, but with the OpenAPI "nullable: true" property. |
| NOTE: The prefixes used for bit rate unit "bps" shall be taken as x1000 multipliers and were meant to follow the standard symbols from "The International System of Units" (https://www.bipm.org/en/measurement-units/si-prefixes). However, even when the standard symbol for 10^3 multiplier is "k", in the present specification it has been defined as "K", and has been kept as such due to backwards-compatibility with earlier versions of this specification. | | |

## 5.5.3 Enumerations

### 5.5.3.1 Enumeration: PreemptionCapability

The enumeration PreemptionCapability indicates the pre-emption capability of a request on other QoS flows. See clause 5.7.2.2 of 3GPP TS 23.501 [8]. It shall comply with the provisions defined in table 5.5.3.1-1.

**Table 5.5.3.1-1: Enumeration PreemptionCapability**

| Enumeration value | Description |
|---|---|
| "NOT_PREEMPT" | Shall not trigger pre-emption. |
| "MAY_PREEMPT" | May trigger pre-emption. |

### 5.5.3.2 Enumeration: PreemptionVulnerability

The enumeration PreemptionVulnerability indicates the pre-emption vulnerability of the QoS flow to pre-emption from other QoS flows. See clause 5.7.2.2 of 3GPP TS 23.501 [8]. It shall comply with the provisions defined in table 5.5.3.2-1.

**Table 5.5.3.2-1: Enumeration PreemptionVulnerability**

| Enumeration value | Description |
|---|---|
| "NOT_PREEMPTABLE" | Shall not be pre-empted. |
| "PREEMPTABLE" | May be pre-empted. |

### 5.5.3.3 Enumeration: ReflectiveQosAttribute

The enumeration ReflectiveQosAttribute indicates whether certain traffic of the QoS flow may be subject to Reflective QoS (see clause 5.7.2.3 of 3GPP TS 23.501 [8]). It shall comply with the provisions defined in table 5.5.3.3-1.

**Table 5.5.3.3-1: Enumeration ReflectiveQosAttribute**

| Enumeration value | Description |
|---|---|
| "RQOS" | Certain traffic of the Qos flow may be subject to Reflective QoS. |
| "NO_RQOS" | Traffic of the Qos flow is not subject to Reflective QoS. |

### 5.5.3.4 Void

### 5.5.3.5 Enumeration: NotificationControl

The enumeration NotificationControl indicates whether notifications are requested from the RAN when the GFBR can no longer (or again) be fulfilled for a QoS Flow during the lifetime of the QoS Flow (see clause 5.7.2.4 of 3GPP TS 23.501 [8]). It shall comply with the provisions defined in table 5.5.3.5-1.

**Table 5.5.3.5-1: Enumeration NotificationControl**

| Enumeration value | Description |
|---|---|
| "REQUESTED" | Notifications are requested from the RAN. |
| "NOT_REQUESTED" | Notifications are not requested from the RAN. |

### 5.5.3.6 Enumeration: QosResourceType

The enumeration QosResourceType indicates whether a QoS Flow is non-GBR, delay critical GBR, or non-delay critical GBR (see clauses 5.7.3.4 and 5.7.3.5 of 3GPP TS 23.501 [8]). It shall comply with the provisions defined in table 5.5.3.6-1.

**Table 5.5.3.6-1: Enumeration QosResourceType**

| Enumeration value | Description |
|---|---|
| "NON_GBR" | Non-GBR QoS Flow. |
| "NON_CRITICAL_GBR" | Non-delay critical GBR QoS flow. |
| "CRITICAL_GBR" | Delay critical GBR QoS flow. |

### 5.5.3.7 Enumeration: PreemptionCapabilityRm

This enumeration is defined in the same way as the "PreemptionCapability" enumeration, but with the OpenAPI "nullable: true" property.

### 5.5.3.8 Enumeration: PreemptionVulnerabilityRm

This enumeration is defined in the same way as the "PreemptionVulnerability" enumeration, but with the OpenAPI "nullable: true" property.

### 5.5.3.9 Enumeration: ReflectiveQosAttributeRm

This enumeration is defined in the same way as the "ReflectiveQosAttribute" enumeration, but with the OpenAPI "nullable: true" property.

### 5.5.3.10 Enumeration: NotificationControlRm

This enumeration is defined in the same way as the "NotificationControl" enumeration, but with the OpenAPI "nullable: true" property.

### 5.5.3.11 Enumeration: QosResourceTypeRm

This enumeration is defined in the same way as the "QosResourceType" enumeration, but with the OpenAPI "nullable: true" property.

### 5.5.3.12 Enumeration: AdditionalQosFlowInfo

The enumeration AdditionalQosFlowInfo provides additional QoS flow information (see clause 9.3.1.12 3GPP TS 38.413 [11]). It shall comply with the provisions defined in table 5.5.3.12-1.

**Table 5.5.3.12-1: Enumeration AdditionalQosFlowInfo**

| Enumeration value | Description |
|---|---|
| "MORE_LIKELY" | Traffic for the QoS flow is likely to appear more often than traffic for other flows established for the PDU session. |

### 5.5.3.13 Enumeration: PartitioningCriteria

The enumeration PartitioningCriteria indicates criteria for grouping the UEs (see clause 4.15.1 of 3GPP TS 23.502 [28]). It shall comply with the provisions defined in table 5.5.3.13-1.

**Table 5.5.3.13-1: Enumeration PartitioningCriteria**

| Enumeration value | Description |
|---|---|
| "TAC" | Type Allocation Code |
| "SUBPLMN" | Subscriber PLMN ID |
| "GEOAREA" | Geographical area |
| "SNSSAI" | S-NSSAI |
| "DNN" | DNN |

### 5.5.3.14 Enumeration: PartitioningCriteriaRm

This enumeration is defined in the same way as the "PartitioningCriteria" enumeration, but with the OpenAPI "nullable: true" property.

## 5.5.4 Structured Data Types

### 5.5.4.1 Type: Arp

**Table 5.5.4.1-1: Definition of type Arp**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| priorityLevel | ArpPriorityLevel | M | 1 | Defines the relative importance of a resource request. |
| preemptCap | PreemptionCapability | M | 1 | Defines whether a service data flow may get resources that were already assigned to another service data flow with a lower priority level. |
| preemptVuln | PreemptionVulnerability | M | 1 | Defines whether a service data flow may lose the resources assigned to it in order to admit a service data flow with higher priority level. |

### 5.5.4.2 Type: Ambr

**Table 5.5.4.2-1: Definition of type Ambr**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| uplink | BitRate | M | 1 | AMBR for uplink |
| downlink | BitRate | M | 1 | AMBR for downlink |

### 5.5.4.3 Type: Dynamic5Qi

**Table 5.5.4.3-1: Definition of type Dynamic5Qi**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| resourceType | QosResourceType | M | 1 | Defines the 5QI resource type. See clause 5.5.3.6. | |
| priorityLevel | 5QiPriorityLevel | M | 1 | Defines the 5QI Priority Level. See clause 5.5.2. | |
| packetDelayBudget | PacketDelBudget | M | 1 | Defines the packet delay budget. See clause 5.5.2.<br>See NOTE 3. | |
| packetErrRate | PacketErrRate | M | 1 | Defines the packet error rate. See clause 5.5.2. | |
| averWindow | AverWindow | C | 0..1 | Defines the averaging window. See clause 5.5.2.<br>This IE shall be present only for a GBR QoS flow or a Delay Critical GBR QoS flow. | |
| maxDataBurstVol | MaxDataBurstVol | C | 0..1 | Defines the maximum data burst volume. See clause 5.5.2.<br>See NOTE 1, NOTE 2.<br>This IE shall be present for a Delay Critical GBR QoS flow. | |
| extMaxDataBurstVol | ExtMaxDataBurstVol | C | 0..1 | Defines the maximum data burst volume. See clause 5.5.2.<br>See NOTE 1, NOTE 2. | |
| extPacketDelBudget | ExtPacketDelBudget | O | 0..1 | Defines the packet delay budget. See clause 5.5.2.<br>See NOTE 3. | |
| cnPacketDelayBudgetDl | ExtPacketDelBudget | O | 0..1 | Defines the Core Network Packet Delay Budget for downlink.<br>See clause 5.5.2. | |
| cnPacketDelayBudgetUl | ExtPacketDelBudget | O | 0..1 | Defines the Core Network Packet Delay Budget for uplink.<br>See clause 5.5.2. | |

NOTE 1: Unless specified otherwise in an API: if the maximum data burst volume value to be transmitted is lower than or equal to 4095 Bytes, the maxDataBurst Vol IE shall be set to the maximum data burst volume value to be transmitted and the extMaxDataBurstVol IE shall be omitted. If the maximum data burst volume value to be transmitted is greater than 4095 Bytes, the maxDataBurst Vol IE shall be set to 4095 Bytes and, if ExtMaxDataBurstVol data type is supported by the sender, the extMaxDataBurstVol IE shall be set to the maximum data burst volume value to be transmitted.

NOTE 2: Unless specified otherwise in an API: if both the maxDataBurstVol IE and the extMaxDataBurstVol IE are received, the value in the extMaxDataBurstVol IE shall be used if the receiver supports ExtMaxDataBurstVol data type, otherwise the value in the maxDataBurstVol IE shall be used.

NOTE 3: Unless specified otherwise in an API: if both the packetDelayBudget IE and the extPacketDelBudget IE are received, the value in the extPacketDelBudget IE shall be used if the receiver supports ExtPacketDelBudget data type, otherwise the value in the packetDelayBudget IE shall be used.

### 5.5.4.4 Type: NonDynamic5Qi

**Table 5.5.4.4-1: Definition of type NonDynamic5Qi**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| priorityLevel | 5QiPriorityLevel | O | 0..1 | Defines the 5QI Priority Level. See clause 5.5.2.<br>When present, it contains the 5QI Priority Level value that overrides the standardized or pre-configured value. | |
| averWindow | AverWindow | O | 0..1 | Defines the averaging window. See clause 5.5.2.<br>This IE may be present for a GBR QoS flow or a Delay Critical GBR QoS flow.<br>When present, it contains the Averaging Window that overrides the standardized or pre-configured value. | |
| maxDataBurstVol | MaxDataBurstVol | O | 0..1 | Defines the maximum data burst volume. See clause 5.5.2.<br>This IE may be present for a Delay Critical GBR QoS flow. When present, it contains the Maximum Data Burst Volume value that overrides the standardized or pre-configured value.<br>See NOTE 1, NOTE 2. | |
| extMaxDataBurstVol | ExtMaxDataBurstVol | C | 0..1 | Defines the maximum data burst volume. See clause 5.5.2.<br>This IE may be present for a Delay Critical GBR QoS flow. When present, it contains the Maximum Data Burst Volume value that overrides the standardized or pre-configured value<br>See NOTE 1, NOTE 2. | |
| cnPacketDelayBudgetDl | ExtPacketDelBudget | O | 0..1 | Defines the Core Network Packet Delay Budget for downlink.<br>See clause 5.5.2. | |
| cnPacketDelayBudgetUl | ExtPacketDelBudget | O | 0..1 | Defines the Core Network Packet Delay Budget for uplink.<br>See clause 5.5.2. | |

NOTE 1: Unless specified otherwise in an API: if the maximum data burst volume value to be transmitted is lower than or equal to 4095 Bytes, the maxDataBurst Vol IE shall be set to the maximum data burst volume value to be transmitted and the extMaxDataBurstVol IE shall be omitted. If the maximum data burst volume value to be transmitted is greater than 4095 Bytes, the maxDataBurst Vol IE shall be set to 4095 Bytes and, if ExtMaxDataBurstVol data type is supported by the sender, the extMaxDataBurstVol IE shall be set to the maximum data burst volume value to be transmitted.

NOTE 2: Unless specified otherwise in an API: if both the maxDataBurstVol IE and the extMaxDataBurstVol IE are received, the value in the extMaxDataBurstVol IE shall be used if the receiver supports ExtMaxDataBurstVol data type, otherwise the value in the maxDataBurstVol IE shall be used.

### 5.5.4.5 Type: ArpRm

This data type is defined in the same way as the "Arp" data type, but with the OpenAPI "nullable: true" property.

### 5.5.4.6 Type: AmbrRm

This data type is defined in the same way as the "Ambr" data type, but with the OpenAPI "nullable: true" property.

### 5.5.4.7 Void

#### 5.5.4.8 Void

#### 5.5.4.9 Type: SliceMbr

**Table 5.5.4.9-1: Definition of type SliceMbr**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| uplink | BitRate | M | 1 | MBR for uplink |
| downlink | BitRate | M | 1 | MBR for downlink |

#### 5.5.4.10 Type: SliceMbrRm

This data type is defined in the same way as the "SliceMbr" data type, but with the OpenAPI "nullable: true" property.

## 5.6 Data Types related to 5G Trace

### 5.6.1 Introduction

This clause defines common data types related to 5G Trace.

### 5.6.2 Simple Data Types

This clause specifies common simple data types.

**Table 5.6.2-1: Simple Data Types**

| Type Name | Type Definition | Description |
|---|---|---|
| PhysCellId | integer | integer value identifying the physical cell identity (PCI), as definition of "*PhysCellId*" IE in clause 6.3.2 of 3GPP TS 38.331 [42].<br><br>Minimum = 0. Maximum = 1007. |
| ArfcnValueNR | integer | Integer value indicating the ARFCN applicable for a downlink, uplink or bi-directional (TDD) NR global frequency raster, as definition of "*ARFCN-ValueNR*" IE in clause 6.3.2 of 3GPP TS 38.331 [42].<br><br>Minimum = 0. Maximum = 3279165. |

### 5.6.3 Enumerations

#### 5.6.3.1 Enumeration: TraceDepth

The enumeration TraceDepth defines how detailed information should be recorded in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.1-1.

**Table 5.6.3.1-1: Enumeration TraceDepth**

| Enumeration value | Description |
|---|---|
| "MINIMUM" | Minimum |
| "MEDIUM" | Medium |
| "MAXIMUM" | Maximum |
| "MINIMUM_WO_VENDOR_EXTENSION" | Minimum without vendor specific extension |
| "MEDIUM_WO_VENDOR_EXTENSION" | Medium without vendor specific extension |
| "MAXIMUM_WO_VENDOR_EXTENSION" | Maximum without vendor specific extension |

### 5.6.3.2 Enumeration: TraceDepthRm

This enumeration is defined in the same way as the "TraceDepth" enumeration, but with the OpenAPI "nullable: true" property.

### 5.6.3.3 Enumeration: JobType

The enumeration JobType defines Job Type in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.3-1.

**Table 5.6.3.3-1: Enumeration JobType**

| Enumeration value | Description |
|---|---|
| "IMMEDIATE_MDT_ONLY" | Immediate MDT only |
| "LOGGED_MDT_ONLY" | Logged MDT only |
| "TRACE_ONLY" | Trace only |
| "IMMEDIATE_MDT_AND_TRACE" | Immediate MDT and Trace |
| "RLF_REPORTS_ONLY" | RLF reports only |
| "RCEF_REPORTS_ONLY" | RCEF reports only |
| "LOGGED_MBSFN_MDT" | Logged MBSFN MDT |

### 5.6.3.4 Enumeration: ReportTypeMdt

The enumeration ReportTypeMdt defines Report Type for logged MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.4-1.

**Table 5.6.3.4-1: Enumeration ReportTypeMdt**

| Enumeration value | Description |
|---|---|
| "PERIODICAL" | Periodical |
| "EVENT_TRIGGED" | Event triggered |

### 5.6.3.5 Enumeration: MeasurementLteForMdt

The enumeration MeasurementLteForMdt defines Measurements used for MDT in LTE in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.5-1.

**Table 5.6.3.5-1: Enumeration MeasurementLteForMdt**

| Enumeration value | Description |
|---|---|
| "M1" | M1 |
| "M2" | M2 |
| "M3" | M3 |
| "M4_DL" | M4 for DL |
| "M4_UL" | M4 for UL |
| "M5_DL" | M5 for DL |
| "M5_UL" | M5 for UL |
| "M6_DL" | M6 for DL |
| "M6_UL" | M6 for UL |
| "M7_DL" | M7 for DL |
| "M7_UL" | M7 for UL |
| "M8" | M8 |
| "M9" | M9 |

### 5.6.3.6 Enumeration: MeasurementNrForMdt

The enumeration MeasurementNrForMdt defines Measurements used for MDT in NR in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.6-1.

**Table 5.6.3.6-1: Enumeration MeasurementNrForMdt**

| Enumeration value | Description |
|---|---|
| "M1" | M1 |
| "M2" | M2 |
| "M3" | M3 |
| "M4_DL" | M4 for DL |
| "M4_UL" | M4 for UL |
| "M5_DL" | M5 for DL |
| "M5_UL" | M5 for UL |
| "M6_DL" | M6 for DL |
| "M6_UL" | M6 for UL |
| "M7_DL" | M7 for DL |
| "M7_UL" | M7 for UL |
| "M8" | M8 |
| "M9" | M9 |

### 5.6.3.7 Enumeration: SensorMeasurement

The enumeration SensorMeasurement defines sensor measurement type for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.7-1.

**Table 5.6.3.7-1: Enumeration SensorMeasurement**

| Enumeration value | Description |
|---|---|
| "BAROMETRIC_PRESSURE" | Barometric pressure |
| "UE_SPEED" | UE speed |
| "UE_ORIENTATION" | UE orientation |

### 5.6.3.8 Enumeration: ReportingTrigger

The enumeration ReportingTrigger defines Reporting Triggers for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.8-1.

**Table 5.6.3.8-1: Enumeration ReportingTrigger**

| Enumeration value | Description |
|---|---|
| "PERIODICAL" | Periodical |
| "EVENT_A2" | Event A2 for LTE and NR |
| "EVENT_A2_PERIODIC" | A2 event triggered periodic for LTE and NR |
| "ALL_RRM_EVENT_TRIGGERS" | All configured RRM event triggers for LTE |

### 5.6.3.9 Enumeration: ReportIntervalMdt

The enumeration ReportIntervalMdt defines Report Interval for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.9-1.

**Table 5.6.3.9-1: Enumeration ReportIntervalMdt**

| Enumeration value | Description |
|---|---|
| "120" | 120 ms |
| "240" | 240 ms |
| "480" | 480 ms |
| "640" | 640 ms |
| "1024" | 1024 ms |
| "2048" | 2048 ms |
| "5120" | 5120 ms |
| "10240" | 10240ms |
| "60000" | 1 min=60000 ms |
| "360000" | 6 min=360000 ms |
| "720000" | 12 min=720000 ms |
| "1800000" | 30 min=1800000 ms |
| "3600000" | 60 min=3600000 ms |

### 5.6.3.10 Enumeration: ReportAmountMdt

The enumeration ReportAmountMdt defines Report Amount for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.10-1.

**Table 5.6.3.10-1: Enumeration ReportAmountMdt**

| Enumeration value | Description |
|---|---|
| "1" | 1 |
| "2" | 2 |
| "4" | 4 |
| "8" | 8 |
| "16" | 16 |
| "32" | 32 |
| "64" | 64 |
| "infinity" | Infinity |

### 5.6.3.11 Enumeration: EventForMdt

The enumeration EventForMdt defines events triggered measurement for logged MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.11-1.

**Table 5.6.3.11-1: Enumeration EventForMdt**

| Enumeration value | Description |
|---|---|
| "OUT_OF_COVERAGE" | Out of coverage |
| "A2_EVENT" | A2 event |

### 5.6.3.12 Enumeration: LoggingIntervalMdt

The enumeration LoggingIntervalMdt defines Logging Interval for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.12-1.

**Table 5.6.3.12-1: Enumeration LoggingIntervalMdt**

| Enumeration value | Description |
|---|---|
| "128" | 1280 ms |
| "256" | 2560 ms |
| "512" | 5120 ms |
| "1024" | 10240 ms |
| "2048" | 20480 ms |
| "3072" | 30720 ms |
| "4096" | 40960 ms |
| "6144" | 61440 ms |

### 5.6.3.13 Enumeration: LoggingDurationMdt

The enumeration LoggingDurationMdt defines Logging Duration for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.13-1.

**Table 5.6.3.13-1: Enumeration LoggingDurationMdt**

| Enumeration value | Description |
|---|---|
| "600" | 600 sec |
| "1200" | 1200 sec |
| "2400" | 2400 sec |
| "3600" | 3600 sec |
| "5400" | 5400 sec |
| "7200" | 7200 sec |

### 5.6.3.14 Enumeration: PositioningMethodMdt

The enumeration PositioningMethodMdt defines Positioning Method for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.14-1.

**Table 5.6.3.14-1: Enumeration PositioningMethodMdt**

| Enumeration value | Description |
|---|---|
| "GNSS" | GNSS |
| "E_CELL_ID" | E-Cell ID |

### 5.6.3.15 Enumeration: CollectionPeriodRmmLteMdt

The enumeration CollectionPeriodRmmLteMdt defines Collection period for RRM measurements LTE for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.15-1.

**Table 5.6.3.15-1: Enumeration CollectionPeriodRmmLteMdt**

| Enumeration value | Description |
|---|---|
| "1024" | 1024 ms |
| "1280" | 1280 ms |
| "2048" | 2048 ms |
| "2560" | 2560 ms |
| "5120" | 5120 ms |
| "10240" | 10240 ms |
| "60000" | 1 min |

### 5.6.3.16 Enumeration: MeasurementPeriodLteMdt

The enumeration MeasurementPeriodLteMdt defines Measurement period LTE for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.16-1.

**Table 5.6.3.16-1: Enumeration MeasurementPeriodLteMdt**

| Enumeration value | Description |
|---|---|
| "1024" | 1024 ms |
| "1280" | 1280 ms |
| "2048" | 2048 ms |
| "2560" | 2560 ms |
| "5120" | 5120 ms |
| "10240" | 10240 ms |
| "60000" | 1 min |

### 5.6.3.17 Enumeration: ReportIntervalNrMdt

The enumeration ReportIntervalNrMdt defines Report Interval in NR for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.17-1.

**Table 5.6.3.17-1: Enumeration ReportIntervalNrMdt**

| Enumeration value | Description |
|---|---|
| "120" | 120 ms |
| "240" | 240 ms |
| "480" | 480 ms |
| "640" | 640 ms |
| "1024" | 1024 ms |
| "2048" | 2048 ms |
| "5120" | 5120 ms |
| "10240" | 10240ms |
| "20480" | 20480ms |
| "40960" | 40960ms |
| "60000" | 1 min=60000 ms |
| "360000" | 6 min=360000 ms |
| "720000" | 12 min=720000 ms |
| "1800000" | 30 min=1800000 ms |
| "3600000" | 60 min=3600000 ms |

### 5.6.3.18 Enumeration: LoggingIntervalNrMdt

The enumeration LoggingIntervalNrMdt defines Logging Interval in NR for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.18-1.

**Table 5.6.3.18-1: Enumeration LoggingIntervalNrMdt**

| Enumeration value | Description |
|---|---|
| "1280" | 1280 ms |
| "2560" | 2560 ms |
| "5120" | 5120 ms |
| "10240" | 10240 ms |
| "20480" | 20480 ms |
| "30720" | 30720 ms |
| "40960" | 40960 ms |
| "61440" | 61440 ms |
| "320" | 320 ms |
| "640" | 640 ms |
| "infinity" | Infinity |

### 5.6.3.19 Enumeration: CollectionPeriodRmmNrMdt

The enumeration CollectionPeriodRmmNrMdt defines Collection period for RRM measurements NR for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.19-1.

**Table 5.6.3.19-1: Enumeration CollectionPeriodRmmNrMdt**

| Enumeration value | Description |
|---|---|
| "1024" | 1024 ms |
| "2048" | 2048 ms |
| "5120" | 5120 ms |
| "10240" | 10240 ms |
| "60000" | 1 min |

### 5.6.3.20 Enumeration: LoggingDurationNrMdt

The enumeration LoggingDurationMdt defines Logging Duration in NR for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.20-1.

**Table 5.6.3.20-1: Enumeration LoggingDurationNrMdt**

| Enumeration value | Description |
|---|---|
| "600" | 600 sec |
| "1200" | 1200 sec |
| "2400" | 2400 sec |
| "3600" | 3600 sec |
| "5400" | 5400 sec |
| "7200" | 7200 sec |

## 5.6.4 Structured Data Types

### 5.6.4.1 Type: TraceData

**Table 5.6.4.1-1: Definition of type TraceData**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| traceRef | string | M | 1 | Trace Reference (see 3GPP TS 32.422 [19]).<br><br>It shall be encoded as the concatenation of MCC, MNC and Trace ID as follows:<br><MCC><MNC>-<Trace ID><br><br>The Trace ID shall be encoded as a 3 octet string in hexadecimal representation. Each character in the Trace ID string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the Trace ID shall appear first in the string, and the character representing the 4 least significant bit of the Trace ID shall appear last in the string.<br><br>Pattern: '^[0-9]{3}[0-9]{2,3}-[A-Fa-f0-9]{6}$' |
| traceDepth | TraceDepth | M | 1 | Trace Depth (see 3GPP TS 32.422 [19]). |
| neTypeList | string | M | 1 | List of NE Types (see 3GPP TS 32.422 [19]).<br><br>It shall be encoded as an octet string in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits shall appear first in the string, and the character representing the 4 least significant bit shall appear last in the string.<br><br>Octets shall be coded according to 3GPP TS 32.422 [19].<br><br>Pattern: '^[A-Fa-f0-9]+$' |
| eventList | string | M | 1 | Triggering events (see 3GPP TS 32.422 [19]).<br><br>It shall be encoded as an octet string in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits shall appear first in the string, and the character representing the 4 least significant bit shall appear last in the string.<br><br>Octets shall be coded according to 3GPP TS 32.422 [19].<br><br>Pattern: '^[A-Fa-f0-9]+$' |
| collectionEntityIpv4Addr | Ipv4Addr | C | 0..1 | IPv4 Address of the Trace Collection Entity (see 3GPP TS 32.422 [19].<br>At least one of the collectionEntityIpv4Addr or collectionEntityIpv6Addr attributes shall be present. |
| collectionEntityIpv6Addr | Ipv6Addr | C | 0..1 | IPv6 Address of the Trace Collection Entity (see 3GPP TS 32.422 [19].<br>At least one of the collectionEntityIpv4Addr or collectionEntityIpv6Addr attributes shall be present. |

| | | | | |
|---|---|---|---|---|
| interfaceList | string | O | 0..1 | List of Interfaces (see 3GPP TS 32.422 [19]).<br><br>It shall be encoded as an octet string in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits shall appear first in the string, and the character representing the 4 least significant bit shall appear last in the string.<br><br>Octets shall be coded according to 3GPP TS 32.422 [19].<br><br>If this attribute is not present, all the interfaces applicable to the list of NE types indicated in the neTypeList attribute should be traced.<br><br>Pattern: '^[A-Fa-f0-9]+$' |

### 5.6.4.2 Type: MdtConfiguration

**Table 5.6.4.2-1: Definition of type MdtConfiguration**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| jobType | JobType | M | 1 | This IE shall indicate the Job type for MDT, see 3GPP TS 32.422 [19]. |
| reportType | ReportTypeMdt | C | 0..1 | This IE shall be present for logged MDT.<br>When present, this IE shall indicate the report type for logged MDT, see 3GPP TS 32.422 [19]. |
| areaScope | AreaScope | O | 0..1 | When present, this IE shall contain the area in Cells or Tracking Areas where the MDT data collection shall take place, see 3GPP TS 32.422 [19]. |
| measurementLteList | array(MeasurementLteForMdt) | C | 1..N | This IE shall be present if the Job type is configured for Immediate MDT or combined Immediate MDT and Trace.<br>When present, this IE shall contain a list of the measurements that shall be collected for LTE. |
| measurementNrList | array(MeasurementNrForMdt) | C | 1..N | This IE shall be present if the Job type is configured for Immediate MDT or combined Immediate MDT and Trace.<br>When present, this IE shall contain a list of the measurements that shall be collected for NR. |
| sensorMeasurementList | array(SensorMeasurement) | O | 1..N | When present, this IE shall include a list o the sensor measurements to be collected for UE if they are available. |
| reportingTriggerList | array(ReportingTrigger) | C | 1..N | This IE shall be present if MeasurementList is configured for UE side measurements (such as M1 measurement in LTE) and the jobType is configured for Immediate MDT or combined Immediate MDT and Trace.<br>When present, this IE shall contain a list of the reporting triggers.<br>For LTE and NR, this IE shall not have the combination of periodical, event based and event based periodic reporting at the same time. |
| reportInterval | ReportIntervalMdt | C | 0..1 | This IE shall be present if the reportingTriggerList is configured for Periodic UE side measurements (such as M1 measurement in LTE) and the jobType is configured for Immediate MDT or combined Immediate MDT and Trace.<br>When present, this IE shall indicate the interval between the periodical measurements to be taken when UE is in connected in LTE. |
| reportIntervalNr | ReportIntervaLNrMdt | C | 0..1 | This IE shall be present if the reportingTriggerList is configured for Periodic UE side measurements (such as M1 measurement in NR) and the jobType is configured for Immediate MDT or combined Immediate MDT and Trace.<br>When present, this IE shall indicate the interval between the periodical measurements to be taken when UE is in connected in NR. |
| reportAmount | ReportAmountMdt | C | 0..1 | This IE shall be present if the reportingTriggerList is configured for Periodic UE side measurements (such as M1 measurement in LTE) and the jobType is configured for Immediate MDT or combined Immediate MDT and Trace.<br>When present, this IE shall indicate the number of measurement reports that shall be taken for periodical reporting while UE is in connected. |
| eventThresholdRsrp | integer | C | 0..1 | This IE shall be present if the report trigger parameter is configured for A2 event reporting or A2 event triggered periodic reporting and the job type parameter is configured for Immediate MDT or combined Immediate MDT and Trace in LTE.<br>When present, this IE shall indicate the Event Threshold for RSRP, and the value shall be between 0-97. |

| | | | | |
|---|---|---|---|---|
| eventThresholdRsrpNr | integer | C | 0..1 | This IE shall be present if the report trigger parameter is configured for A2 event reporting or A2 event triggered periodic reporting and the job type parameter is configured for Immediate MDT or combined Immediate MDT and Trace in NR.<br>When present, this IE shall indicate the Event Threshold for RSRP, and the value shall be between 0-127. |
| eventThresholdRsrq | integer | C | 0..1 | This IE shall be present if the report trigger parameter is configured for A2 event reporting or A2 event triggered periodic reporting and the job type parameter is configured for Immediate MDT or combined Immediate MDT and Trace in LTE.<br>When present, this IE shall indicate the Event Threshold for RSRQ, and the value shall be between 0-34. |
| eventThresholdRsrqNr | integer | C | 0..1 | This IE shall be present if the report trigger parameter is configured for A2 event reporting or A2 event triggered periodic reporting and the job type parameter is configured for Immediate MDT or combined Immediate MDT and Trace in NR.<br>When present, this IE shall indicate the Event Threshold for RSRQ, and the value shall be between 0-127. |
| eventList | array(EventForMdt) | C | 1..N | This IE shall be present for event triggered measurement in the case of logged MDT.<br>When present, this IE shall contain a list of events triggered measurement in NR. |
| loggingInterval | LoggingIntervalMdt | C | 0..1 | This IE shall be present if the job type is configured for Logged MDT or Logged MBSFN MDT in LTE.<br>When present, this IE shall contain the periodicity for logging MDT measurement results for periodic downlink pilot strength measurement in LTE when UE is in Idle. |
| loggingIntervalNr | LoggingIntervalNrMdt | C | 0..1 | This IE shall be present if the job type is configured for Logged MDT or Logged MBSFN MDT in NR.<br>When present, this IE shall contain the periodicity for logging MDT measurement results for periodic downlink pilot strength measurement in NR when UE is in Idle. |
| loggingDuration | LoggingDurationMdt | O | 0..1 | This IE shall be present if the job type parameter is configured for Logged MDT or Logged MBSFN MDT.<br>When present, this IE shall indicate the validity time of MDT logged configuration for IDLE in LTE |
| loggingDurationNr | LoggingDurationNrMdt | O | 0..1 | This IE shall be present if the job type parameter is configured for Logged MDT or Logged MBSFN MDT.<br>When present, this IE shall indicate the validity time of MDT logged configuration for IDLE in NR. |
| positioningMethod | PositioningMethodMdt | O | 0..1 | This IE may be present if the job type is set to Immediate MDT or Immediate MDT and Trace.<br>When present, it shall indicate the positioning method that shall be used for the MDT job.<br>For LTE the value "GNSS" may be selected only if the M1 measurement is selected in measurementList. |
| addPositioningMethodList | array(PositioningMethodMdt) | O | 1..N | This IE may be present if positioningMethod is present.<br><br>When present, it shall indicate a list of the additional positioning methods that shall be used for the MDT job.<br><br>For LTE, the value "GNSS" may be selected only if the M1 measurement is selected in measurementList. |

| | | | | |
|---|---|---|---|---|
| collectionPeriodRmmLte | CollectionPeriodRmmLteMdt | C | 0..1 | This IE shall be present if the job type is set to Immediate MDT or Immediate MDT and Trace and any of the "M2" or "M3" is contained in measurementList attribute in LTE.<br>When present, it shall contain the collection period that should be used to collect available measurement samples in case of RRM configured measurements. The same collection period should be used for all such measurements that are requested in the same MDT or combined Trace and MDT job. |
| collectionPeriodRmmNr | CollectionPeriodRmmNrMdt | C | 0..1 | This IE shall be present if the job type is set to Immediate MDT or Immediate MDT and Trace and any of the "M4" or "M5" is contained in measurementList attribute in NR.<br><br>When present, it shall contain the collection period that should be used to collect available measurement samples in case of RRM configured measurements. The same collection period should be used for all such measurements that are requested in the same MDT or combined Trace and MDT job. |
| measurementPeriodLte | MeasurementPeriodLteMdt | C | 0..1 | This IE shall be present if the job type is set to Immediate MDT or Immediate MDT and Trace and either the value "M4_DL" or "M4_UL" or "M5_DL" or "M5_UL" is contained in measurementList attribute in LTE.<br>When present, it shall contain the collection period that should be used for the Data Volume and Scheduled IP Throughput measurements made by the eNB. The same measurement period should be used for the UL and DL. |
| mdtAllowedPlmnIdList | array(PlmnId) | O | 1..N | When present, this IE shall contain the PLMNs where measurement collection, status indication and log reporting is allowed. E.g. the UE performs these actions for Logged MDT when the RPLMN is part of this set of PLMNs.<br>Maximum of 16 PLMNs can be contained. |
| mbsfnAreaList | array(MbsfnArea) | O | 1..N | When present, this IE shall contain MBSFN Area(s) for MBSFN measurement logging.<br>Maximum of 8 MBSFN area(s) can be contained.<br>This parameter is applicable only if the job type is Logged MBSFN MDT and for eUTRAN only. |
| interFreqTargetList | array(InterFreqTargetInfo) | O | 1..8 | When present, this IE shall indicate Inter Frequency Target(s) for which the UE is requested to perform measurement logging. |

### 5.6.4.3 Type: AreaScope

**Table 5.6.4.3-1: Definition of type AreaScope**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| eutraCellIdList | array(EutraCellId) | O | 1..N | When present, this IE shall contain a list of the E-UTRAN Cell Identifications where the MDT data collection shall take place. |
| nrCellIdList | array(NrCellId) | O | 1..N | When present, this IE shall contain a list of the NR Cell Identities where the MDT data collection shall take place. |
| tacList | array(Tac) | O | 1..N | When present, this IE shall contain a list of the tracking area codes where the MDT data collection shall take place. |
| tacInfoPerPlmn | map(TacInfo) | O | 1..N | A map (list of key-value pairs where PlmnId converted to string serves as key; see clause 5.4.4.3) of TacInfo |

### 5.6.4.4 Type: TacInfo

**Table 5.6.4.4-1: Definition of type TacInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| tacList | array(Tac) | M | 1..N | This IE shall contain a list of the tracking area codes. |

### 5.6.4.5 Type: MbsfnArea

**Table 5.6.4.5-1: Definition of type MbsfnArea**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| mbsfnAreaId | integer | O | 0..1 | This IE shall contain the MBSFN Area ID.<br>The range of the value is from 0 to 255, see 3GPP TS 36.331 [39]. |
| carrierFrequency | integer | O | 0..1 | When present, this IE shall contain the Carrier Frequency (EARFCN).<br>The range of the value is from 0 to 262143, see 3GPP TS 36.331 [39]. |
| NOTE If both mbsfnAreaId and carrierFrequency values are present, a specific MBSFN area is indicated. If carrierFrequency is present, but mbsfnAreaId is absent, all MBSFN areas on that carrier frequency are indicated. If both mbsfnAreaId and carrierFrequency are absent, any MBSFN area is indicated. | | | | |

### 5.6.4.6 Type: InterFreqTargetInfo

**Table 5.6.4.6-1: Definition of type InterFreqTargetInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| dlCarrierFreq | ArfcnValueNr | M | 1 | This IE shall indicate the value of frequency for download for measurement logging. |
| cellIdList | array(PhysCellId) | O | 1..32 | When present, this IE shall contain a list of the physical cell identities where the UE is requested to perform measurement logging for the indicated frequency.<br><br>If absent, the UE shall perform measurement logging on all physical cells. |

## 5.7 Data Types related to 5G Operator Determined Barring

### 5.7.1 Introduction

This clause defines common data types related to 5G Operator Determined Barring.

### 5.7.2 Simple Data Types

This clause specifies common simple data types.

**Table 5.7.2-1: Simple Data Types**

| Type Name | Type Definition | Description |
|---|---|---|
| | | |

## 5.7.3 Enumerations

### 5.7.3.1 Enumeration: RoamingOdb

The enumeration RoamingOdb defines the Barring of Roaming as. See 3GPP TS 23.015 [26] for further description. It shall comply with the provisions defined in table 5.7.3.1-1.

**Table 5.7.3.1-1: Enumeration RoamingOdb**

| Enumeration value | Description |
|---|---|
| "OUTSIDE_HOME_PLMN" | Barring of roaming outside the home PLMN |
| "OUTSIDE_HOME_PLMN_COUNTRY" | Barring of roaming outside the home PLMN country |

### 5.7.3.2 Enumeration: OdbPacketServices

The enumeration OdbPacketServices defines the Barring of Packet Oriented Services. See 3GPP TS 23.015 [26] for further description. It shall comply with the provisions defined in table 5.7.3.2-1.

**Table 5.7.3.2-1: Enumeration OdbPacketServices**

| Enumeration value | Description |
|---|---|
| "ALL_PACKET_SERVICES" | Barring of all Packet Oriented Services |
| "ROAMER_ACCESS_HPLMN_AP" | Barring of Packet Oriented Services from access points that are within the HPLMN whilst the subscriber is roaming in a VPLMN |
| "ROAMER_ACCESS_VPLMN_AP" | Barring of Packet Oriented Services from access points that are within the roamed to VPLMN. |

## 5.7.4 Structured Data Types

### 5.7.4.1 Type: OdbData

**Table 5.7.4.1-1: Definition of type OdbData**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| roamingOdb | RoamingOdb | O | 0..1 | Barring of Roaming (see 3GPP TS 23.015 [26]). |

# 5.8 Data Types related to Charging

## 5.8.1 Introduction

This clause defines common data types related to Charging.

## 5.8.2 Simple Data Types

This clause specifies common simple data types.

**Table 5.8.2-1: Simple Data Types**

| Type Name | Type Definition | Description |
|---|---|---|
| ChargingId | Uint32 | Charging identifier allowing correlation of charging information (NOTE) |
| ApplicationChargingId | string | Application provided charging identifier allowing correlation of charging information. |
| RatingGroup | Uint32 | Identifier of a Rating Group |
| ServiceId | Uint32 | Identifier of a Service |
| NOTE: This data type is deprecated and shall not be used by any new API definition. To secure the uniqueness of the charging identifier, "string" type shall be used for attributes carrying a charging identifier. | | |

## 5.8.3 Enumerations

## 5.8.4 Structured Data Types

### 5.8.4.1 Type: SecondaryRatUsageReport

**Table 5.8.4.1-1: Definition of type SecondaryRatUsageReport**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| secondaryRatType | RatType | M | 1 | Secondary RAT type |
| qosFlowsUsageData | array(QosFlowUsageReport) | M | 1..N | QoS flows usage data |

### 5.8.4.2 Type: QoSFlowUsageReport

**Table 5.8.4.2-1: Definition of type QoSFlowUsageReport**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| qfi | Qfi | M | 1 | QoS Flow Indicator |
| startTimeStamp | DateTime | M | 1 | UTC time indicating the start time of the collection period of the included usage data for DL and UL. |
| endTimeStamp | DateTime | M | 1 | UTC time indicating the end time of the collection period of the included usage data for DL and UL. |
| downlinkVolume | Int64 | M | 1 | Data usage for DL, encoding a number of octets |
| uplinkVolume | Int64 | M | 1 | Data usage for UL, encoding a number of octets |

### 5.8.4.3 Type: SecondaryRatUsageInfo

**Table 5.8.4.3-1: Definition of type SecondaryRatUsageInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| secondaryRatType | RatType | M | 1 | Secondary RAT type |
| qosFlowsUsageData | array(QosFlowUsageReport) | O | 1..N | QoS flows usage data |
| pduSessionUsageData | array(VolumeTimedReport) | O | 1..N | PDU session usage data |

#### 5.8.4.4 Type: VolumeTimedReport

**Table 5.8.4.4-1: Definition of type VolumeTimedReport**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| startTimeStamp | DateTime | M | 1 | UTC time indicating the start time of the collection period of the included usage data for DL and UL. |
| endTimeStamp | DateTime | M | 1 | UTC time indicating the end time of the collection period of the included usage data for DL and UL. |
| downlinkVolume | Int64 | M | 1 | Data usage for DL, encoding a number of octets |
| uplinkVolume | Int64 | M | 1 | Data usage for UL, encoding a number of octets |

## 5.9 Data Types related to MBS

### 5.9.1 Introduction

This clause defines common data types related to MBS.

### 5.9.2 Simple Data Types

This clause specifies common simple data types.

**Table 5.9.2-1: Simple Data Types**

| Type Name | Type Definition | Description |
|---|---|---|
| AreaSessionId | Uint16 | Area Session Identifier used for MBS session with location dependent content.<br>When present, the Area Session ID together with the TMGI uniquely identifies the MBS session in a specific MBS service area. |
| MbsFsaId | string | MBS Frequency Selection Area ID, for a broadcast MBS session<br><br>The value of the MbsFsaId shall be encoded in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the MBS FSA Id shall appear first in the string, and the character representing the 4 least significant bit of the MBS FSA Id shall appear last in the string.<br><br>Pattern: '^[A-Fa-f0-9]{6}$' |

### 5.9.3 Enumerations

#### 5.9.3.1 Enumeration: MbsServiceType

The enumeration MbsServiceType indicates the type of MBS session. It shall comply with the provisions defined in Table 5.9.3.1-1.

**Table 5.9.3.1-1: Enumeration MbsServiceType**

| Enumeration value | Description | Applicability |
|---|---|---|
| "MULTICAST" | Multicast MBS session | |
| "BROADCAST" | Broadcast MBS session | |

### 5.9.3.2 Enumeration: MbsSessionActivityStatus

The enumeration MbsSessionActivityStatus indicates the MBS session's activity status. It shall comply with the provisions defined in Table 5.9.3.2-1.

**Table 5.9.3.2-1: Enumeration MbsSessionActivityStatus**

| Enumeration value | Description | Applicability |
|---|---|---|
| "ACTIVE" | Active MBS session | |
| "INACTIVE" | Inactive MBS session | |

### 5.9.3.3 Enumeration: MbsSessionEventType

**Table 5.9.3.3-1: Enumeration MbsSessionEventType**

| Enumeration value | Description | Applicability |
|---|---|---|
| "MBS_REL_TMGI_EXPIRY" | Subscription to be notified or notification request about the MBS session release due to TMGI expiry. | |
| "BROADCAST_DELIVERY_STATUS" | Subscription to be notified or notification request about the MBS session broadcast delivery status. | |
| "INGRESS_TUNNEL_ADD_CHANGE" | Subscription to be notified or notification request about change of the Ingress Tunnel Address, when using unicast transport over N6mb/Nmb9. | |

### 5.9.3.4 Enumeration: BroadcastDeliveryStatus

**Table 5.9.3.4-1: Enumeration BroadcastDeliveryStatus**

| Enumeration value | Description | Applicability |
|---|---|---|
| "STARTED" | The MBS session has been started. | |
| "TERMINATED" | The MBS session has been terminated. | |

## 5.9.4 Structured Data Types

### 5.9.4.1 Type: MbsSessionId

**Table 5.9.4.1-1: Definition of type MbsSessionId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| tmgi | Tmgi | C | 0..1 | TMGI identifying the MBS session (NOTE) |
| ssm | Ssm | C | 0..1 | Source specific IP multicast address identifying the MBS session (NOTE) |
| nid | Nid | O | 0..1 | Network Identity used together with the TMGI to identify an MBS session in an SNPN |
| NOTE: At least one of the tmgi IE and ssm IE shall be present. | | | | |

### 5.9.4.2 Type: Tmgi

**Table 5.9.4.2-1: Definition of type Tmgi**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| mbsServiceId | string | M | 1 | MBS Service ID consisting of a 6-digit fixed-length hexadecimal number between 000000 and FFFFFF.<br><br>Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the MBS Service ID shall appear first in the string, and the character representing the 4 least significant bit of the MBS Service ID shall appear last in the string.<br><br>Pattern: '^[A-Fa-f0-9]{6}$' |
| plmnId | PlmnId | M | 1 | PLMN ID |

### 5.9.4.3 Type: Ssm

**Table 5.9.4.3-1: Definition of type Ssm**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| sourceIpAddr | IpAddr | M | 1 | IP unicast address used as source address in IP packets for identifying the source of the multicast service (e.g. AF/AS). |
| destIpAddr | IpAddr | M | 1 | IP multicast address used as destination address in related IP packets for identifying the multicast service associated with the source. |

### 5.9.4.4 Type: MbsServiceArea

**Table 5.9.4.4-1: Definition of type MbsServiceArea**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ncgiList | array(NcgiTai) | C | 1..N | List of NR cell ids with their pertaining TAIs (NOTE). |
| taiList | array(Tai) | C | 1..N | List of tracking area Ids (NOTE). |
| NOTE: The MBS Service Area consists of the union of the cells in the tracking areas listed in the taiList IE and the cells listed in the ncgiList IE. At least one of the ncgiList IE and taiList IE shall be present. | | | | |

### 5.9.4.5 Type: NcgiTai

**Table 5.9.4.5-1: Definition of type NcgiTai**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| tai | Tai | M | 1 | TAI of the cells in cellList (NOTE) |
| cellList | array(Ncgi) | M | 1..N | List of NR cell ids |
| NOTE: The NcgiTai consists of the list of cells listed in the cellList IE. These cells pertain to the TAI indicated in the tai IE. The TAI may be used e.g. to discover and select an AMF that serves NG-RAN nodes supporting the corresponding cells. | | | | |

### 5.9.4.6 Type: MbsSession

**Table 5.9.4.6-1: Definition of type MbsSession**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| mbsSessionId | MbsSessionId | C | 0..1 | MBS session identifier (TMGI and/or SSM, and NID for an SNPN)<br>(NOTE 1) |
| tmgiAllocReq | boolean | C | 0..1 | TMGI allocation request indication.<br>This IE shall be present if the mbsSessionId IE is absent. This IE may also be present if the mbsSessionId IE is present and it does not contain a TMGI.<br>When present, it shall be set as follows:<br>- true: a TMGI is requested to be allocated<br>- false (default): no TMGI is requested to be allocated<br>Write-Only: true<br>(NOTE 1) |
| tmgi | Tmgi | C | 0..1 | This IE shall be present in an MBS session creation response if the tmgiAllocReq IE was present and set to "true" in the MBS session creation request.<br>When present, it shall indicate the TMGI allocated to the MBS session.<br>Read-Only: true |
| expirationTime | DateTime | C | 0..1 | This IE shall be present in an MBS session creation response if the tmgiAllocReq IE was present and set to "true" in the in the MBS session creation request.<br>When present, it shall indicate the expiration time for the TMGI allocated to the MBS session.<br>Read-Only: true |
| serviceType | MbsServiceType | M | 1 | MBS Service Type (either multicast or broadcast service)<br>Write-Only: true |
| locationDependent | boolean | C | 0..1 | Location dependent MBS session indication.<br>This IE shall be present and set to true for a Location dependent MBS session. It may be present otherwise.<br>When present, it shall be set as follows:<br>- true: this is a Location dependent MBS session<br>- false (default): this is not a Location dependent MBS session |
| areaSessionId | AreaSessionId | C | 0..1 | This IE shall be present in a successful response to a request to create an instance of a Location dependent MBS session i.e. when the "locationDependent" attribute is present and set to "true" in the MBS session creation request.<br>When present, it shall contain the Area Session ID assigned by the MB-SMF to the location dependent MBS session instance in the MBS Service Area.<br>Read-Only: true |
| ingressTunAddrReq | boolean | O | 0..1 | Ingress transport address request indication (for unicast transport over N6mb/Nmb9).<br>When present, it shall be set as follows:<br>- true: an ingress transport address is requested<br>- false (default): no request<br>Write-Only: true |

| | | | | |
|---|---|---|---|---|
| ingressTunAddr | array(TunnelAddress) | C | 1..N | Ingress tunnel address (UDP/IP tunnel).<br><br>This IE shall be present in an MBS session creation response if the ingressTunAddrReq IE was present and set to "true" in the corresponding MBS session creation request.<br>When present, it shall indicate the allocated ingress tunnel address(es).<br><br>Read-Only: true<br>(NOTE 2) |
| ssm | Ssm | C | 0..1 | Source specific IP multicast address<br><br>This IE shall be present if multicast transport applies over N6mb and the MBS session is not identified by the SSM, e.g. for a location-dependent MBS session with multicast transport over N6mb.<br><br>Write-Only: true |
| mbsServiceArea | MbsServiceArea | O | 0..1 | Contains the MBS Service Area<br><br>This attribute shall be present only for a location dependent MBS session or a local MBS session.<br><br>Write-Only: true |
| extMbsServiceArea | ExternalMbsServiceArea | O | 0..1 | Contains the MBS service area.<br><br>This attribute shall be present only for a location dependent MBS session or a local MBS session.<br><br>This IE may be present only over the N33 and Nmb10 interfaces; it shall not be present over other interfaces.<br>When present, it shall indicate the MBS Service Area information which shall either be geographical area information or civic address information.<br><br>Write-Only: true |
| dnn | Dnn | O | 0..1 | Represents the DNN<br>Write-Only: true |
| snssai | Snssai | O | 0..1 | Represents the S-NSSAI<br>Write-Only: true |
| activationTime | DateTime | O | 0..1 | Represents the MBS session start time.<br>This attribute is deprecated and replaced by the "startTime" attribute. |
| startTime | DateTime | O | 0..1 | Represents the MBS session start time. |
| terminationTime | DateTime | O | 0..1 | Represents the MBS session termination time. |
| mbsServInfo | MbsServiceInfo | O | 0..1 | Contains the MBS Service Information for the MBS session. |
| mbsSessionSubsc | MbsSessionSubscription | O | 0..1 | Contains the parameters to request the creation of a subscription to one or more MBS session status event(s). |
| activityStatus | MbsSessionActivityStatus | O | 0..1 | Contains the session activity status (active or inactive).<br>This IE may be provided if the "serviceType" attribute indicates a multicast MBS session. |
| anyUeInd | boolean | O | 0..1 | Indication that any UE may join the MBS session.<br>This IE may be provided if the "serviceType" attribute indicates a multicast MBS session.<br>When present, it shall be set as follows:<br>- true: any UE may join the MBS session<br><br>- false (default): the MBS session is not open to any UE<br><br>Write-Only: true |

| | | | | |
|---|---|---|---|---|
| mbsFsaIdList | array(MbsFsaId) | O | 1..N | List of MBS Frequency Selection Area Identifiers, for a broadcast MBS session.<br><br>This attribute may be present if the "serviceType" attribute indicates a broadcast MBS session. |
| NOTE 1: At least one of the mbsSessionId IE and tmgiAllocReq IE shall be present. Both may be present if the mbsSessionId IE does not contain a TMGI (i.e. if it only contains a SSM).<br>NOTE 2: In a scenario where an MB-UPF covers a small service area (i.e. a list of TAIs that is a subset of the MBS service area), the MB-SMF needs to find other MB-UPF(s) to cover the whole MBS service area for the MBS session. In such scenarios, multiple ingress addresses of all MB-UPFs need to be allocated for an MBS session. These multiple ingress tunnel addresses are used to receive the same copy of the MBS session data from the AF/MBSTF. In such scenarios, the MBS service area served by an MB-UPF shall be larger than the MBS service area served by an AMF (set), i.e. an AMF in an AMF set shall receive only one MBS Session Information Request Transfer for an MBS session in the MBS Session Context Create/Update Request message. | | | | |

### 5.9.4.7 Type: MbsSessionSubscription

**Table 5.9.4.7-1: Definition of type MbsSessionSubscription**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| mbsSessionId | MbsSessionId | C | 0..1 | Identifier of the MBS Session for which the subscription is created.<br>This IE shall be present, except for an MBS session subscription request that is sent within an MBS session creation request. |
| areaSessionId | AreaSessionId | C | 0..1 | Area Session ID, for a location dependent MBS session, identifying the part of the MBS session in an MBS service area for which the subscription is created.<br>It shall be present for a location dependent MBS session, except for an MBS session subscription request that is sent within an MBS session creation request |
| eventList | array(MbsSessionEvent) | M | 1..N | List of MBS session events subscribed |
| notifyUri | Uri | M | 1 | URI where the NF service consumer requests to receive MBS session notifications.<br>Write-Only: true |
| notifyCorrelationId | string | O | 0..1 | Notification Correlation ID<br>Write-Only: true |
| expiryTime | DateTime | O | 0..1 | When present in an MBS Session subscription creation request, it shall indicate the time up to which the subscription is desired to be kept active and after which the subscribed events shall stop generating notifications.<br><br>When present in a subscription response, it shall indicate the expiry time after which the subscription becomes invalid. |
| nfcInstanceId | NfInstanceId | C | 0..1 | NF Instance ID of the NF Service Consumer<br>This IE shall be present if available.<br>Write-Only: true |
| mbsSessionSubscUri | Uri | C | 0..1 | This IE shall be present in the response to an MBS session creation request that includes a subscription to events about the MBS session and the subscription was created successfully. When present, it shall contain the URI of the individual subscription resource.<br><br>Read-Only: true<br>(NOTE) |
| NOTE: When an MBS session status subscription is created separately (i.e. after) an MBS session creation, the Location header returned in the MBS session status subscription creation response contains the URI of the created subscription. | | | | |

### 5.9.4.8 Type: MbsSessionEventReportList

**Table 5.9.4.8-1: Definition of type MbsSessionEventReportList**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| eventReportList | Array(MbsSessionEventReport) | M | 1..N | List of MBS session events to report |
| notifyCorrelationId | string | C | 0..1 | Notification Correlation ID.<br>This IE shall be present if a Notification Correlation ID is available in the subscription. |

### 5.9.4.9 Type: MbsSessionEvent

**Table 5.9.4.9-1: Definition of type MbsSessionEvent**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| eventType | MbsSessionEventType | M | 1 | MBS session event type | |

### 5.9.4.10 Type: MbsSessionEventReport

**Table 5.9.4.10-1: Definition of type MbsSessionEventReport**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| eventType | MbsSessionEventType | M | 1 | MBS session event type | |
| timeStamp | DateTime | C | 0..1 | This IE shall contain the time at which the event is generated. This IE should be present, if available. | |
| ingressTunAddrInfo | IngressTunAddrInfo | C | 0..1 | This IE shall be present if the eventType IE indicates "INGRESS_TUNNEL_ADD_CHANGE". | |
| broadcastDelStatus | BroadcastDeliveryStatus | C | 0..1 | This IE shall be present if the eventType IE indicates "BROADCAST_DELIVERY_STATUS". | |

### 5.9.4.11 Type: ExternalMbsServiceArea

**Table 5.9.4.11-1: Definition of type ExternalMbsServiceArea**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| geographicAreaList | array(GeographicArea) | C | 1..N | Identifies a list of geographic area specified by different shapes. |
| civicAddressList | Array(CivicAddress) | C | 1..N | Identifies a list of civic address. |
| NOTE: Either the geographicAreaList IE or the civicAddressList IE shall be present. | | | | |

### 5.9.4.12 Type: MbsSecurityContext

**Table 5.9.4.12-1: Definition of type MbsSecurityContext**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| keyList | map(MbsKeyInfo) | M | 1..N | One or more MSK/MTK(s) and associated IDs. The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters |

### 5.9.4.13 Type: MbsKeyInfo

**Table 5.9.4.13-1: Definition of type MbsSecurityContext**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| keyDomainId | Bytes | M | 1 | Key Domain ID = MCC \|\| MNC as defined in 3GPP TS 33.246 [45]. (NOTE)<br><br>It shall be encoded as a string with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, representing the Key Domain ID (encoded in 3 bytes). |
| mskID | Bytes | M | 1 | MSK ID as defined in 3GPP TS 33.246 [45].<br><br>It shall be encoded as a string with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, representing the MSK ID (encoded in 4 bytes). |
| msk | Bytes | C | 0..1 | MSK as defined in 3GPP TS 33.246 [45].<br><br>The IE shall not be present when MBSTF requests updated MSK from MBSF after, e.g. lifetime expiry. Shall be present otherwise.<br><br>When present, it shall be encoded as a string with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, representing the MSK (encoded in 16 bytes). |
| mskLifetime | DateTime | O | 0..1 | MSK Lifetime as defined in 3GPP TS 33.501 [46]. |
| mtkID | Bytes | C | 0..1 | MTK ID as defined in 3GPP TS 33.246 [45]. Shall be present if available.<br><br>It shall be encoded as a string with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, representing the MTK ID (encoded in 2 bytes). |
| mtk | Bytes | C | 0..1 | MTK as defined in 3GPP TS 33.246 [45]. Shall be present if available.<br><br>It shall be encoded as a string with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, representing the MTK (encoded in 16 bytes). |
| NOTE: For a multicast MBS session in a SNPN, the Key Domain ID for the MBS session should be encoded using MCC and MNC, in this case, it may not be unique. | | | | |

### 5.9.4.14 Type: IngressTunAddrInfo

**Table 5.9.4.14-1: Definition of type IngressTunAddrInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| ingressTunAddr | array(TunnelAddress) | M | 1..N | Ingress Tunnel Address(es) to use to send MBS session data over N6mb/Nmb9 and that replace any earlier provided Ingress Tunnel Address(es). | |

### 5.9.4.15 Type: MbsServiceAreaInfo

**Table 5.9.4.15-1: Definition of type MbsServiceAreaInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| areaSessionId | AreaSessionId | M | 1 | Area Session Identifier used for MBS session with location dependent content. |
| mbsServiceArea | MbsServiceArea | M | 1 | MBS Service Area for MBS session with location dependent content. |

### 5.9.4.16 Type: MbsServiceInfo

**Table 5.9.4.16-1: Definition of type MbsServiceInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| mbsMediaComps | map(MbsMediaCompRm) | M | 1..N | Contains the information of one or several media component(s).<br>The key of the map is the "medCompN" attribute of the corresponding MbsMediaComRm data structure provided as a map entry. |
| mbsSdfResPrio | ReservPriority | O | 0..1 | Indicates the reservation priority of the MBS service data flow(s) identified by the "mbsMediaComps" attribute. |
| afAppId | AfAppId | O | 0..1 | Contains the AF application identifier. |
| mbsSessionAmbr | BitRate | O | 0..1 | Contains the required MBS Session-AMBR. |

### 5.9.4.17 Type: MbsMediaComp

**Table 5.9.4.17-1: Definition of type MbsMediaComp**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| mbsMedCompNum | integer | M | 1 | Contains the ordinal number of the MBS media component. | |
| mbsFlowDescs | array(FlowDescription) | O | 1..N | Contains the flow description for the MBS Downlink IP flow(s). | |
| mbsSdfResPrio | ReservPriority | O | 0..1 | Indicates the reservation priority for the MBS service data flow(s) identified by the "mbsFlowDescs" attribute.<br>(NOTE 2) | |
| mbsMediaInfo | MbsMediaInfo | O | 0..1 | Indicates the MBS media information.<br>(NOTE 1) | |
| qosRef | string | O | 0..1 | Contains the identifier to pre-defined MBS QoS.<br>(NOTE 1) | |
| mbsQoSReq | MbsQoSReq | O | 0..1 | Contains the MBS QoS requirements.<br>(NOTE 1) | |

NOTE 1: Only one of these attributes may be present.
NOTE 2: When present, the value of this attribute shall apply for the MBS service data flow(s) identified by this MBS Media Component. It shall take precedence over the value of the same attribute within the parent MbsServiceInfo data structure.

### 5.9.4.18 Type: MbsMediaCompRm

This data type is defined in the same way as the MediaComponent data type defined in clause 5.9.4.17, but with the OpenAPI "nullable: true" property.

### 5.9.4.19 Type: MbsQoSReq

**Table 5.9.4.19-1: Definition of type MbsQoSReq**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| 5qi | 5Qi | M | 1 | Represents the required 5QI. | |
| guarBitRate | BitRate | O | 0..1 | Contain the required 5GS guaranteed bit rate. | |
| maxBitRate | BitRate | O | 0..1 | Contain the required 5GS maximum bit rate. | |
| averWindow | AverWindow | C | 0..1 | Indicates the averaging window.<br><br>This attribute shall be present only for a GBR QoS flow or a Delay Critical GBR QoS flow. | |
| reqMbsArp | Arp | O | 1 | Indicates the requested allocation and retention priority. | |

### 5.9.4.20 Type: MbsMediaInfo

**Table 5.9.4.20-1: Definition of type MbsMediaInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| mbsMedType | MediaType | O | 0..1 | Indicates the MBS media type. | |
| maxReqMbsBwDl | BitRate | O | 0..1 | Contains the Maximum requested bandwidth. | |
| minReqMbsBwDl | BitRate | O | 0..1 | Contains the Minimum requested bandwidth. | |
| codecs | array(CodecData) | O | 1..2 | Indicates the codec data. | |

# Annex A (normative): OpenAPI specification

## A.1 General

This Annex specifies the formal definition of common data types. It consists of an OpenAPI 3.0.0 specification, 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 1: 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 [2] clause 5.3.1 and 3GPP TR 21.900 [27] clause 5B)

## A.2 Data related to Common Data Types

```
openapi: 3.0.0

info:
  version: '1.4.2'
  title: 'Common Data Types'
  description: |
    Common Data Types for Service Based Interfaces.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.571 Common Data Types for Service Based Interfaces, version 17.9.0
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.571/'

paths: {}
components:
  schemas:

#
# Common Data Types for  Generic usage definitiones as defined in clause 5.2
#

#
# COMMON SIMPLE DATA TYPES
#
    Binary:
      format: binary
      type: string
      description: string with format 'binary' as defined in OpenAPI.

    BinaryRm:
      format: binary
      type: string
      nullable: true
      description: "string with format 'binary' as defined in OpenAPI OpenAPI with 'nullable: true'
property."

    Bytes:
      format: byte
      type: string
      description: string with format 'bytes' as defined in OpenAPI

    BytesRm:
      format: byte
```

```
      type: string
      nullable: true
      description: >
        string with format 'bytes' as defined in OpenAPI OpenAPI with 'nullable: true' property.

    Date:
      format: date
      type: string
      description: string with format 'date' as defined in OpenAPI.

    DateRm:
      format: date
      type: string
      nullable: true
      description: >
        string with format 'date' as defined in OpenAPI OpenAPI with 'nullable: true' property.

    DateTime:
      format: date-time
      type: string
      description: string with format 'date-time' as defined in OpenAPI.

    DateTimeRm:
      format: date-time
      type: string
      nullable: true
      description: >
        string with format 'date-time' as defined in OpenAPI with 'nullable:true' property.

    DiameterIdentity:
      $ref: '#/components/schemas/Fqdn'

    DiameterIdentityRm:
      $ref: '#/components/schemas/FqdnRm'

    Double:
      format: double
      type: number
      description: string with format 'double' as defined in OpenAPI

    DoubleRm:
      format: double
      type: number
      nullable: true
      description: >
        string with format 'double' as defined in OpenAPI with 'nullable: true' property.

    DurationSec:
      type: integer
      description: indicating a time in seconds.

    DurationSecRm:
      type: integer
      nullable: true
      description: "indicating a time in seconds with OpenAPI defined 'nullable: true' property."

    Float:
      format: float
      type: number
      description: string with format 'float' as defined in OpenAPI.

    FloatRm:
      format: float
      type: number
      nullable: true
      description: >
        string with format 'float' as defined in OpenAPI with the OpenAPI defined
        'nullable: true' property.

    Int32:
      format: int32
      type: integer
      description: string with format 'int32' as defined in OpenAPI.

    Int32Rm:
      format: int32
      type: integer
      nullable: true
```

```
      description: >
        string with format 'int32' as defined in OpenAPI with the OpenAPI defined
        'nullable: true' property.

    Int64:
      type: integer
      format: int64
      description: string with format 'int64' as defined in OpenAPI.

    Int64Rm:
      format: int64
      type: integer
      nullable: true
      description: >
        string with format 'int64' as defined in OpenAPI with the OpenAPI defined
        'nullable: true' property.

    Ipv4Addr:
      type: string
      pattern: '^(([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])\.){3}([0-9]|[1-9][0-9]|1[0-
9][0-9]|2[0-4][0-9]|25[0-5])$'
      example: '198.51.100.1'
      description: >
        String identifying a IPv4 address formatted in the 'dotted decimal' notation
        as defined in RFC 1166.

    Ipv4AddrRm:
      type: string
      pattern: '^(([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])\.){3}([0-9]|[1-9][0-9]|1[0-
9][0-9]|2[0-4][0-9]|25[0-5])$'
      example: '198.51.100.1'
      nullable: true
      description: >
        String identifying a IPv4 address formatted in the 'dotted decimal' notation
        as defined in RFC 1166 with the OpenAPI defined 'nullable: true' property.

    Ipv4AddrMask:
      type: string
      pattern: '^(([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])\.){3}([0-9]|[1-9][0-9]|1[0-
9][0-9]|2[0-4][0-9]|25[0-5])(\/([0-9]|[1-2][0-9]|3[0-2]))$'
      example: '198.51.0.0/16'
      description: >
        "String identifying a IPv4 address mask formatted in the 'dotted decimal' notation
        as defined in RFC 1166."

    Ipv4AddrMaskRm:
      type: string
      pattern: '^(([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])\.){3}([0-9]|[1-9][0-9]|1[0-
9][0-9]|2[0-4][0-9]|25[0-5])(\/([0-9]|[1-2][0-9]|3[0-2]))$'
      example: '198.51.0.0/16'
      nullable: true
      description: >
        String identifying a IPv4 address mask formatted in the 'dotted decimal' notation
        as defined in RFC 1166 with the OpenAPI defined 'nullable: true' property.

    Ipv6Addr:
      type: string
      allOf:
        - pattern: '^((:|(0?|([1-9a-f][0-9a-f]{0,3}))):)((0?|([1-9a-f][0-9a-
f]{0,3})):){0,6}(:|(0?|([1-9a-f][0-9a-f]{0,3})))$'
        - pattern: '^((([^:]+:){7}([^:]+))|((([^:]+:)*[^:]+)?::(([^:]+:)*[^:]+)?))$'
      example: '2001:db8:85a3::8a2e:370:7334'
      description: >
        String identifying an IPv6 address formatted according to clause 4 of RFC5952.
        The mixed IPv4 IPv6 notation according to clause 5 of RFC5952 shall not be used.

    Ipv6AddrRm:
      type: string
      allOf:
        - pattern: '^((:|(0?|([1-9a-f][0-9a-f]{0,3}))):)((0?|([1-9a-f][0-9a-
f]{0,3})):){0,6}(:|(0?|([1-9a-f][0-9a-f]{0,3})))$'
        - pattern: '^((([^:]+:){7}([^:]+))|((([^:]+:)*[^:]+)?::(([^:]+:)*[^:]+)?))$'
      example: '2001:db8:85a3::8a2e:370:7334'
      nullable: true
      description: >
        String identifying an IPv6 address formatted according to clause 4 of RFC5952 with the
        OpenAPI 'nullable: true' property.
        The mixed IPv4 IPv6 notation according to clause 5 of RFC5952 shall not be used.
```

```
    Ipv6Prefix:
      type: string
      allOf:
        - pattern: '^((:|(0?|([1-9a-f][0-9a-f]{0,3}))):)((0?|([1-9a-f][0-9a-
f]{0,3})):){0,6}(:|(0?|([1-9a-f][0-9a-f]{0,3}))(\/(([0-9])|([0-9]{2})|(1[0-1][0-9])|(12[0-8])))$'
        - pattern: '^((([^:]+:){7}([^:]+))|((([^:]+:)*[^:]+)?::(([^:]+:)*[^:]+)?))(\/.+)$'
      example: '2001:db8:abcd:12::0/64'
      description: >
        String identifying an IPv6 address prefix formatted according to clause 4 of RFC 5952.
        IPv6Prefix data type may contain an individual /128 IPv6 address.

    Ipv6PrefixRm:
      type: string
      allOf:
        - pattern: '^((:|(0?|([1-9a-f][0-9a-f]{0,3}))):)((0?|([1-9a-f][0-9a-
f]{0,3})):){0,6}(:|(0?|([1-9a-f][0-9a-f]{0,3}))(\/(([0-9])|([0-9]{2})|(1[0-1][0-9])|(12[0-8])))$'
        - pattern: '^((([^:]+:){7}([^:]+))|((([^:]+:)*[^:]+)?::(([^:]+:)*[^:]+)?))(\/.+)$'
      nullable: true
      description: >
        String identifying an IPv6 address prefix formatted according to clause 4 of RFC 5952 with
        the OpenAPI 'nullable: true' property. IPv6Prefix data type may contain an individual
        /128 IPv6 address.

    MacAddr48:
      type: string
      pattern: '^([0-9a-fA-F]{2})((-[0-9a-fA-F]{2}){5})$'
      description: >
        String identifying a MAC address formatted in the hexadecimal notation
        according to clause 1.1 and clause 2.1 of RFC 7042.

    MacAddr48Rm:
      type: string
      pattern: '^([0-9a-fA-F]{2})((-[0-9a-fA-F]{2}){5})$'
      nullable: true
      description: >
        "String identifying a MAC address formatted in the hexadecimal notation according to
        clause 1.1 and clause 2.1 of RFC 7042 with the OpenAPI 'nullable: true' property."

    SupportedFeatures:
      type: string
      pattern: '^[A-Fa-f0-9]*$'
      description: >
        A string used to indicate the features supported by an API that is used as defined in clause
        6.6 in 3GPP TS 29.500. The string shall contain a bitmask indicating supported features in
        hexadecimal representation Each character in the string shall take a value of "0" to "9",
        "a" to "f" or "A" to "F" and shall represent the support of 4 features as described in
        table 5.2.2-3. The most significant character representing the highest-numbered features
        shall  appear first in the string, and the character representing features 1 to 4
        shall appear last  in the string. The list of features and their numbering (starting with 1)
        are defined  separately for each API. If the string contains a lower number of characters
        than there are  defined features for an API, all features that would be represented by
        characters that are not  present in the string are not supported.

    Uinteger:
      type: integer
      minimum: 0
      description: Unsigned Integer, i.e. only value 0 and integers above 0 are permissible.

    UintegerRm:
      type: integer
      minimum: 0
      description: >
        Unsigned Integer, i.e. only value 0 and integers above 0 are permissible with
        the OpenAPI 'nullable: true' property.
      nullable: true

    Uint16:
      type: integer
      minimum: 0
      maximum: 65535
      description: Integer where the allowed values correspond to the value range of an unsigned 16-
bit integer.

    Uint16Rm:
      type: integer
      minimum: 0
      maximum: 65535
```

```
    nullable: true
    description: >
      Integer where the allowed values correspond to the value range of an unsigned
      16-bit integer with the OpenAPI 'nullable: true' property.

  Uint32:
    type: integer
    minimum: 0
    maximum: 4294967295 #(2^32)-1
    description: >
      Integer where the allowed values correspond to the value range of an unsigned
      32-bit integer.

  Uint32Rm:
    format: int32
    type: integer
    minimum: 0
    maximum: 4294967295 #(2^32)-1
    nullable: true
    description: >
      Integer where the allowed values correspond to the value range of an unsigned
      32-bit integer with the OpenAPI 'nullable: true' property.

  Uint64:
    type: integer
    minimum: 0
    maximum: 18446744073709551615 #(2^64)-1
    description: >
      Integer where the allowed values correspond to the value range of an
      unsigned 64-bit integer.

  Uint64Rm:
    type: integer
    minimum: 0
    maximum: 18446744073709551615 #(2^64)-1
    nullable: true
    description: >
      Integer where the allowed values correspond to the value range of an unsigned
      16-bit integer with the OpenAPI 'nullable: true' property.

  Uri:
    type: string
    description: String providing an URI formatted according to RFC 3986.

  UriRm:
    type: string
    nullable: true
    description: >
      String providing an URI formatted according to RFC 3986 with the OpenAPI
      'nullable: true' property.

  VarUeId:
    type: string
    pattern: '^(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|gci-.+|gli-.+|.+)$'
    description: String represents the SUPI or GPSI

  VarUeIdRm:
    type: string
    pattern: '^(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|gci-.+|gli-.+|.+)$'
    nullable: true
    description: "String represents the SUPI or GPSI with the OpenAPI 'nullable: true' property."

  TimeZone:
    type: string
    example: '-08:00+1'
    description: |
      String with format "time-numoffset" optionally appended by "daylightSavingTime", where
      - "time-numoffset" shall represent the time zone adjusted for daylight saving time and be
         encoded as time-numoffset as defined in clause 5.6 of IETF RFC 3339;
      - "daylightSavingTime" shall represent the adjustment that has been made and shall be
         encoded as "+1" or "+2" for a +1 or +2 hours adjustment.

      The example is for 8 hours behind UTC, +1 hour adjustment for Daylight Saving Time.

  TimeZoneRm:
    type: string
    nullable: true
    description: |
```

```
        "String with format 'time-numoffset' optionally appended by '<daylightSavingTime>', where
          - 'time-numoffset' shall represent the time zone adjusted for daylight saving time and be
            encoded as time-numoffset as defined in clause 5.6 of IETF RFC 3339;
          - 'daylightSavingTime' shall represent the adjustment that has been made and shall be
            encoded as '+1' or '+2' for a +1 or +2 hours adjustment.

          But with the OpenAPI 'nullable: true' property."

    StnSr:
      type: string
      description: String representing the STN-SR as defined in clause 18.6 of 3GPP TS 23.003.

    StnSrRm:
      type: string
      nullable: true
      description: >
        String representing the STN-SR as defined in clause 18.6 of 3GPP TS 23.003
        with the OpenAPI 'nullable: true' property.

    CMsisdn:
      type: string
      pattern: '^[0-9]{5,15}$'
      description: String representing the C-MSISDN as defined in clause 18.7 of 3GPP TS 23.003.

    CMsisdnRm:
      type: string
      pattern: '^[0-9]{5,15}$'
      nullable: true
      description: >
        String representing the C-MSISDN as defined in clause 18.7 of 3GPP TS 23.003 with
        the OpenAPI 'nullable: true' property.

    DayOfWeek:
      type: integer
      minimum: 1
      maximum: 7
      description: >
        integer between and including 1 and 7 denoting a weekday. 1 shall indicate Monday,
        and the subsequent weekdays  shall be indicated with the next higher numbers.
        7 shall indicate Sunday.

    TimeOfDay:
      type: string
      description: >
        String with format partial-time or full-time as defined in clause 5.6 of IETF RFC 3339.
        Examples, 20:15:00, 20:15:00-08:00 (for 8 hours behind UTC).

    EmptyObject:
      description: Empty JSON object { }, it is defined with the keyword additionalProperties false
      type: object
      additionalProperties: false

    Fqdn:
      description: Fully Qualified Domain Name
      type: string
      pattern: '^([0-9A-Za-z]([-0-9A-Za-z]{0,61}[0-9A-Za-z])?\.)+[A-Za-z]{2,63}\.?$'
      minLength: 4
      maxLength: 253

    FqdnRm:
      description: Fully Qualified Domain Name, but it also allows the null value
      anyOf:
        - $ref: '#/components/schemas/Fqdn'
        - $ref: '#/components/schemas/NullValue'

#
#   COMMON ENUMERATED DATA TYPES
#

    PatchOperation:
      anyOf:
        - type: string
          enum:
            - add
            - copy
            - move
            - remove
            - replace
```

```
            - test
        - type: string
      description: Operations as defined in IETF RFC 6902.

    UriScheme:
      anyOf:
        - type: string
          enum:
            - http
            - https
        - type: string
      description: HTTP and HTTPS URI scheme.

    ChangeType:
      anyOf:
        - type: string
          enum:
            - ADD
            - MOVE
            - REMOVE
            - REPLACE
        - type: string
      description: Indicates the type of change to be performed.

    HttpMethod:
      anyOf:
        - type: string
          enum:
            - GET
            - POST
            - PUT
            - DELETE
            - PATCH
            - OPTIONS
            - HEAD
            - CONNECT
            - TRACE
        - type: string
      description: HTTP methodes.

    NullValue:
      enum:
        - null
      description: JSON's null value.


    MatchingOperator:
      anyOf:
        - type: string
          enum:
            - FULL_MATCH
            - MATCH_ALL
            - STARTS_WITH
            - NOT_START_WITH
            - ENDS_WITH
            - NOT_END_WITH
            - CONTAINS
            - NOT_CONTAIN
        - type: string
      description: the matching operation.

#
#  COMMON STRUCTURED DATA TYPES
#

    ProblemDetails:
      description: Provides additional information in an error response.
      type: object
      properties:
        type:
          $ref: '#/components/schemas/Uri'
        title:
          type: string
        status:
          type: integer
        detail:
          type: string
          description: A human-readable explanation specific to this occurrence of the problem.
```

```
      instance:
        $ref: '#/components/schemas/Uri'

      cause:
        type: string
        description: >
          A machine-readable application error cause specific to this occurrence of the problem.
          This IE should be present and provide application-related error information, if
          available.

      invalidParams:
        type: array
        items:
          $ref: '#/components/schemas/InvalidParam'
        minItems: 1
      supportedFeatures:
        $ref: '#/components/schemas/SupportedFeatures'
      accessTokenError:
        $ref: 'TS29510_Nnrf_AccessToken.yaml#/components/schemas/AccessTokenErr'
      accessTokenRequest:
        $ref: 'TS29510_Nnrf_AccessToken.yaml#/components/schemas/AccessTokenReq'
      nrfId:
        $ref: '#/components/schemas/Fqdn'

  Link:
    type: object
    properties:
      href:
        $ref: '#/components/schemas/Uri'
    description: It contains the URI of the linked resource.

  LinkRm:
    type: object
    properties:
      href:
        $ref: '#/components/schemas/Uri'
    nullable: true
    description: >
      It contains the URI of the linked resource with the OpenAPI 'nullable: true' property.

  PatchItem:
    type: object
    properties:
      op:
        $ref: '#/components/schemas/PatchOperation'
      path:
        type: string
        description: >
          contains a JSON pointer value (as defined in IETF RFC 6901) that references
          a location of a resource on which the patch operation shall be performed.
      from:
        type: string
        description: >
          indicates the path of the source JSON element (according to JSON Pointer syntax)
          being moved or copied to the location indicated by the "path" attribute.
      value: {}
    required:
      - op
      - path
    description: it contains information on data to be changed.

  LinksValueSchema:
    oneOf:
      - type: array
        items:
          $ref: '#/components/schemas/Link'
        minItems: 1
      - $ref: '#/components/schemas/Link'
    description: A list of mutually exclusive alternatives of 1 or more links.

  SelfLink:
    type: object
    properties:
      self:
        $ref: '#/components/schemas/Link'
    required:
      - self
    description: It contains the URI of the linked resource.
```

```
    InvalidParam:
      type: object
      properties:
        param:
          type: string
          description: >
            If the invalid parameter is an attribute in a JSON body, this IE shall contain the
            attribute's name and shall be encoded as a JSON Pointer. If the invalid parameter is
            an HTTP header, this IE shall be formatted as the concatenation of the string "header "
            plus the name of such header. If the invalid parameter is a query parameter, this IE
            shall be formatted as the concatenation of the string "query " plus the name of such
            query parameter. If the invalid parameter is a variable part in the path of a resource
            URI, this IE shall contain the name of the variable, including the symbols "{" and "}"
            used in OpenAPI specification as the notation to represent variable path segments.
        reason:
          type: string
          description: >
            A human-readable reason, e.g. "must be a positive integer". In cases involving failed
            operations in a PATCH request, the reason string should identify the operation that
            failed using the operation's array index to assist in correlation of the invalid
            parameter with the failed operation, e.g." Replacement value invalid for attribute
            (failed operation index= 4)"
      required:
        - param
      description: It contains an invalid parameter and a related description.

    ChangeItem:
      type: object
      properties:
        op:
          $ref: '#/components/schemas/ChangeType'
        path:
          type: string
          description: >
            contains a JSON pointer value (as defined in IETF RFC 6901) that references a target
            location within the resource on which the change has been applied.
        from:
          type: string
          description: >
            indicates the path of the source JSON element (according to JSON Pointer syntax)
            being moved or copied to the location indicated by the "path" attribute. It shall
            be present if the "op" attribute is of value "MOVE".
        origValue: {}
        newValue: {}
      required:
        - op
        - path
      description: It contains data which need to be changed.

    NotifyItem:
      type: object
      required:
        - resourceId
        - changes
      properties:
        resourceId:
          $ref: '#/components/schemas/Uri'
        changes:
          type: array
          items:
            $ref: '#/components/schemas/ChangeItem'
          minItems: 1
      description: Indicates changes on a resource.

    ComplexQuery:
      oneOf:
        - $ref: '#/components/schemas/Cnf'
        - $ref: '#/components/schemas/Dnf'
      description: >
        The ComplexQuery data type is either a conjunctive normal form or a disjunctive normal form.
        The attribute names "cnfUnits" and "dnfUnits" (see clause 5.2.4.11 and clause 5.2.4.12)
        serve as discriminator.

    Cnf:
      type: object
      required:
        - cnfUnits
```

```
    properties:
      cnfUnits:
        type: array
        items:
          $ref: '#/components/schemas/CnfUnit'
        minItems: 1
    description: A conjunctive normal form

  Dnf:
    type: object
    required:
      - dnfUnits
    properties:
      dnfUnits:
        type: array
        items:
          $ref: '#/components/schemas/DnfUnit'
        minItems: 1
    description: A disjunctive normal form.

  CnfUnit:
    type: object
    required:
      - cnfUnit
    properties:
      cnfUnit:
        type: array
        items:
          $ref: '#/components/schemas/Atom'
        minItems: 1
    description: >
      During the processing of cnfUnits attribute, all the members in the array shall be
      interpreted as logically concatenated with logical "AND".

  DnfUnit:
    type: object
    required:
      - dnfUnit
    properties:
      dnfUnit:
        type: array
        items:
          $ref: '#/components/schemas/Atom'
        minItems: 1
    description: >
      During the processing of dnfUnits attribute, all the members in the array shall be
      interpreted as logically concatenated with logical "OR".

  Atom:
    description: contains a search parameter and its positive or negative content.
    type: object
    required:
      - attr
      - value
    properties:
      attr:
        type: string
        description: contains the name of a defined query parameter.
      value: {}
      negative:
        type: boolean
        description: indicates whether the negative condition applies for the query condition.

  PatchResult:
    description: The execution report result on failed modification.
    type: object
    required:
      - report
    properties:
     report:
      type: array
      items:
        $ref: '#/components/schemas/ReportItem'
      minItems: 1
      description: >
        The execution report contains an array of report items. Each report item indicates one
        failed modification.
```

```
    ReportItem:
      type: object
      required:
        - path
      properties:
        path:
          type: string
          description: >
            Contains a JSON pointer value (as defined in IETF RFC 6901) that references a
            location of a resource to which the modification is subject.
        reason:
          type: string
          description: >
            A human-readable reason providing details on the reported modification failure.
            The reason string should identify the operation that failed using the operation's
            array index to assist in correlation of the invalid parameter with the failed
            operation, e.g. "Replacement value invalid for attribute (failed operation index= 4)".
      description: indicates performed modivications.

    HalTemplate:
      description: >
        Hypertext Application Language (HAL) template contains the extended 3GPP hypermedia format.
      type: object
      required:
        - method
      properties:
        title:
          type: string
          description: A human-readable string that can be used to identify this template
        method:
          $ref: '#/components/schemas/HttpMethod'
        contentType:
          type: string
          description: >
            The media type that should be used for the corresponding request. If the attribute
            is missing, or contains an unrecognized value, the client should act as if the
            contentType is set to "application/json".
        properties:
          type: array
          items:
            $ref: '#/components/schemas/Property'
          minItems: 1
          description: >
            The properties that should be included in the body of the corresponding request.
            If the contentType attribute is set to "application/json", then this attribute
            describes the attributes of the JSON object of the body.

    Property:
      description: >
       If the contentType attribute is set to "application/json", then this attribute describes
       the attributes of the JSON object of the body.
      type: object
      required:
        - name
      properties:
        name:
          type: string
          description: The name of the property
        required:
          type: boolean
          description: >
            Indicates whether the property is required – true= required –
            false(default)= not required.
        regex:
          type: string
          description: A regular expression string to be applied to the value of the property.
        value:
          type: string
          description: The property value. When present, it shall be a valid JSON string.

    RedirectResponse:
      description: >
        The response shall include a Location header field containing a different URI
        (pointing to a different URI of an other service instance), or the same URI if a request
        is redirected to the same target resource via a different SCP.
      type: object
      properties:
        cause:
```

```
          type: string
        targetScp:
          $ref: '#/components/schemas/Uri'
        targetSepp:
          $ref: '#/components/schemas/Uri'

    TunnelAddress:
      description: Tunnel address
      type: object
      properties:
        ipv4Addr:
          $ref: '#/components/schemas/Ipv4Addr'
        ipv6Addr:
          $ref: '#/components/schemas/Ipv6Addr'
        portNumber:
          $ref: '#/components/schemas/Uinteger'
      required:
        - portNumber
      anyOf:
        - required: [ ipv4Addr ]
        - required: [ ipv6Addr ]


    FqdnPatternMatchingRule:
      description: a matching rule for a FQDN pattern
      type: object
      oneOf:
        - required: [ regex ]
        - required: [ stringMatchingRule ]
      properties:
        regex:
          type: string
        stringMatchingRule:
          $ref: '#/components/schemas/StringMatchingRule'


    StringMatchingRule:
      description: A list of conditions for string matching
      type: object
      properties:
        stringMatchingConditions:
          type: array
          items:
            $ref: '#/components/schemas/StringMatchingCondition'
          minItems: 1

    StringMatchingCondition:
      description: A String with Matching Operator
      type: object
      properties:
        matchingString:
          type: string
        matchingOperator:
          $ref: '#/components/schemas/MatchingOperator'
      required:
        - matchingOperator



#
# Data Types related to Subscription, Identification and Numbering as defined in clause 5.3
#

#
# SIMPLE DATA TYPES
#
    Dnn:
      type: string
      description: >
            String representing a Data Network as defined in clause 9A of 3GPP TS 23.003;
            it shall contain either a DNN Network Identifier, or a full DNN with both the Network
            Identifier and Operator Identifier, as specified in 3GPP TS 23.003 clause 9.1.1 and
9.1.2.
            It shall be coded as string in which the labels are separated by dots
            (e.g. "Label1.Label2.Label3").
    DnnRm:
      type: string
      nullable: true
```

```
      description: >
        String representing a Data Network as defined in clause 9A of 3GPP TS 23.003;
        it shall contain either a DNN Network Identifier, or a full DNN with both the
        Network Identifier and Operator Identifier, as specified in 3GPP TS 23.003 clause 9.1.1
        and 9.1.2. It shall be coded as string in which the labels are separated by dots
        (e.g. 'Label1.Label2.Label3') with the OpenAPI 'nullable: true' property.

    WildcardDnn:
      type: string
      pattern: '^[*]$'
      description: String representing the Wildcard DNN. It shall contain the string "*".

    WildcardDnnRm:
      type: string
      pattern: '^[*]$'
      nullable: true
      description: >
        String representing the Wildcard DNN. It shall contain the string '*' but with the
        OpenAPI 'nullable: true' property.

    Gpsi:
      type: string
      pattern: '^(msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|.+)$'
      description: >
        String identifying a Gpsi shall contain either an External Id or an MSISDN.
        It shall be formatted as follows -External Identifier= "extid-'extid', where 'extid'
        shall be formatted according to clause 19.7.2 of 3GPP TS 23.003 that describes an
        External Identifier.

    GpsiRm:
      type: string
      pattern: '^(msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|.+)$'
      nullable: true
      description: >
        String identifying a Gpsi shall contain either an External Id or an MSISDN. It shall be
        formatted as follows -External Identifier= 'extid-'extid', where 'extid' shall be formatted
        according to clause 19.7.2 of 3GPP TS 23.003 that describes an External Identifier with the
        OpenAPI 'nullable: true' property.

    GroupId:
      type: string
      pattern: '^[A-Fa-f0-9]{8}-[0-9]{3}-[0-9]{2,3}-([A-Fa-f0-9][A-Fa-f0-9]){1,10}$'
      description: >
        String identifying a group of devices network internal globally unique ID which identifies
        a set of IMSIs, as specified in clause 19.9 of 3GPP TS 23.003.

    GroupIdRm:
      type: string
      pattern: '^[A-Fa-f0-9]{8}-[0-9]{3}-[0-9]{2,3}-([A-Fa-f0-9][A-Fa-f0-9]){1,10}$'
      nullable: true
      description: >
        String identifying a group of devices network internal globally unique ID which
        identifies a set of IMSIs, as specified in clause 19.9 of 3GPP TS 23.003 with the
        OpenAPI 'nullable: true' property.

    ExternalGroupId:
      type: string
      pattern: '^extgroupid-[^@]+@[^@]+$'
      description: >
        String identifying External Group Identifier that identifies a group made up of one or
        more  subscriptions associated to a group of IMSIs, as specified in clause 19.7.3 of 3GPP
        TS 23.003.

    ExternalGroupIdRm:
      type: string
      pattern: '^extgroupid-[^@]+@[^@]+$'
      nullable: true
      description: >
        String identifying External Group Identifier that identifies a group made up of one or
        more  subscriptions associated to a group of IMSIs, as specified in clause 19.7.3 of
        3GPP TS 23.003  with the OpenAPI 'nullable: true' property.

    Pei:
      type: string
      pattern: '^(imei-[0-9]{15}|imeisv-[0-9]{16}|mac((-[0-9a-fA-F]{2}){6})(-untrusted)?|eui((-[0-
9a-fA-F]{2}){8})|.+)$'
      description: >
        String representing a Permanent Equipment Identifier that may contain - an IMEI or IMEISV,
```

```
        as  specified in clause 6.2 of 3GPP TS 23.003; a MAC address for a 5G-RG or FN-RG via
        wireline  access, with an indication that this address cannot be trusted for regulatory
        purpose if this  address cannot be used as an Equipment Identifier of the FN-RG, as
        specified in clause 4.7.7  of 3GPP TS23.316. Examples are imei-012345678901234 or
        imeisv-0123456789012345.

    PeiRm:
      type: string
      pattern: '^(imei-[0-9]{15}|imeisv-[0-9]{16}|mac((-[0-9a-fA-F]{2}){6})(-untrusted)?|eui((-[0-
9a-fA-F]{2}){8})|.+)$'
      nullable: true
      description: >
        This data type is defined in the same way as the 'Pei' data type but with the OpenAPI
'nullable: true' property.

    Supi:
      type: string
      pattern: '^(imsi-[0-9]{5,15}|nai-.+|gci-.+|gli-.+|.+)$'
      description: |
        String identifying a Supi that shall contain either an IMSI, a network specific identifier,
        a Global Cable Identifier (GCI) or a Global Line Identifier (GLI) as specified in clause
        2.2A of 3GPP TS 23.003. It shall be formatted as follows
         - for an IMSI "imsi-<imsi>", where <imsi> shall be formatted according to clause 2.2
           of 3GPP TS 23.003 that describes an IMSI.
         - for a network specific identifier "nai-<nai>, where <nai> shall be formatted
           according to clause 28.7.2 of 3GPP TS 23.003 that describes an NAI.
         - for a GCI "gci-<gci>", where <gci> shall be formatted according to clause 28.15.2
           of 3GPP TS 23.003.
         - for a GLI "gli-<gli>", where <gli> shall be formatted according to clause 28.16.2 of
           3GPP TS 23.003.To enable that the value is used as part of an URI, the string shall
           only contain characters allowed according to the "lower-with-hyphen" naming convention
           defined in 3GPP TS 29.501.

    SupiRm:
      type: string
      pattern: '^(imsi-[0-9]{5,15}|nai-.+|gci-.+|gli-.+|.+)$'
      nullable: true
      description: >
        This data type is defined in the same way as the 'Supi' data type, but with the
        OpenAPI 'nullable: true' property.

    NfInstanceId:
      type: string
      format: uuid
      description: >
        String uniquely identifying a NF instance. The format of the NF Instance ID shall be a
        Universally Unique Identifier (UUID) version 4, as described in IETF RFC 4122.

    AmfId:
      type: string
      pattern: '^[A-Fa-f0-9]{6}$'
      description: >
        String identifying the AMF ID composed of AMF Region ID (8 bits), AMF Set ID (10 bits)
        and AMF  Pointer (6 bits) as specified in clause 2.10.1 of 3GPP TS 23.003. It is encoded
        as a string of  6 hexadecimal characters (i.e., 24 bits).

    AmfRegionId:
      type: string
      pattern: '^[A-Fa-f0-9]{2}$'
      description: >
        String identifying the AMF Set ID (10 bits) as specified in clause 2.10.1 of 3GPP TS 23.003.
        It is encoded as a string of 3 hexadecimal characters where the first character is limited
        to  values 0 to 3 (i.e. 10 bits)

    AmfSetId:
      type: string
      pattern: '^[0-3][A-Fa-f0-9]{2}$'
      description: >
        String identifying the AMF Set ID (10 bits) as specified in clause 2.10.1 of 3GPP TS 23.003.
        It is encoded as a string of 3 hexadecimal characters where the first character is limited
        to  values 0 to 3 (i.e. 10 bits).

    RfspIndex:
      type: integer
      minimum: 1
      maximum: 256
      description: >
        Unsigned integer representing the "Subscriber Profile ID for RAT/Frequency Priority"
```

```
        as specified in 3GPP TS 36.413.

    RfspIndexRm:
      type: integer
      minimum: 1
      maximum: 256
      nullable: true
      description: >
        Unsigned integer representing the 'Subscriber Profile ID for RAT/Frequency Priority'
        as specified in 3GPP TS 36.413 with the OpenAPI 'nullable: true' property.

    NfGroupId:
      type: string
      description: Identifier of a group of NFs.

    MtcProviderInformation:
      type: string
      description: String uniquely identifying MTC provider information.

    CagId:
      type: string
      pattern: '^[A-Fa-f0-9]{8}$'
      description: String containing a Closed Access Group Identifier.

    SupiOrSuci:
      type: string
      pattern: '^(imsi-[0-9]{5,15}|nai-.+|gli-.+|gci-.+|suci-(0-[0-9]{3}-[0-9]{2,3}|[1-7]-.+)-[0-
9]{1,4}-(0-0-.*|[a-fA-F1-9]-([1-9]|[1-9][0-9]|1[0-9]{2}|2[0-4][0-9]|25[0-5])-[a-fA-F0-9]+)|.+)$'
      description: String identifying a SUPI or a SUCI.

#
# STRUCTURED DATA TYPES
#
    Guami:
      type: object
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnIdNid'
        amfId:
          $ref: '#/components/schemas/AmfId'
      required:
        - plmnId
        - amfId
      description: Globally Unique AMF Identifier constructed out of PLMN, Network and AMF identity.

    GuamiRm:
      anyOf:
        - $ref: '#/components/schemas/Guami'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'Guami' data type, but with the OpenAPI
        'nullable: true' property.

    NetworkId:
      type: object
      properties:
        mnc:
          $ref: '#/components/schemas/Mnc'
        mcc:
          $ref: '#/components/schemas/Mcc'
      description: contains PLMN and Network identity.


#
# Data Types related to 5G Network as defined in clause 5.4
#

#
# SIMPLE DATA TYPES
#
    ApplicationId:
      type: string
      description: String providing an application identifier.
    ApplicationIdRm:
      type: string
      nullable: true
      description: >
        String providing an application identifier with the OpenAPI 'nullable: true' property.
```

```
    PduSessionId:
      type: integer
      minimum: 0
      maximum: 255
      description: >
        Unsigned integer identifying a PDU session, within the range 0 to 255, as specified in
        clause 11.2.3.1b, bits 1 to 8, of 3GPP TS 24.007. If the PDU Session ID is allocated by the
        Core Network for UEs not supporting N1 mode, reserved range 64 to 95 is used. PDU Session ID
        within the reserved range is only visible in the Core Network.

    Mcc:
      type: string
      pattern: '^\d{3}$'
      description: >
        Mobile Country Code part of the PLMN, comprising 3 digits, as defined in clause 9.3.3.5
        of 3GPP TS 38.413.

    MccRm:
      type: string
      pattern: '^\d{3}$'
      nullable: true
      description: >
        Mobile Country Code part of the PLMN, comprising 3 digits, as defined in clause 9.3.3.5 of
        3GPP TS 38.413 with the OpenAPI 'nullable: true' property.

    Mnc:
      type: string
      pattern: '^\d{2,3}$'
      description: Mobile Network Code part of the PLMN, comprising 2 or 3 digits, as defined in
clause 9.3.3.5 of 3GPP TS 38.413.

    MncRm:
      type: string
      pattern: '^\d{2,3}$'
      nullable: true
      description: >
        Mobile Network Code part of the PLMN, comprising 2 or 3 digits, as defined in clause
        9.3.3.5 of 3GPP TS 38.413 with the OpenAPI 'nullable: true' property.

    Tac:
      type: string
      pattern: '(^[A-Fa-f0-9]{4}$)|(^[A-Fa-f0-9]{6}$)'
      description: >
        2 or 3-octet string identifying a tracking area code as specified in clause 9.3.3.10
        of 3GPP TS 38.413, in hexadecimal representation. Each character in the string shall
        take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The
        most significant character representing the 4 most significant bits of the TAC shall
        appear first in the string, and the character representing the 4 least significant bit
        of the TAC shall appear last in the string.

    TacRm:
      type: string
      pattern: '(^[A-Fa-f0-9]{4}$)|(^[A-Fa-f0-9]{6}$)'
      nullable: true
      description: >
        This data type is defined in the same way as the 'Tac' data type, but with the
        OpenAPI 'nullable: true' property.

    EutraCellId:
      type: string
      pattern: '^[A-Fa-f0-9]{7}$'
      description: >
        28-bit string identifying an E-UTRA Cell Id as specified in clause 9.3.1.9 of
        3GPP TS 38.413, in hexadecimal representation. Each character in the string shall take a
        value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most
        significant character representing the 4 most significant bits of the Cell Id shall appear
        first in the string, and the character representing the 4 least significant bit of the
        Cell Id shall appear last in the string.

    EutraCellIdRm:
      type: string
      pattern: '^[A-Fa-f0-9]{7}$'
      nullable: true
      description: >
        This data type is defined in the same way as the 'EutraCellId' data type, but with
        the OpenAPI 'nullable: true' property.
```

```
    NrCellId:
      type: string
      pattern: '^[A-Fa-f0-9]{9}$'
      description: >
        36-bit string identifying an NR Cell Id as specified in clause 9.3.1.7 of 3GPP TS 38.413,
        in hexadecimal representation. Each character in the string shall take a value of "0" to
        "9",  "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character
        representing the 4 most significant bits of the Cell Id shall appear first in the string,
        and  the character representing the 4 least significant bit of the Cell Id shall appear last
        in the  string.

    NrCellIdRm:
      type: string
      pattern: '^[A-Fa-f0-9]{9}$'
      nullable: true
      description: >
        This data type is defined in the same way as the 'NrCellId' data type, but with the
        OpenAPI 'nullable: true' property.
    Dnai:
      type: string
      description: DNAI (Data network access identifier), see clause 5.6.7 of 3GPP TS 23.501.

    DnaiRm:
      type: string
      nullable: true
      description: >
        This data type is defined in the same way as the 'Dnai' data type, but with the
        OpenAPI 'nullable: true' property.

    5GMmCause:
      $ref: '#/components/schemas/Uinteger'

    AmfName:
      $ref: '#/components/schemas/Fqdn'

    AreaCode:
      type: string
      description: Values are operator specific.

    AreaCodeRm:
      type: string
      nullable: true
      description: >
        This data type is defined in the same way as the 'AreaCode' data type, but with the
        OpenAPI 'nullable: true' property.

    N3IwfId:
      type: string
      pattern: '^[A-Fa-f0-9]+$'
      description: >
        This represents the identifier of the N3IWF ID as specified in clause 9.3.1.57 of
        3GPP TS 38.413 in hexadecimal representation. Each character in the string shall take a
value
        of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant
        character representing the 4 most significant bits of the N3IWF ID shall appear first in the
        string, and the character representing the 4 least significant bit of the N3IWF ID shall
        appear last in the string.

    WAgfId:
      type: string
      pattern: '^[A-Fa-f0-9]+$'
      description: >
        This represents the identifier of the W-AGF ID as specified in clause 9.3.1.162 of
        3GPP TS 38.413 in hexadecimal representation. Each character in the string shall take a
        value  of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most
        significant  character representing the 4 most significant bits of the W-AGF ID shall
        appear first in the  string, and the character representing the 4 least significant bit
        of the W-AGF ID shall  appear last in the string.

    TngfId:
      type: string
      pattern: '^[A-Fa-f0-9]+$'
      description: >
        This represents the identifier of the TNGF ID as specified in clause 9.3.1.161 of
        3GPP TS 38.413  in hexadecimal representation. Each character in the string shall take a
value
        of "0" to "9", "a"  to "f" or "A" to "F" and shall represent 4 bits. The most significant
        character representing the  4 most significant bits of the TNGF ID shall appear first in
```

```
    the string, and the character  representing the 4 least significant bit of the TNGF ID
    shall appear last in the string.

NgeNbId:
  type: string
  pattern: '^(MacroNGeNB-[A-Fa-f0-9]{5}|LMacroNGeNB-[A-Fa-f0-9]{6}|SMacroNGeNB-[A-Fa-f0-9]{5})$'
  description: >
    This represents the identifier of the ng-eNB ID as specified in clause 9.3.1.8 of
    3GPP TS 38.413. The value of the ng-eNB ID shall be encoded in hexadecimal representation.
    Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and
    shall represent 4 bits. The padding 0 shall be added to make multiple nibbles, so the most
    significant character representing the padding 0 if required together with the 4 most
    significant bits of the ng-eNB ID shall appear first in the string, and the character
    representing the 4 least significant bit of the ng-eNB ID (to form a nibble) shall appear
    last  in the string.

  example: SMacroNGeNB-34B89
Nid:
  type: string
  pattern: '^[A-Fa-f0-9]{11}$'
  description: >
    This represents the Network Identifier, which together with a PLMN ID is used to identify
    an SNPN (see 3GPP TS 23.003 and 3GPP TS 23.501 clause 5.30.2.1).

NidRm:
  type: string
  pattern: '^[A-Fa-f0-9]{11}$'
  nullable: true
  description: >
    This data type is defined in the same way as the 'Nid' data type, but with the OpenAPI
    'nullable: true' property."

NfSetId:
  type: string
  description: >
    NF Set Identifier (see clause 28.12 of 3GPP TS 23.003), formatted as the following string
    "set<Set ID>.<nftype>set.5gc.mnc<MNC>.mcc<MCC>", or
    "set<SetID>.<NFType>set.5gc.nid<NID>.mnc<MNC>.mcc<MCC>" with
    <MCC> encoded as defined in clause 5.4.2 ("Mcc" data type definition)
    <MNC> encoding the Mobile Network Code part of the PLMN, comprising 3 digits.
      If there are only 2 significant digits in the MNC, one "0" digit shall be inserted
      at the left side to fill the 3 digits coding of MNC.  Pattern: '^[0-9]{3}$'
    <NFType> encoded as a value defined in Table 6.1.6.3.3-1 of 3GPP TS 29.510 but
      with lower case characters <Set ID> encoded as a string of characters consisting of
      alphabetic characters (A-Z and a-z), digits (0-9) and/or the hyphen (-) and that
      shall end with either an alphabetic character or a digit.

NfServiceSetId:
  type: string
  description: >
    NF Service Set Identifier (see clause 28.12 of 3GPP TS 23.003) formatted as the following
    string "set<Set ID>.sn<Service Name>.nfi<NF Instance ID>.5gc.mnc<MNC>.mcc<MCC>", or
    "set<SetID>.sn<ServiceName>.nfi<NFInstanceID>.5gc.nid<NID>.mnc<MNC>.mcc<MCC>" with
    <MCC> encoded as defined in clause 5.4.2 ("Mcc" data type definition)
    <MNC> encoding the Mobile Network Code part of the PLMN, comprising 3 digits.
      If there are only 2 significant digits in the MNC, one "0" digit shall be inserted
      at the left side to fill the 3 digits coding of MNC.  Pattern: '^[0-9]{3}$'
    <NID> encoded as defined in clause 5.4.2 ("Nid" data type definition)
    <NFInstanceId> encoded as defined in clause 5.3.2
    <ServiceName> encoded as defined in 3GPP TS 29.510
    <Set ID> encoded as a string of characters consisting of alphabetic
      characters (A-Z and a-z), digits (0-9) and/or the hyphen (-) and that shall end
      with either an alphabetic character or a digit.

PlmnAssiUeRadioCapId:
  $ref: '#/components/schemas/Bytes'

ManAssiUeRadioCapId:
  $ref: '#/components/schemas/Bytes'

TypeAllocationCode:
  type: string
  pattern: '^[0-9]{8}$'
  description: >
    Type Allocation Code (TAC) of the UE, comprising the initial eight-digit portion of the
    15-digit IMEI and 16-digit IMEISV codes. See clause 6.2 of 3GPP TS 23.003.

HfcNId:
```

```
      type: string
      maxLength: 6
      description: >
        This IE represents the identifier of the HFC node Id as specified in CableLabs
        WR-TR-5WWC-ARCH. It is provisioned by the wireline operator as part of wireline
        operations and may contain up to six characters.

    HfcNIdRm:
      type: string
      maxLength: 6
      nullable: true
      description: >
        This data type is defined in the same way as the 'HfcNId' data type, but with the
        OpenAPI 'nullable: true' property.

    ENbId:
      type: string
      pattern: '^(MacroeNB-[A-Fa-f0-9]{5}|LMacroeNB-[A-Fa-f0-9]{6}|SMacroeNB-[A-Fa-f0-9]{5}|HomeeNB-
[A-Fa-f0-9]{7})$'
      description: >
        This represents the identifier of the eNB ID as specified in clause 9.2.1.37 of
        3GPP TS 36.413. The string shall be formatted with the following pattern
        '^('MacroeNB-[A-Fa-f0-9]{5}|LMacroeNB-[A-Fa-f0-9]{6}|SMacroeNB-[A-Fa-f0-9]{5}
        |HomeeNB-[A-Fa-f0-9]{7})$'. The value of the eNB ID shall be encoded in hexadecimal
        representation. Each character in the  string shall take a value of "0" to "9", "a" to "f"
        or "A" to "F" and shall represent 4 bits.  The padding 0 shall be added to make multiple
        nibbles, so the most significant character  representing the padding 0 if required together
        with the 4 most significant bits of the eNB ID  shall appear first in the string, and the
        character representing the 4 least significant bit  of the eNB ID (to form a nibble) shall
        appear last in the string.

    Gli:
      $ref: '#/components/schemas/Bytes'
    Gci:
      type: string
      description: >
        Global Cable Identifier uniquely identifying the connection between the 5G-CRG or FN-CRG
        to the 5GS. See clause 28.15.4 of 3GPP TS 23.003. This shall be encoded as a string per
        clause 28.15.4 of 3GPP TS 23.003, and compliant with the syntax specified  in clause 2.2
        of IETF RFC 7542 for the username part of a NAI. The GCI value is specified in
        CableLabs WR-TR-5WWC-ARCH.

    NsSrg:
      type: string
      description: >
        String providing a Network Slice Simultaneous Registration Group. See clause 5.15.12 of
        3GPP TS 23.501

    NsSrgRm:
      type: string
      nullable: true
      description: >
        String providing a Network Slice Simultaneous Registration Group with the OpenAPI
        "nullable: true" property. See clause 5.15.12 of 3GPP TS 23.501


    RelayServiceCode:
      type: integer
      minimum: 0
      maximum: 16777215
      description: >
        Relay Service Code to identify a connectivity service provided by the UE-to-Network relay.

    5GPrukId:
      type: string
      description: >
        A string carrying the CP-PRUK ID of the remote UE. The CP-PRUK ID is a string in NAI
        format as specified in clause 28.7.11 of 3GPP TS 23.003.
      pattern: '^rid[0-9]{1,4}\.pid[0-9a-fA-F]+\@prose-cp\.5gc\.mnc[0-9]{2,3}\.mcc[0-
9]{3}\.3gppnetwork\.org$'

    NsagId:
      type: integer
      description: >
        The Network Slice AS Group ID, see 3GPP TS 38.413

    NsagIdRm:
      type: integer
```

```
      nullable: true
      description: >
        This data type is defined in the same way as the "NsagId" data type, but with the OpenAPI
"nullable: true" property


#
# ENUMERATED DATA TYPES
#

    AccessType:
      type: string
      enum:
        - 3GPP_ACCESS
        - NON_3GPP_ACCESS
      description: Indicates whether the access is  via 3GPP or via non-3GPP.

    AccessTypeRm:
      anyOf:
        - $ref: '#/components/schemas/AccessType'
        - $ref: '#/components/schemas/NullValue'
      description: >
        Indicates wether the access is via 3GPP or via non-3GPP but with the OpenAPI
        'nullable: true' property."

    RatType:
      anyOf:
        - type: string
          enum:
            - NR
            - EUTRA
            - WLAN
            - VIRTUAL
            - NBIOT
            - WIRELINE
            - WIRELINE_CABLE
            - WIRELINE_BBF
            - LTE-M
            - NR_U
            - EUTRA_U
            - TRUSTED_N3GA
            - TRUSTED_WLAN
            - UTRA
            - GERA
            - NR_LEO
            - NR_MEO
            - NR_GEO
            - NR_OTHER_SAT
            - NR_REDCAP
        - type: string
      description: Indicates the radio access used.

    RatTypeRm:
      anyOf:
        - $ref: '#/components/schemas/RatType'
        - $ref: '#/components/schemas/NullValue'
      description: >
        Provides information about the radio access but with the OpenAPI 'nullable: true' property.

    PduSessionType:
      anyOf:
        - type: string
          enum:
            - IPV4
            - IPV6
            - IPV4V6
            - UNSTRUCTURED
            - ETHERNET
        - type: string
      description: >
        PduSessionType indicates the type of a PDU session. It shall comply with the provisions
        defined in table 5.4.3.3-1.

    PduSessionTypeRm:
      anyOf:
        - $ref: '#/components/schemas/PduSessionType'
        - $ref: '#/components/schemas/NullValue'
      description: >
```

```
        PduSessionType indicates the type of a PDU session. It shall comply with the provisions
        defined in table 5.4.3.3-1 but with the OpenAPI "nullable: true" property.

    UpIntegrity:
      anyOf:
        - type: string
          enum:
            - REQUIRED
            - PREFERRED
            - NOT_NEEDED
        - type: string
      description: >
        indicates whether UP integrity protection is required, preferred or not needed for all
        the traffic on the PDU Session. It shall comply with the provisions defined in
        table 5.4.3.4-1.

    UpIntegrityRm:
      anyOf:
        - $ref: '#/components/schemas/UpIntegrity'
        - $ref: '#/components/schemas/NullValue'
      description: >
        indicates whether UP integrity protection is required, preferred or not needed for all
        the traffic on the PDU Session. It shall comply with the provisions defined in
        table 5.4.3.4-1.

    UpConfidentiality:
      anyOf:
        - type: string
          enum:
            - REQUIRED
            - PREFERRED
            - NOT_NEEDED
        - type: string
      description: >
        indicates whether UP confidentiality protection is required, preferred or not needed for
        all the traffic on the PDU Session. It shall comply with the provisions defined in
        table 5.4.3.5-1.

    UpConfidentialityRm:
      anyOf:
        - $ref: '#/components/schemas/UpConfidentiality'
        - $ref: '#/components/schemas/NullValue'
      description: >
        indicates whether UP integrity protection is required, preferred or not needed for all the
        traffic on the PDU Session. It shall comply with the provisions defined in table 5.4.3.4-1,
        but with the OpenAPI 'nullable: true' property.

    SscMode:
      anyOf:
        - type: string
          enum:
            - SSC_MODE_1
            - SSC_MODE_2
            - SSC_MODE_3
        - type: string
      description: >
        represents the service and session continuity mode It shall comply with the provisions
defined in table 5.4.3.6-1.

    SscModeRm:
      anyOf:
        - $ref: '#/components/schemas/SscMode'
        - $ref: '#/components/schemas/NullValue'
      description: >
        represents the service and session continuity mode It shall comply with the provisions
        defined in table 5.4.3.6-1 but with the OpenAPI 'nullable: true' property.

    DnaiChangeType:
      anyOf:
      - type: string
        enum:
          - EARLY
          - EARLY_LATE
          - LATE
      - type: string
        description: >
          This string provides forward-compatibility with future extensions to the enumeration
          but is not used to encode  content defined in the present version of this API.
```

```
    description: |
      Possible values are:
      - EARLY: Early notification of UP path reconfiguration.
      - EARLY_LATE: Early and late notification of UP path reconfiguration. This value shall
        only be present in the subscription to the DNAI change event.
      - LATE: Late notification of UP path reconfiguration.

  DnaiChangeTypeRm:
    anyOf:
      - $ref: '#/components/schemas/DnaiChangeType'
      - $ref: '#/components/schemas/NullValue'
    description: >
      It can take the values  as specified for DnaiChangeType but with the OpenAPI
      'nullable: true' property.

  RestrictionType:
    anyOf:
      - type: string
        enum:
          - ALLOWED_AREAS
          - NOT_ALLOWED_AREAS
      - type: string
    description: It contains the restriction type ALLOWED_AREAS or NOT_ALLOWED_AREAS.

  RestrictionTypeRm:
    anyOf:
      - $ref: '#/components/schemas/RestrictionType'
      - $ref: '#/components/schemas/NullValue'
    description: >
      It contains the restriction type ALLOWED_AREAS or NOT_ALLOWED_AREAS but with the
      OpenAPI 'nullable: true' property.

  CoreNetworkType:
    anyOf:
      - type: string
        enum:
          - 5GC
          - EPC
      - type: string
    description: It contains the Core Network type 5GC or EPC.

  CoreNetworkTypeRm:
    anyOf:
      - $ref: '#/components/schemas/CoreNetworkType'
      - $ref: '#/components/schemas/NullValue'
    description: >
      It contains the Core Network type 5GC or EPC but with the OpenAPI
      'nullable: true' property.

  PresenceState:
    anyOf:
      - type: string
        enum:
          - IN_AREA
          - OUT_OF_AREA
          - UNKNOWN
          - INACTIVE
      - type: string
    description: |
      Possible values are:
      -IN_AREA: Indicates that the UE is inside or enters the presence reporting area.
      -OUT_OF_AREA: Indicates that the UE is outside or leaves the presence reporting area
      -UNKNOW: Indicates it is unknown whether the UE is in the presence reporting area or not
      -INACTIVE: Indicates that the presence reporting area is inactive in the serving node.

  StationaryIndication:
    anyOf:
    - type: string
      enum:
        - STATIONARY
        - MOBILE
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: |
```

```
    Possible values are:
    - STATIONARY: Identifies the UE is stationary
    - MOBILE: Identifies the UE is mobile

StationaryIndicationRm:
  anyOf:
    - $ref: '#/components/schemas/StationaryIndication'
    - $ref: '#/components/schemas/NullValue'
  description: >
    This enumeration is defined in the same way as the 'StationaryIndication' enumeration,
    but with the OpenAPI 'nullable: true' property."

ScheduledCommunicationType:
  anyOf:
    - type: string
      enum:
        - DOWNLINK_ONLY
        - UPLINK_ONLY
        - BIDIRECTIONAL
    - type: string
  description: |
   Possible values are:
   -DOWNLINK_ONLY: Downlink only
   -UPLINK_ONLY: Uplink only
   -BIDIRECTIONA: Bi-directional

ScheduledCommunicationTypeRm:
  anyOf:
    - $ref: '#/components/schemas/ScheduledCommunicationType'
    - $ref: '#/components/schemas/NullValue'
  description: >
    This enumeration is defined in the same way as the 'ScheduledCommunicationTypen'
    enumeration, but with the OpenAPI 'nullable: true' property."

TrafficProfile:
  anyOf:
  - type: string
    enum:
      - SINGLE_TRANS_UL
      - SINGLE_TRANS_DL
      - DUAL_TRANS_UL_FIRST
      - DUAL_TRANS_DL_FIRST
      - MULTI_TRANS
  - type: string
    description: >
      This string provides forward-compatibility with future
      extensions to the enumeration but is not used to encode
      content defined in the present version of this API.

  description: |
    Possible values are:
    - SINGLE_TRANS_UL: Uplink single packet transmission.
    - SINGLE_TRANS_DL: Downlink single packet transmission.
    - DUAL_TRANS_UL_FIRST: Dual packet transmission, firstly uplink packet transmission
      with subsequent downlink packet transmission.
    - DUAL_TRANS_DL_FIRST: Dual packet transmission, firstly downlink packet transmission
      with subsequent uplink packet transmission.

TrafficProfileRm:
  anyOf:
    - $ref: '#/components/schemas/TrafficProfile'
    - $ref: '#/components/schemas/NullValue'
  description: >
    This enumeration is defined in the same way as the 'TrafficProfile' enumeration, but
    with the OpenAPI 'nullable: true' property.

LcsServiceAuth:
  anyOf:
  - type: string
    enum:
      - "LOCATION_ALLOWED_WITH_NOTIFICATION"
      - "LOCATION_ALLOWED_WITHOUT_NOTIFICATION"
      - "LOCATION_ALLOWED_WITHOUT_RESPONSE"
      - "LOCATION_RESTRICTED_WITHOUT_RESPONSE"
      - "NOTIFICATION_ONLY"
      - "NOTIFICATION_AND_VERIFICATION_ONLY"
  - type: string
    description: >
```

```
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: |
      Possible values are:
      - "LOCATION_ALLOWED_WITH_NOTIFICATION": Location allowed with notification
      - "LOCATION_ALLOWED_WITHOUT_NOTIFICATION": Location allowed without notification
      - "LOCATION_ALLOWED_WITHOUT_RESPONSE": Location with notification and privacy
         verification; location allowed if no response
      - "LOCATION_RESTRICTED_WITHOUT_RESPONSE": Location with notification and privacy
        verification; location restricted if no response
      - "NOTIFICATION_ONLY": Notification only
      - "NOTIFICATION_AND_VERIFICATION_ONLY": Notification and privacy verification only
  UeAuth:
    anyOf:
      - type: string
        enum:
          - AUTHORIZED
          - NOT_AUTHORIZED
      - type: string
    description: |
      Possible values are:
      - AUTHORIZED: Indicates that the UE is authorized.
      - NOT_AUTHORIZED: Indicates that the UE is not authorized.

  DlDataDeliveryStatus:
    anyOf:
    - type: string
      enum:
        - BUFFERED
        - TRANSMITTED
        - DISCARDED
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: |
      Possible values are:
      - BUFFERED: The first downlink data is buffered with extended buffering matching the
        source of the downlink traffic.
      - TRANSMITTED: The first downlink data matching the source of the downlink traffic is
        transmitted after previous buffering or discarding of corresponding packet(s) because
        the UE of the PDU Session becomes ACTIVE, and buffered data can be delivered to UE.
      - DISCARDED: The first downlink data matching the source of the downlink traffic is
        discarded because the Extended Buffering time, as determined by the SMF, expires or
        the amount of downlink data to be buffered is exceeded.

  DlDataDeliveryStatusRm:
    anyOf:
      - $ref: '#/components/schemas/DlDataDeliveryStatus'
      - $ref: '#/components/schemas/NullValue'
    description: >
      This data type is defined in the same way as the ' DlDataDeliveryStatus ' data type,
      but with the OpenAPI 'nullable: true' property.

  AuthStatus:
    anyOf:
    - type: string
      enum:
        - EAP_SUCCESS
        - EAP_FAILURE
        - PENDING
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.

    description: |
      Possible values are:
      - "EAP_SUCCESS": The NSSAA status is EAP-Success.
      - "EAP_FAILURE": The NSSAA status is EAP-Failure.
      - "PENDING": The NSSAA status is Pending.

  LineType:
    anyOf:
    - type: string
```

```
      enum:
        - DSL
        - PON
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.

    description: |
      Possible values are:
      - DSL: Identifies a DSL line
      - PON: Identifies a PON line

  LineTypeRm:
    anyOf:
      - $ref: '#/components/schemas/LineType'
      - $ref: '#/components/schemas/NullValue'
    description: >
      This data type is defined in the same way as the 'LineType' data type, but with the
      OpenAPI 'nullable: true' property.


  NotificationFlag:
    anyOf:
    - type: string
      enum:
        - ACTIVATE
        - DEACTIVATE
        - RETRIEVAL
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.

    description: |
      Possible values are:
      - ACTIVATE: The event notification is activated.
      - DEACTIVATE: The event notification is deactivated and shall be muted. The available
         event(s) shall be stored.
      - RETRIEVAL: The event notification shall be sent to the NF service consumer(s),
        after that, is muted again.


  TransportProtocol:
    anyOf:
    - type: string
      enum:
        - UDP
        - TCP
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.

    description: |
      Possible values are:
      - UDP: User Datagram Protocol.
      - TCP: Transmission Control Protocol.


  SatelliteBackhaulCategory:
    anyOf:
      - type: string
        enum:
          - GEO
          - MEO
          - LEO
          - OTHER_SAT
          - NON_SATELLITE
      - type: string
    description: Indicates the satellite backhaul used.

  SatelliteBackhaulCategoryRm:
    anyOf:
      - $ref: '#/components/schemas/SatelliteBackhaulCategory'
```

```
        - $ref: '#/components/schemas/NullValue'
      description: >
        Provides information about the satellite backhaul but with the OpenAPI
        'nullable: true' property.



#
# STRUCTURED DATA TYPES
#
    SubscribedDefaultQos:
      type: object
      required:
        - 5qi
        - arp
      properties:
        5qi:
          $ref: '#/components/schemas/5Qi'
        arp:
          $ref: '#/components/schemas/Arp'
        priorityLevel:
          $ref: '#/components/schemas/5QiPriorityLevel'
      description: Provides the subsribed 5QI and the ARP, it may contain the priority level.

    Snssai:
      type: object
      properties:
        sst:
          type: integer
          minimum: 0
          maximum: 255
          description: >
            Unsigned integer, within the range 0 to 255, representing the Slice/Service Type.
            It indicates the expected Network Slice behaviour in terms of features and services.
            Values 0 to 127 correspond to the standardized SST range. Values 128 to 255 correspond
            to the Operator-specific range. See clause 28.4.2 of 3GPP TS 23.003.
            Standardized values are defined in clause 5.15.2.2 of 3GPP TS 23.501.

        sd:
          type: string
          pattern: '^[A-Fa-f0-9]{6}$'
          description: >
            3-octet string, representing the Slice Differentiator, in hexadecimal representation.
            Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F"
            and shall represent 4 bits. The most significant character representing the 4 most
            significant bits of the SD shall appear first in the string, and the character
            representing the 4 least significant bit of the SD shall appear last in the string.
            This is an optional parameter that complements the Slice/Service type(s) to allow to
            differentiate amongst multiple Network Slices of the same Slice/Service type. This IE
            shall be absent if no SD value is associated with the SST.
      description: >
        When Snssai needs to be converted to string (e.g. when used in maps as key), the string
shall
        be composed of one to three digits "sst" optionally followed by "-" and 6 hexadecimal digits
        "sd".

      required:
        - sst

    PlmnId:
      type: object
      properties:
        mcc:
          $ref: '#/components/schemas/Mcc'
        mnc:
          $ref: '#/components/schemas/Mnc'
      description: >
        When PlmnId needs to be converted to string (e.g. when used in maps as key), the string
        shall be composed of three digits "mcc" followed by "-" and two or three digits "mnc".

      required:
        - mcc
        - mnc
    PlmnIdRm:
      anyOf:
        - $ref: '#/components/schemas/PlmnId'
        - $ref: '#/components/schemas/NullValue'
      description: >
```

```
      This data type is defined in the same way as the 'PlmnId' data type, but with the
      OpenAPI 'nullable: true' property.

    Tai:
      description: Contains the tracking area identity as described in 3GPP 23.003
      type: object
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnId'
        tac:
          $ref: '#/components/schemas/Tac'
        nid:
          $ref: '#/components/schemas/Nid'
      required:
        - plmnId
        - tac

    TaiRm:
      anyOf:
        - $ref: '#/components/schemas/Tai'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'Tai' data type, but with the OpenAPI
        'nullable: true' property.

    Ecgi:
      description: Contains the ECGI (E-UTRAN Cell Global Identity), as described in 3GPP 23.003
      type: object
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnId'
        eutraCellId:
          $ref: '#/components/schemas/EutraCellId'
        nid:
          $ref: '#/components/schemas/Nid'
      required:
        - plmnId
        - eutraCellId

    EcgiRm:
      anyOf:
        - $ref: '#/components/schemas/Ecgi'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'Ecgi' data type, but with the
        OpenAPI 'nullable: true' property.

    Ncgi:
      description: Contains the NCGI (NR Cell Global Identity), as described in 3GPP 23.003
      type: object
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnId'
        nrCellId:
          $ref: '#/components/schemas/NrCellId'
        nid:
          $ref: '#/components/schemas/Nid'
      required:
        - plmnId
        - nrCellId

    NcgiRm:
      anyOf:
        - $ref: '#/components/schemas/Ncgi'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'Ncgi' data type, but with the
        OpenAPI 'nullable: true' property.

    UserLocation:
      type: object
      properties:
        eutraLocation:
          $ref: '#/components/schemas/EutraLocation'
        nrLocation:
          $ref: '#/components/schemas/NrLocation'
        n3gaLocation:
          $ref: '#/components/schemas/N3gaLocation'
```

```
      utraLocation:
        $ref: '#/components/schemas/UtraLocation'
      geraLocation:
        $ref: '#/components/schemas/GeraLocation'
    description: >
      At least one of eutraLocation, nrLocation and n3gaLocation shall be present. Several
      of them may be present.

  EutraLocation:
    description: Contains the E-UTRA user location.
    type: object
    properties:
      tai:
        $ref: '#/components/schemas/Tai'
      ignoreTai:
        type: boolean
        default: false
      ecgi:
        $ref: '#/components/schemas/Ecgi'
      ignoreEcgi:
        type: boolean
        default: false
        description: >
          This flag when present shall indicate that the Ecgi shall be ignored
          When present, it shall be set as follows:
          - true: ecgi shall be ignored.
          - false (default): ecgi shall not be ignored.
      ageOfLocationInformation:
        type: integer
        minimum: 0
        maximum: 32767
        description: >
          The value represents the elapsed time in minutes since the last network contact of the
          mobile station.  Value "0" indicates that the location information was obtained after a
          successful paging procedure for Active Location Retrieval when the UE is in idle mode
          or after a successful NG-RAN location reporting procedure with the eNB when the UE is
          in connected mode.  Any other value than "0" indicates that the location information is
          the last known one.  See 3GPP TS 29.002 clause 17.7.8.
      ueLocationTimestamp:
        $ref: '#/components/schemas/DateTime'
      geographicalInformation:
        type: string
        pattern: '^[0-9A-F]{16}$'
        description: >
          Refer to geographical Information. See 3GPP TS 23.032 clause 7.3.2. Only the
          description of an ellipsoid point with uncertainty circle is allowed to be used.
      geodeticInformation:
        type: string
        pattern: '^[0-9A-F]{20}$'
        description: >
          Refers to Calling Geodetic Location. See ITU-T Recommendation Q.763 (1999) [24]
          clause 3.88.2. Only the description of an ellipsoid point with uncertainty circle
          is allowed to be used.
      globalNgenbId:
        $ref: '#/components/schemas/GlobalRanNodeId'

      globalENbId:
        $ref: '#/components/schemas/GlobalRanNodeId'
    required:
      - tai
      - ecgi

  EutraLocationRm:
    anyOf:
      - $ref: '#/components/schemas/EutraLocation'
      - $ref: '#/components/schemas/NullValue'
    description: >
      This data type is defined in the same way as the 'EutraLocation' data type, but with
      the OpenAPI 'nullable: true' property.

  NrLocation:
    description: Contains the NR user location.
    type: object
    properties:
      tai:
        $ref: '#/components/schemas/Tai'
      ncgi:
        $ref: '#/components/schemas/Ncgi'
```

```
        ignoreNcgi:
          type: boolean
          default: false
        ageOfLocationInformation:
          type: integer
          minimum: 0
          maximum: 32767
          description: >
            The value represents the elapsed time in minutes since the last network contact of the
mobile
            station. Value "0" indicates that the location information was obtained after a
            successful paging procedure for Active Location Retrieval when the UE is in idle mode
            or after a successful  NG-RAN location reporting procedure with the eNB when the UE is
            in connected mode. Any other value than "0" indicates that the location information is
            the last known one. See 3GPP TS 29.002 clause 17.7.8.
        ueLocationTimestamp:
          $ref: '#/components/schemas/DateTime'
        geographicalInformation:
          type: string
          pattern: '^[0-9A-F]{16}$'
          description: >
            Refer to geographical Information. See 3GPP TS 23.032 clause 7.3.2. Only the description
            of an ellipsoid point with uncertainty circle is allowed to be used.
        geodeticInformation:
          type: string
          pattern: '^[0-9A-F]{20}$'
          description: >
            Refers to Calling Geodetic Location. See ITU-T Recommendation Q.763 (1999) [24] clause
            3.88.2. Only the description of an ellipsoid point with uncertainty circle is allowed
            to be used.
        globalGnbId:
          $ref: '#/components/schemas/GlobalRanNodeId'
      required:
        - tai
        - ncgi

    NrLocationRm:
      anyOf:
        - $ref: '#/components/schemas/NrLocation'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'NrLocation' data type, but with the
        OpenAPI 'nullable: true' property."

    N3gaLocation:
      description: Contains the Non-3GPP access user location.
      type: object
      properties:
        n3gppTai:
          $ref: '#/components/schemas/Tai'
        n3IwfId:
          type: string
          pattern: '^[A-Fa-f0-9]+$'
          description: >
            This IE shall contain the N3IWF identifier received over NGAP and shall be encoded as a
            string of hexadecimal characters. Each character in the string shall take a value of "0"
            to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant
            character representing the 4 most significant bits of the N3IWF ID shall appear first in
            the string, and the character representing the 4 least significant bit of the N3IWF ID
            shall appear last in the string.

        ueIpv4Addr:
          $ref: '#/components/schemas/Ipv4Addr'
        ueIpv6Addr:
          $ref: '#/components/schemas/Ipv6Addr'
        portNumber:
          $ref: '#/components/schemas/Uinteger'
        protocol:
          $ref: '#/components/schemas/TransportProtocol'
        tnapId:
          $ref: '#/components/schemas/TnapId'
        twapId:
          $ref: '#/components/schemas/TwapId'
        hfcNodeId:
          $ref: '#/components/schemas/HfcNodeId'
        gli:
          $ref: '#/components/schemas/Gli'
        w5gbanLineType:
```

```
      $ref: '#/components/schemas/LineType'
    gci:
      $ref: '#/components/schemas/Gci'

UpSecurity:
  description: Contains Userplain security information.
  type: object
  properties:
    upIntegr:
      $ref: '#/components/schemas/UpIntegrity'
    upConfid:
      $ref: '#/components/schemas/UpConfidentiality'
  required:
    - upIntegr
    - upConfid

UpSecurityRm:
  anyOf:
    - $ref: '#/components/schemas/UpSecurity'
    - $ref: '#/components/schemas/NullValue'
  description: >
    This data type is defined in the same way as the 'UpSecurity' data type, but with the
    OpenAPI 'nullable: true' property.

NgApCause:
  description: Represents the NGAP cause.
  type: object
  properties:
    group:
      $ref: '#/components/schemas/Uinteger'
    value:
      $ref: '#/components/schemas/Uinteger'
  required:
    - group
    - value

BackupAmfInfo:
  description: Provides details of the Backup AMF.
  type: object
  properties:
    backupAmf:
      $ref: '#/components/schemas/AmfName'
    guamiList:
      type: array
      items:
        $ref: '#/components/schemas/Guami'
      minItems: 1
      description: >
        If present, this IE shall contain the list of GUAMI(s) (supported by the AMF) for
        which the backupAmf IE applies.
  required:
    - backupAmf

RefToBinaryData:
  description: This parameter provides information about the referenced binary body data.
  type: object
  properties:
    contentId:
      type: string
      description: >
        This IE shall contain the value of the Content-ID header of the referenced binary
        body part.
  required:
    - contentId

RefToBinaryDataRm:
 anyOf:
    - $ref: '#/components/schemas/RefToBinaryData'
    - $ref: '#/components/schemas/NullValue'
 description: >
    This data type is defined in the same way as the ' RefToBinaryData ' data type,
    but with the OpenAPI 'nullable: true' property.

RouteToLocation:
  type: object
  properties:
    dnai:
      $ref: '#/components/schemas/Dnai'
```

```
      routeInfo:
        $ref: '#/components/schemas/RouteInformation'
      routeProfId:
        type: string
        nullable: true
        description: Identifies the routing profile Id.
    required:
      - dnai
    anyOf:
      - required: [ routeInfo ]
      - required: [ routeProfId ]
    nullable: true
    description: >
      At least one of the "routeInfo" attribute and the "routeProfId" attribute shall be included
      in the "RouteToLocation" data type.

  RouteInformation:
    type: object
    properties:
      ipv4Addr:
        $ref: '#/components/schemas/Ipv4Addr'
      ipv6Addr:
        $ref: '#/components/schemas/Ipv6Addr'
      portNumber:
        $ref: '#/components/schemas/Uinteger'
    required:
      - portNumber
    nullable: true
    description: >
      At least one of the "ipv4Addr" attribute and the "ipv6Addr" attribute shall be included in
      the "RouteInformation" data type.

  Area:
    description: Provides area information.
    type: object
    oneOf:
      - required:
        - tacs
      - required:
        - areaCode
    properties:
      tacs:
        type: array
        items:
          $ref: '#/components/schemas/Tac'
        minItems: 1
      areaCode:
          $ref: '#/components/schemas/AreaCode'

  ServiceAreaRestriction:
    description: Provides information about allowed or not allowed areas.
    type: object
    properties:
      restrictionType:
        $ref: '#/components/schemas/RestrictionType'
      areas:
        type: array
        items:
          $ref: '#/components/schemas/Area'
      maxNumOfTAs:
        $ref: '#/components/schemas/Uinteger'
      maxNumOfTAsForNotAllowedAreas:
        $ref: '#/components/schemas/Uinteger'
    allOf:
      #
      # 1st condition: restrictionType and areas attributes shall be either both absent
      #                or both present
      #
      - oneOf:
          - not:
              required: [ restrictionType ]
          - required: [ areas ]
      #
      # 2nd condition: if restrictionType takes value NOT_ALLOWED_AREAS,
      #                then maxNumOfTAs shall be absent
      #
      - anyOf:
          - not:
```

```
            required: [ restrictionType ]
            properties:
              restrictionType:
                type: string
                enum: [ NOT_ALLOWED_AREAS ]
        - not:
            required: [ maxNumOfTAs ]
    #
    # 3rd condition: if restrictionType takes value ALLOWED_AREAS,
    #                then maxNumOfTAsForNotAllowedAreas shall be absent
    #
    - anyOf:
        - not:
            required: [ restrictionType ]
            properties:
              restrictionType:
                type: string
                enum: [ ALLOWED_AREAS ]
        - not:
            required: [ maxNumOfTAsForNotAllowedAreas ]

  PresenceInfo:
    type: object
    properties:
      praId:
        type: string
        description: >
          Represents an identifier of the Presence Reporting Area (see clause 28.10 of 3GPP
          TS 23.003.  This IE shall be present  if the Area of Interest subscribed or reported is
          a Presence Reporting Area or a Set of Core Network predefined Presence Reporting Areas.
          When present, it shall be encoded as a string representing an integer in the following
          ranges:
          0 to 8 388 607 for UE-dedicated PRA
          8 388 608 to 16 777 215 for Core Network predefined PRA
          Examples:
          PRA ID 123 is encoded as "123"
          PRA ID 11 238 660 is encoded as "11238660"

      additionalPraId:
        type: string
        description: >
          This IE may be present if the praId IE is present and if it contains a PRA identifier
          referring to a set of Core Network predefined Presence Reporting Areas. When present,
          this IE shall contain a PRA Identifier of an individual PRA within the Set of Core
          Network predefined Presence Reporting Areas indicated by the praId IE.

      presenceState:
        $ref: '#/components/schemas/PresenceState'
      trackingAreaList:
        type: array
        items:
          $ref: '#/components/schemas/Tai'
        minItems: 1
        description: >
          Represents the list of tracking areas that constitutes the area. This IE shall be
          present if the subscription or  the event report is for tracking UE presence in the
          tracking areas. For non 3GPP access the TAI shall be the N3GPP TAI.

      ecgiList:
        type: array
        items:
          $ref: '#/components/schemas/Ecgi'
        minItems: 1
        description: >
          Represents the list of EUTRAN cell Ids that constitutes the area. This IE shall
          be present if the Area of Interest subscribed is a list of EUTRAN cell Ids.

      ncgiList:
        type: array
        items:
          $ref: '#/components/schemas/Ncgi'
        minItems: 1
        description: >
          Represents the list of NR cell Ids that constitutes the area. This IE shall be
          present if the Area of Interest subscribed is a list of NR cell Ids.

      globalRanNodeIdList:
        type: array
```

```
        items:
          $ref: '#/components/schemas/GlobalRanNodeId'
        minItems: 1
        description: >
          Represents the list of NG RAN node identifiers that constitutes the area. This IE shall
          be present if the Area of Interest subscribed is a list of NG RAN node identifiers.

      globaleNbIdList:
        type: array
        items:
          $ref: '#/components/schemas/GlobalRanNodeId'
        minItems: 1
        description: >
          Represents the list of eNodeB identifiers that constitutes the area. This IE shall be
          present if the Area of Interest subscribed is a list of eNodeB identifiers.
    description: >
      If the additionalPraId IE is present, this IE shall state the presence information of the
      UE for the individual PRA identified by the additionalPraId IE;  If the additionalPraId IE
      is not present, this IE shall state the presence information of the UE for the PRA
      identified by the praId IE.
  PresenceInfoRm:
    type: object
    properties:
      praId:
        type: string
        description: |
          Represents an identifier of the Presence Reporting Area (see clause 28.10 of
          3GPP TS 23.003. This IE shall be present  if the Area of Interest subscribed or
          reported is a Presence Reporting Area or a Set of Core Network predefined Presence
          Reporting Areas. When present, it shall be encoded as a string representing an integer
          in the following ranges:
          - 0 to 8 388 607 for UE-dedicated PRA
          - 8 388 608 to 16 777 215 for Core Network predefined PRA
          Examples:
          PRA ID 123 is encoded as "123"
          PRA ID 11 238 660 is encoded as "11238660"
      additionalPraId:
        type: string
        description: >
          This IE may be present if the praId IE is present and if it contains a PRA identifier
          referring to a set of Core Network predefined Presence Reporting Areas.
          When present, this IE shall contain a PRA Identifier of an individual PRA within the Set
          of Core Network predefined Presence Reporting Areas indicated by the praId IE.

      presenceState:
        $ref: '#/components/schemas/PresenceState'
      trackingAreaList:
        type: array
        items:
          $ref: '#/components/schemas/Tai'
        minItems: 0
        description: >
          Represents the list of tracking areas that constitutes the area. This IE shall be
          present if the subscription or the event report  is for tracking UE presence in the
          tracking areas. For non 3GPP access the TAI shall be the N3GPP TAI.

      ecgiList:
        type: array
        items:
          $ref: '#/components/schemas/Ecgi'
        minItems: 0
        description: >
          Represents the list of EUTRAN cell Ids that constitutes the area. This IE shall be
          present if the Area of Interest subscribed is a list of EUTRAN cell Ids.
      ncgiList:
        type: array
        items:
          $ref: '#/components/schemas/Ncgi'
        minItems: 0
        description: >
          Represents the list of NR cell Ids that constitutes the area. This IE shall be present
          if the Area of Interest subscribed is a list of NR cell Ids.
      globalRanNodeIdList:
        type: array
        items:
          $ref: '#/components/schemas/GlobalRanNodeId'
        description: >
```

```
            Represents the list of NG RAN node identifiers that constitutes the area. This IE shall
be
            present if the Area of Interest subscribed is a list of NG RAN node identifiers.
          globaleNbIdList:
            type: array
            items:
              $ref: '#/components/schemas/GlobalRanNodeId'
            minItems: 1
            description: >
              Represents the list of eNodeB identifiers that constitutes the area. This IE shall be
present
              if the Area of Interest subscribed is a list of eNodeB identifiers.
        nullable: true
        description: >
          This data type is defined in the same way as the 'PresenceInfo' data type, but with the
          OpenAPI 'nullable: true' property.  If the additionalPraId IE is present, this IE shall
state
          the presence information of the UE for the individual PRA identified by the additionalPraId
          IE;  If the additionalPraId IE is not present, this IE shall state the presence information
          of the UE for the PRA identified by the praId IE.

    GlobalRanNodeId:
      type: object
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnId'
        n3IwfId:
          $ref: '#/components/schemas/N3IwfId'
        gNbId:
          $ref: '#/components/schemas/GNbId'
        ngeNbId:
          $ref: '#/components/schemas/NgeNbId'
        wagfId:
          $ref: '#/components/schemas/WAgfId'
        tngfId:
          $ref: '#/components/schemas/TngfId'
        nid:
          $ref: '#/components/schemas/Nid'
        eNbId:
          $ref: '#/components/schemas/ENbId'
      oneOf:
        - required: [ n3IwfId ]
        - required: [ gNbId ]
        - required: [ ngeNbId ]
        - required: [ wagfId ]
        - required: [ tngfId ]
        - required: [ eNbId ]
      description: >
        One of the six attributes n3IwfId, gNbIdm, ngeNbId, wagfId, tngfId, eNbId shall be present.
      required:
        - plmnId
    GNbId:
      description: Provides the G-NB identifier.
      type: object
      properties:
        bitLength:
          type: integer
          minimum: 22
          maximum: 32
          description: >
            Unsigned integer representing the bit length of the gNB ID as defined in clause
            9.3.1.6 of 3GPP TS 38.413 [11], within the range 22 to 32.
        gNBValue:
          type: string
          pattern: '^[A-Fa-f0-9]{6,8}$'
          description: >
            This represents the identifier of the gNB. The value of the gNB ID shall be encoded
            in hexadecimal representation. Each character in the string shall take a value of
            "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The padding 0 shall
            be added to make multiple nibbles,  the most significant character representing the
            padding 0 if required together with the 4 most significant bits of the gNB ID shall
            appear first in the string, and the character representing the 4 least significant bit
            of the gNB ID shall appear last in the string.
      required:
        - bitLength
        - gNBValue

    AtsssCapability:
```

```
      description: >
        Containes Capability to support procedures related to Access Traffic Steering, Switching,
        Splitting.
      type: object
      properties:
        atsssLL:
          type: boolean
          default: false
          description: >
            Indicates the ATSSS-LL capability to support procedures related to Access Traffic
            Steering, Switching, Splitting (see clauses 4.2.10, 5.32 of 3GPP TS 23.501).
            true: Supported
            false (default): Not Supported
        mptcp:
          type: boolean
          default: false
          description: >
            Indicates the MPTCP capability to support procedures related to Access Traffic Steering,
            Switching, Splitting (see clauses 4.2.10, 5.32 of 3GPP TS 23.501
            true: Supported
            false (default): Not Supported
        rttWithoutPmf:
          type: boolean
          default: false
          description: >
            This IE is only used by the UPF to indicate whether the UPF supports RTT measurement
            without PMF (see clauses 5.32.2, 6.3.3.3 of 3GPP TS 23.501
            true: Supported
            false (default): Not Supported
    PlmnIdNid:
      description: >
        Contains the serving core network operator PLMN ID and, for an SNPN, the NID that together
        with the PLMN ID identifies the SNPN.
      type: object
      required:
        - mcc
        - mnc
      properties:
        mcc:
          $ref: '#/components/schemas/Mcc'
        mnc:
          $ref: '#/components/schemas/Mnc'
        nid:
          $ref: '#/components/schemas/Nid'

    PlmnIdNidRm:
      anyOf:
        - $ref: '#/components/schemas/PlmnIdNid'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'PlmnIdNid' data type, but with the
        OpenAPI 'nullable: true' property.

    SmallDataRateStatus:
      description: It indicates theSmall Data Rate Control Status
      type: object
      properties:
        remainPacketsUl:
          type: integer
          minimum: 0
          description: >
            When present, it shall contain the number of packets the UE is allowed to send uplink
            in the given time unit for the given PDU session (see clause 5.31.14.3 of 3GPP TS
23.501.
        remainPacketsDl:
          type: integer
          minimum: 0
          description: >
            When present it shall contain the number of packets the AF is allowed to send downlink
            in the given time unit for the given PDU session (see clause 5.31.14.3 of 3GPP TS
23.501.
        validityTime:
          $ref: '#/components/schemas/DateTime'
        remainExReportsUl:
          type: integer
          minimum: 0
          description: >
            When present, it shall indicate number of additional exception reports the UE is allowed
```

```
        to send uplink in the given time  unit for  the given PDU session (see clause 5.31.14.3
        of 3GPP TS 23.501.
    remainExReportsDl:
      type: integer
      minimum: 0
      description: >
        When present, it shall indicate number of additional exception reports the AF is allowed
        to send downlink  in the given time unit for the given PDU session (see clause 5.31.14.3
        in 3GPP TS 23.501

HfcNodeId:
  description: REpresents the HFC Node Identifer received over NGAP.
  type: object
  required:
    - hfcNId
  properties:
    hfcNId:
      $ref: '#/components/schemas/HfcNId'

HfcNodeIdRm:
 anyOf:
    - $ref: '#/components/schemas/HfcNodeId'
    - $ref: '#/components/schemas/NullValue'
 description: >
    This data type is defined in the same way as the 'HfcNodeId' data type, but with the
    OpenAPI 'nullable: true' property.

WirelineArea:
  type: object
  properties:
    globalLineIds:
      type: array
      items:
        $ref: '#/components/schemas/Gli'
      minItems: 1
    hfcNIds:
      type: array
      items:
        $ref: '#/components/schemas/HfcNId'
      minItems: 1
    areaCodeB:
      $ref: '#/components/schemas/AreaCode'
    areaCodeC:
      $ref: '#/components/schemas/AreaCode'
  description: >
    One and only one of the "globLineIds", "hfcNIds", "areaCodeB" and "areaCodeC" attributes
    shall be included in a WirelineArea data structure

WirelineServiceAreaRestriction:
  type: object
  properties:
    restrictionType:
      $ref: '#/components/schemas/RestrictionType'
    areas:
      type: array
      items:
        $ref: '#/components/schemas/WirelineArea'
  description: >
      The "restrictionType" attribute and the "areas" attribute shall be either both present
      or absent.  The empty array of areas is used when service is allowed/restricted nowhere.

ApnRateStatus:
  description: Contains the APN rate control status e.g. of the AMF.
  type: object
  properties:
    remainPacketsUl:
      type: integer
      minimum: 0
      description: >
        When present, it shall contain the number of packets the UE is allowed to send uplink
        in the given time unit for the given APN (all PDN connections of the UE to this APN
        see clause 4.7.7.3 in 3GPP TS 23.401.
    remainPacketsDl:
      type: integer
      minimum: 0
      description: >
        When present, it shall contain the number of packets the UE is allowed to send uplink
        in the given time unit for the given APN (all PDN connections of the UE to this APN
```

```
            see clause 4.7.7.3 in 3GPP TS 23.401.
        validityTime:
          $ref: '#/components/schemas/DateTime'
        remainExReportsUl:
          type: integer
          minimum: 0
          description: >
            When present, it shall indicate the number of additional exception reports the UE is
            allowed to send uplink in the given time unit for the given APN (all PDN connections of
the UE to this APN,
            see clause 4.7.7.3 in 3GPP TS 23.401.
        remainExReportsDl:
          type: integer
          minimum: 0
          description: >
            When present, it shall indicate the number of additional exception reports the AF is
            allowed to send downlink in the  given time unit for the given APN (all PDN connections
            of the UE to this APN, see clause 4.7.7.3 in 3GPP TS 23.401.

    ScheduledCommunicationTime:
      description: Identifies time and day of the week when the UE is available for communication.
      type: object
      properties:
        daysOfWeek:
          type: array
          items:
            $ref: '#/components/schemas/DayOfWeek'
          minItems: 1
          maxItems: 6
          description: >
           Identifies the day(s) of the week. If absent, it indicates every day of the week.
        timeOfDayStart:
          $ref: '#/components/schemas/TimeOfDay'
        timeOfDayEnd:
          $ref: '#/components/schemas/TimeOfDay'

    ScheduledCommunicationTimeRm:
      anyOf:
        - $ref: '#/components/schemas/ScheduledCommunicationTime'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'ScheduledCommunicationTime' data type,
        but with the OpenAPI 'nullable: true' property.

    BatteryIndication:
      type: object
      properties:
        batteryInd:
          type: boolean
          description: >
            This IE shall indicate whether the UE is battery powered or not.
            true: the UE is battery powered;
            false or absent: the UE is not battery powered
        replaceableInd:
          type: boolean
          description: >
            This IE shall indicate whether the battery of the UE is replaceable or not.
            true: the battery of the UE is replaceable;
            false or absent: the battery of the UE is not replaceable.
        rechargeableInd:
          type: boolean
          description: >
            This IE shall indicate whether the battery of the UE is rechargeable or not.
            true: the battery of UE is rechargeable;
            false or absent: the battery of the UE is not rechargeable.
      description: >
        Parameters "replaceableInd" and "rechargeableInd" are only included if the value of
        Parameter "batteryInd" is true.

    BatteryIndicationRm:
      anyOf:
        - $ref: '#/components/schemas/BatteryIndication'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'BatteryIndication' data type, but
        with the OpenAPI 'nullable: true' property.

    AcsInfo:
```

```
    description: The ACS information for the 5G-RG is defined in BBF TR-069 [42] or in BBF TR-369
    type: object
    properties:
      acsUrl:
        $ref: '#/components/schemas/Uri'
      acsIpv4Addr:
        $ref: '#/components/schemas/Ipv4Addr'
      acsIpv6Addr:
        $ref: '#/components/schemas/Ipv6Addr'

  AcsInfoRm:
    anyOf:
      - $ref: '#/components/schemas/AcsInfo'
      - $ref: '#/components/schemas/NullValue'
    description: >
      This data type is defined in the same way as the 'AcsInfo' data type, but with the
      OpenAPI 'nullable: true' property.

  NrV2xAuth:
    description: Contains NR V2X services authorized information.
    type: object
    properties:
      vehicleUeAuth:
        $ref: '#/components/schemas/UeAuth'
      pedestrianUeAuth:
        $ref: '#/components/schemas/UeAuth'

  LteV2xAuth:
    description: Contains LTE V2X services authorized information.
    type: object
    properties:
      vehicleUeAuth:
        $ref: '#/components/schemas/UeAuth'
      pedestrianUeAuth:
        $ref: '#/components/schemas/UeAuth'

  Pc5QoSPara:
    description: Contains policy data on the PC5 QoS parameters.
    type: object
    required:
      - pc5QosFlowList
    properties:
      pc5QosFlowList:
        type: array
        items:
          $ref: '#/components/schemas/Pc5QosFlowItem'
      pc5LinkAmbr:
        $ref: '#/components/schemas/BitRate'

  Pc5QosFlowItem:
    description: Contains a PC5 QOS flow.
    type: object
    required:
      - pqi
    properties:
      pqi:
        $ref: '#/components/schemas/5Qi'

      pc5FlowBitRates:
        $ref: '#/components/schemas/Pc5FlowBitRates'
      range:
        $ref: '#/components/schemas/Uinteger'

  Pc5FlowBitRates:
    description: it shall represent the PC5 Flow Bit Rates
    type: object
    properties:
      guaFbr:
        $ref: '#/components/schemas/BitRate'
      maxFbr:
        $ref: '#/components/schemas/BitRate'

  UtraLocation:
    type: object
    oneOf:
      - required:
        - cgi
      - required:
```

```
        - sai
      - required:
        - rai
    description: Exactly one of cgi, sai or lai shall be present.
    properties:
      cgi:
        $ref: '#/components/schemas/CellGlobalId'
      sai:
        $ref: '#/components/schemas/ServiceAreaId'
      lai:
        $ref: '#/components/schemas/LocationAreaId'
      rai:
        $ref: '#/components/schemas/RoutingAreaId'
      ageOfLocationInformation:
        type: integer
        minimum: 0
        maximum: 32767
        description: >
          The value represents the elapsed time in minutes since the last network contact of the
          mobile station.  Value "0" indicates that the location information was obtained after a
          successful paging procedure for  Active Location Retrieval when the UE is in idle mode
           or after a successful location reporting procedure  the UE is in connected mode. Any
          other value than "0" indicates that the location information is the last known one.
          See 3GPP TS 29.002 clause 17.7.8.
      ueLocationTimestamp:
        $ref: '#/components/schemas/DateTime'
      geographicalInformation:
        type: string
        pattern: '^[0-9A-F]{16}$'
        description: >
          Refer to geographical Information.See 3GPP TS 23.032 clause 7.3.2. Only the
          description of an ellipsoid point with uncertainty circle is allowed to be used.
      geodeticInformation:
        type: string
        pattern: '^[0-9A-F]{20}$'
        description: >
          Refers to Calling Geodetic Location. See ITU-T Recommendation Q.763 (1999) clause
          3.88.2. Only the description of an ellipsoid point with uncertainty circle is allowed
          to be used.

  GeraLocation:
    type: object
    oneOf:
      - required:
        - cgi
      - required:
        - sai
      - required:
        - lai
      - required:
        - rai
    description: Exactly one of cgi, sai or lai shall be present.
    properties:
      locationNumber:
        type: string
        description: Location number within the PLMN. See 3GPP TS 23.003, clause 4.5.
      cgi:
        $ref: '#/components/schemas/CellGlobalId'
      rai:
        $ref: '#/components/schemas/RoutingAreaId'
      sai:
        $ref: '#/components/schemas/ServiceAreaId'
      lai:
        $ref: '#/components/schemas/LocationAreaId'
      vlrNumber:
        type: string
        description: VLR number. See 3GPP TS 23.003 clause 5.1.
      mscNumber:
        type: string
        description: MSC number. See 3GPP TS 23.003 clause 5.1.
      ageOfLocationInformation:
        type: integer
        minimum: 0
        maximum: 32767
        description: >
          The value represents the elapsed time in minutes since the last network contact of the
          mobile station. Value "0" indicates that the location information was obtained after a
          successful paging procedure for  Active Location Retrieval when the UE is in idle mode
```

```
          or after a successful location reporting procedure the UE is in connected mode. Any
          other value than "0" indicates that the location information is the last known one.
          See 3GPP TS 29.002 clause 17.7.8.
      ueLocationTimestamp:
        $ref: '#/components/schemas/DateTime'
      geographicalInformation:
        type: string
        pattern: '^[0-9A-F]{16}$'
        description: >
          Refer to geographical Information.See 3GPP TS 23.032 clause 7.3.2. Only the
          description of an ellipsoid point with uncertainty circle is allowed to be used.
      geodeticInformation:
        type: string
        pattern: '^[0-9A-F]{20}$'
        description: >
          Refers to Calling Geodetic Location.See ITU-T Recommendation Q.763 (1999) clause 3.88.2.
          Only the description of an ellipsoid point with uncertainty circle is allowed to be
          used.

  CellGlobalId:
    description: Contains a Cell Global Identification as defined in 3GPP TS 23.003, clause 4.3.1.
    type: object
    required:
      - plmnId
      - lac
      - cellId
    properties:
      plmnId:
        $ref: '#/components/schemas/PlmnId'
      lac:
        type: string
        pattern: '^[A-Fa-f0-9]{4}$'
      cellId:
        type: string
        pattern: '^[A-Fa-f0-9]{4}$'

  ServiceAreaId:
    description: Contains a Service Area Identifier as defined in 3GPP TS 23.003, clause 12.5.
    type: object
    required:
      - plmnId
      - lac
      - sac
    properties:
      plmnId:
        $ref: '#/components/schemas/PlmnId'
      lac:
        type: string
        pattern: '^[A-Fa-f0-9]{4}$'
        description: Location Area Code.
      sac:
        type: string
        pattern: '^[A-Fa-f0-9]{4}$'
        description: Service Area Code.

  LocationAreaId:
    description: Contains a Location area identification as defined in 3GPP TS 23.003, clause 4.1.
    type: object
    required:
      - plmnId
      - lac
    properties:
      plmnId:
        $ref: '#/components/schemas/PlmnId'

      lac:
        type: string
        pattern: '^[A-Fa-f0-9]{4}$'
        description: Location Area Code.

  RoutingAreaId:
    description: Contains a Routing Area Identification as defined in 3GPP TS 23.003, clause 4.2.
    type: object
    required:
      - plmnId
      - lac
      - rac
    properties:
```

```
      plmnId:
        $ref: '#/components/schemas/PlmnId'
      lac:
        type: string
        pattern: '^[A-Fa-f0-9]{4}$'
        description: Location Area Code
      rac:
        type: string
        pattern: '^[A-Fa-f0-9]{2}$'
        description: Routing Area Code

  DddTrafficDescriptor:
    description: Contains a Traffic Descriptor.
    type: object
    properties:
      ipv4Addr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
      ipv6Addr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
      portNumber:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      macAddr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'

  MoExpDataCounter:
    description: Contain the MO Exception Data Counter.
    type: object
    required:
      - counter
    properties:
      counter:
        type: integer
        description: >
          Unsigned integer identifying the MO Exception Data Counter, as specified in clause
          5.31.14.3 of 3GPP TS 23.501.
      timeStamp:
        $ref: '#/components/schemas/DateTime'

  NssaaStatus:
    description: contains the Subscribed S-NSSAI subject to NSSAA procedure and the status.
    type: object
    required:
      - snssai
      - status
    properties:
      snssai:
        $ref: '#/components/schemas/Snssai'
      status:
        $ref: '#/components/schemas/AuthStatus'

  NssaaStatusRm:
    anyOf:
      - $ref: '#/components/schemas/NssaaStatus'
      - $ref: '#/components/schemas/NullValue'
    description: >
      This data type is defined in the same way as the 'NssaaStatus' data type, but with
      the OpenAPI 'nullable: true' property.

  TnapId:
    description: Contain the TNAP Identifier see clause5.6.2 of 3GPP TS 23.501.
    type: object
    properties:
      ssId:
        type: string
        description: >
          This IE shall be present if the UE is accessing the 5GC via a trusted WLAN access
          network.When present, it shall contain the SSID of the access point to which the UE
          is attached, that is received over NGAP,  see IEEE Std 802.11-2012.

      bssId:
        type: string
        description: >
          When present, it shall contain the BSSID of the access point to which the UE is
          attached, that is received over NGAP, see IEEE Std 802.11-2012.

      civicAddress:
        $ref: '#/components/schemas/Bytes'
```

```
    TnapIdRm:
      anyOf:
        - $ref: '#/components/schemas/TnapId'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'TnapId' data type, but with the
        OpenAPI 'nullable: true' property.

    TwapId:
      description: >
        Contain the TWAP Identifier as defined in clause 4.2.8.5.3 of 3GPP TS 23.501
        or the WLAN location information as defined in clause 4.5.7.2.8 of 3GPP TS 23.402.
      type: object
      required:
        - ssId
      properties:
        ssId:
          type: string
          description: >
            This IE shall contain the SSID of the access point to which the UE is attached, that is
            received over NGAP, see IEEE Std 802.11-2012.

        bssId:
          type: string
          description: >
            When present, it shall contain the BSSID of the access point to which the UE is
            attached, for trusted WLAN access, see IEEE Std 802.11-2012.

        civicAddress:
          $ref: '#/components/schemas/Bytes'

    TwapIdRm:
      anyOf:
        - $ref: '#/components/schemas/TwapId'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'TwapId' data type, but with the
        OpenAPI 'nullable: true' property.

    SnssaiExtension:
      description: >
        Extensions to the Snssai data type, sdRanges and wildcardSd shall not be present
        simultaneously
      type: object
      not:
        required:
          - sdRanges
          - wildcardSd
      properties:
        sdRanges:
          description: >
            When present, it shall contain the range(s) of Slice Differentiator values supported for
            the Slice/Service Type value indicated in the sst attribute of the Snssai data type
          type: array
          items:
            $ref: '#/components/schemas/SdRange'
          minItems: 1
        wildcardSd:
          description: >
            When present, it shall be set to true, to indicate that all SD values are supported for
            the Slice/Service Type value indicated in the sst attribute of the Snssai data type.
          type: boolean
          enum:
            - true

    SdRange:
      description: A range of SDs (Slice Differentiators)
      type: object
      properties:
        start:
          type: string
          pattern: '^[A-Fa-f0-9]{6}$'
          description: >
            First value identifying the start of an SD range. This string shall be formatted as
            specified for the sd attribute of the Snssai data type in clause 5.4.4.2.
        end:
          type: string
          pattern: '^[A-Fa-f0-9]{6}$'
```

```
      description: >
        Last value identifying the end of an SD range. This string shall be formatted as
        specified for the sd attribute of the Snssai data type in clause 5.4.4.2.

ProseServiceAuth:
  description: >
    Indicates whether the UE is authorized to use ProSe related services.
  type: object
  properties:
    proseDirectDiscoveryAuth:
      $ref: '#/components/schemas/UeAuth'
    proseDirectCommunicationAuth:
      $ref: '#/components/schemas/UeAuth'
    proseL2RelayAuth:
      $ref: '#/components/schemas/UeAuth'
    proseL3RelayAuth:
      $ref: '#/components/schemas/UeAuth'
    proseL2RemoteAuth:
      $ref: '#/components/schemas/UeAuth'
    proseL3RemoteAuth:
      $ref: '#/components/schemas/UeAuth'

EcsServerAddr:
  description: >
    Contains the Edge Configuration Server Address Configuration Information as defined in
    clause 5.2.3.6.1 of 3GPP TS 23.502.
  type: object
  properties:
    ecsFqdnList:
      type: array
      items:
        $ref: '#/components/schemas/Fqdn'
      minItems: 1
    ecsIpAddressList:
      type: array
      items:
        $ref: '#/components/schemas/IpAddr'
      minItems: 1
    ecsUriList:
      type: array
      items:
        $ref: '#/components/schemas/Uri'
      minItems: 1
    ecsProviderId:
      type: string

EcsServerAddrRm:
  anyOf:
    - $ref: '#/components/schemas/EcsServerAddr'
    - $ref: '#/components/schemas/NullValue'
  description: >
    This data type is defined in the same way as the ' EcsServerAddr ' data type, but with
    the OpenAPI 'nullable: true' property.

IpAddr:
  description: Contains an IP adresse.
  type: object
  oneOf:
    - required:
      - ipv4Addr
    - required:
      - ipv6Addr
    - required:
      - ipv6Prefix
  properties:
    ipv4Addr:
      $ref: '#/components/schemas/Ipv4Addr'
    ipv6Addr:
      $ref: '#/components/schemas/Ipv6Addr'
    ipv6Prefix:
      $ref: '#/components/schemas/Ipv6Prefix'

SACInfo:
  description: >
    Represents threshold(s) to control the triggering of network slice reporting notifications
    or the information contained in the network slice reporting notification.
  type: object
  properties:
```

```
      numericValNumUes:
        type: integer
      numericValNumPduSess:
        type: integer
      percValueNumUes:
        type: integer
        minimum: 0
        maximum: 100
      percValueNumPduSess:
        type: integer
        minimum: 0
        maximum: 100

  SACEventStatus:
    description: >
      Contains the network slice status information in terms of the current number of UEs
      registered  with a network slice, the current number of PDU Sessions established on a
      network slice or both.
    type: object
    properties:
      reachedNumUes:
        $ref: '#/components/schemas/SACInfo'
      reachedNumPduSess:
        $ref: '#/components/schemas/SACInfo'

  SpatialValidityCond:
    description: Contains the Spatial Validity Condition.
    type: object
    properties:
      trackingAreaList:
        type: array
        items:
          $ref: '#/components/schemas/Tai'
        minItems: 1
      countries:
        type: array
        items:
          $ref: '#/components/schemas/Mcc'
        minItems: 1
      geographicalServiceArea:
        $ref: '#/components/schemas/GeoServiceArea'

  SpatialValidityCondRm:
    description: Contains the Spatial Validity Condition or the null value.
    anyOf:
      - $ref: '#/components/schemas/SpatialValidityCond'
      - $ref: '#/components/schemas/NullValue'

  ServerAddressingInfo:
    description: Contains addressing information (IP addresses and/or FQDNs) of a server.
    type: object
    anyOf:
      - required:
        - ipv4Addresses
      - required:
        - ipv6Addresses
      - required:
        - fqdnList
    properties:
      ipv4Addresses:
        type: array
        items:
          $ref: '#/components/schemas/Ipv4Addr'
        minItems: 1
      ipv6Addresses:
        type: array
        items:
          $ref: '#/components/schemas/Ipv6Addr'
        minItems: 1
      fqdnList:
        type: array
        items:
          $ref: '#/components/schemas/Fqdn'
        minItems: 1

  PcfUeCallbackInfo:
    description: >
      Contains the PCF for the UE information necessary for the PCF for the PDU session to send
```

```
        SM Policy Association Establishment and Termination events.
      type: object
      properties:
        callbackUri:
          $ref: '#/components/schemas/Uri'
        bindingInfo:
          type: string
      nullable: true
      required:
        - callbackUri

    PduSessionInfo:
      description: indicates the DNN and S-NSSAI combination of a PDU session.
      type: object
      properties:
        snssai:
          $ref: '#/components/schemas/Snssai'
        dnn:
          $ref: '#/components/schemas/Dnn'
      required:
        - dnn
        - snssai

    EasIpReplacementInfo:
      description: Contains EAS IP replacement information for a Source and a Target EAS.
      type: object
      properties:
        source:
          $ref: '#/components/schemas/EasServerAddress'
        target:
          $ref: '#/components/schemas/EasServerAddress'
      required:
        - source
        - target

    EasServerAddress:
      description: Represents the IP address and port of an EAS server.
      type: object
      properties:
        ip:
          $ref: '#/components/schemas/IpAddr'
        port:
          $ref: '#/components/schemas/Uinteger'
      required:
        - ip
        - port

    RoamingRestrictions:
      description: >
        Indicates if access is allowed to a given serving network, e.g. a PLMN (MCC, MNC) or an
        SNPN (MCC, MNC, NID).
      type: object
      properties:
        accessAllowed:
          type: boolean

    GeoServiceArea:
      description: List of geographic area or list of civic address info
      type: object
      properties:
        geographicAreaList:
          type: array
          items:
            $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
          minItems: 1
        civicAddressList:
          type: array
          items:
            $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
          minItems: 1

#
# Data types describing alternative data types or combinations of data types
#
    ExtSnssai:
      allOf:
        - $ref: '#/components/schemas/Snssai'
        - $ref: '#/components/schemas/SnssaiExtension'
```

```
      description: >
        The sdRanges and wildcardSd attributes shall be exclusive from each other. If one of these
        attributes is present,  the sd attribute shall also be present and it shall contain one
Slice
        Differentiator value within the range of SD  (if the sdRanges attribute is present) or with
        any value (if the wildcardSd attribute is present).

#
# Data Types related to 5G QoS as defined in clause 5.5
#

#
# SIMPLE DATA TYPES
#
#
    Qfi:
      type: integer
      minimum: 0
      maximum: 63
      description: Unsigned integer identifying a QoS flow, within the range 0 to 63.

    QfiRm:
      type: integer
      minimum: 0
      maximum: 63
      nullable: true
      description: >
        This data type is defined in the same way as the 'Qfi' data type, but with the
        OpenAPI 'nullable: true' property.

    5Qi:
      type: integer
      minimum: 0
      maximum: 255
      description: >
        Unsigned integer representing a 5G QoS Identifier (see clause 5.7.2.1 of 3GPP TS 23.501,
        within the range 0 to 255.

    5QiRm:
      type: integer
      minimum: 0
      maximum: 255
      nullable: true
      description: >
        This data type is defined in the same way as the '5QiPriorityLevel' data type, but with
        the OpenAPI 'nullable: true' property. "

    BitRate:
      type: string
      pattern: '^\d+(\.\d+)? (bps|Kbps|Mbps|Gbps|Tbps)$'
      description: >
        String representing a bit rate; the prefixes follow the standard symbols from The
International
        System of Units, and represent x1000 multipliers, with the exception that prefix "K" is
        used to represent the standard symbol "k".

    BitRateRm:
      type: string
      pattern: '^\d+(\.\d+)? (bps|Kbps|Mbps|Gbps|Tbps)$'
      nullable: true
      description: >
        This data type is defined in the same way as the 'BitRate' data type, but with the OpenAPI
'nullable: true' property.

    ArpPriorityLevelRm:
      type: integer
      minimum: 1
      maximum: 15
      nullable: true
      description: >
        This data type is defined in the same way as the 'ArpPriorityLevel' data type, but with
        the OpenAPI 'nullable: true' property.

    ArpPriorityLevel:
      type: integer
      minimum: 1
      maximum: 15
      nullable: true
```

```
    description: >
      nullable true shall not be used for this attribute. Unsigned integer indicating the ARP
      Priority Level (see clause 5.7.2.2 of 3GPP TS 23.501, within the range 1 to 15.Values are
      ordered in decreasing order of priority, i.e. with 1 as the highest priority and 15 as
      the lowest priority.

  5QiPriorityLevel:
    type: integer
    minimum: 1
    maximum: 127
    description: >
      Unsigned integer indicating the 5QI Priority Level (see clauses 5.7.3.3 and 5.7.4 of 3GPP
      TS 23.501, within the range 1 to 127.Values are ordered in decreasing order of priority,
      i.e. with 1 as the highest priority and 127 as the lowest priority.

  5QiPriorityLevelRm:
    type: integer
    minimum: 1
    maximum: 127
    nullable: true
    description: >
      This data type is defined in the same way as the '5QiPriorityLevel' data type, but with
      the OpenAPI 'nullable: true' property.

  PacketDelBudget:
    type: integer
    minimum: 1
    description: >
      Unsigned integer indicating Packet Delay Budget (see clauses 5.7.3.4 and 5.7.4 of 3GPP
      TS 23.501), expressed in milliseconds.

  PacketDelBudgetRm:
    type: integer
    minimum: 1
    nullable: true
    description: >
      This data type is defined in the same way as the 'PacketDelBudget' data type, but with
      the OpenAPI 'nullable: true' property.

  PacketErrRate:
    type: string
    pattern: '^([0-9]E-[0-9])$'
    description: >
      String representing Packet Error Rate (see clause 5.7.3.5 and 5.7.4 of 3GPP TS 23.501,
      expressed as a "scalar x 10-k" where the scalar and the exponent k are each encoded as
      one decimal digit.

  PacketErrRateRm:
    type: string
    pattern: '^([0-9]E-[0-9])$'
    nullable: true
    description: >
      This data type is defined in the same way as the 'PacketErrRate' data type, but with
      the OpenAPI 'nullable: true' property.

  PacketLossRate:
    type: integer
    minimum: 0
    maximum: 1000
    description: >
      Unsigned integer indicating Packet Loss Rate (see clauses 5.7.2.8 and 5.7.4 of 3GPP
      TS 23.501), expressed in tenth of percent.

  PacketLossRateRm:
    type: integer
    minimum: 0
    maximum: 1000
    nullable: true
    description: >
      This data type is defined in the same way as the 'PacketLossRate' data type, but with
      the OpenAPI 'nullable: true' property.

  AverWindow:
    type: integer
    minimum: 1
    maximum: 4095
    default: 2000
```

```
      description: Unsigned integer indicating Averaging Window (see clause 5.7.3.6 and 5.7.4 of
3GPP TS 23.501), expressed in milliseconds.

    AverWindowRm:
      type: integer
      maximum: 4095
      default: 2000
      minimum: 1
      nullable: true
      description: >
        This data type is defined in the same way as the 'AverWindow' data type, but with
        the OpenAPI 'nullable: true' property.

    MaxDataBurstVol:
      type: integer
      minimum: 1
      maximum: 4095
      description: >
        Unsigned integer indicating Maximum Data Burst Volume (see clauses 5.7.3.7 and 5.7.4 of
        3GPP TS 23.501), expressed in Bytes.

    MaxDataBurstVolRm:
      type: integer
      minimum: 1
      maximum: 4095
      nullable: true
      description: >
        This data type is defined in the same way as the 'MaxDataBurstVol' data type, but with
        the OpenAPI 'nullable: true' property.

    SamplingRatio:
      type: integer
      minimum: 1
      maximum: 100
      description: >
        Unsigned integer indicating Sampling Ratio (see clauses 4.15.1 of 3GPP TS 23.502),
        expressed in percent.

    SamplingRatioRm:
      type: integer
      minimum: 1
      maximum: 100
      nullable: true
      description: >
        This data type is defined in the same way as the 'SamplingRatio' data type, but with the
        OpenAPI 'nullable: true' property.
#
    RgWirelineCharacteristics:
      $ref: '#/components/schemas/Bytes'

    RgWirelineCharacteristicsRm:
      anyOf:
        - $ref: '#/components/schemas/RgWirelineCharacteristics'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'RgWirelineCharacteristics' data type,
        but with the OpenAPI 'nullable: true' property.

    ExtMaxDataBurstVol:
      type: integer
      minimum: 4096
      maximum: 2000000
      description: >
        Unsigned integer indicating Maximum Data Burst Volume (see clauses 5.7.3.7 and 5.7.4 of
        3GPP TS 23.501), expressed in Bytes.

    ExtMaxDataBurstVolRm:
      type: integer
      minimum: 4096
      maximum: 2000000
      nullable: true
      description: >
        This data type is defined in the same way as the 'ExtMaxDataBurstVol' data type, but
        with the OpenAPI 'nullable: true' property.

    ExtPacketDelBudget:
      type: integer
      minimum: 1
```

```
      description: >
        Unsigned integer indicating Packet Delay Budget (see clauses 5.7.3.4 and 5.7.4 of 3GPP
        TS 23.501 [8])), expressed in 0.01 milliseconds.

    ExtPacketDelBudgetRm:
      type: integer
      minimum: 1
      nullable: true
      description: >
        This data type is defined in the same way as the 'ExtPacketDelBudget' data type, but
        with the OpenAPI 'nullable: true' property. "

#
# ENUMERATED DATA TYPES
#

    PreemptionCapability:
      anyOf:
        - type: string
          enum:
            - NOT_PREEMPT
            - MAY_PREEMPT
        - type: string
      description: >
        The enumeration PreemptionCapability indicates the pre-emption capability of a request on
        other QoS flows. See clause 5.7.2.2 of 3GPP TS 23.501. It shall comply with the provisions
        defined in table 5.5.3.1-1.
    PreemptionCapabilityRm:
      anyOf:
        - $ref: '#/components/schemas/PreemptionCapability'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This enumeration is defined in the same way as the 'PreemptionCapability' enumeration,
        but with the OpenAPI 'nullable: true' property.

    PreemptionVulnerability:
      anyOf:
        - type: string
          enum:
            - NOT_PREEMPTABLE
            - PREEMPTABLE
        - type: string
      description: >
        The enumeration PreemptionVulnerability indicates the pre-emption vulnerability of the QoS
        flow to pre-emption from other QoS flows. See clause 5.7.2.2 of 3GPP TS 23.501. It shall
        comply with the provisions defined in table 5.5.3.2-1

    PreemptionVulnerabilityRm:
      anyOf:
        - $ref: '#/components/schemas/PreemptionVulnerability'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This enumeration is defined in the same way as the 'PreemptionVulnerability' enumeration,
        but with the OpenAPI 'nullable: true' property."

    ReflectiveQoSAttribute:
      anyOf:
        - type: string
          enum:
            - RQOS
            - NO_RQOS
        - type: string
      description: >
        The enumeration ReflectiveQosAttribute indicates whether certain traffic of the QoS flow may
        be subject to Reflective QoS (see clause 5.7.2.3 of 3GPP TS 23.501). It shall comply with
        the provisions defined in table 5.5.3.3-1.

    ReflectiveQoSAttributeRm:
      anyOf:
        - $ref: '#/components/schemas/ReflectiveQoSAttribute'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This enumeration is defined in the same way as the 'ReflectiveQosAttribute' enumeration,
        but with the OpenAPI 'nullable: true' property. "

    NotificationControl:
      anyOf:
        - type: string
```

```
      enum:
        - REQUESTED
        - NOT_REQUESTED
    - type: string
  description: >
    The enumeration NotificationControl indicates whether notifications are requested from the
    RAN when the GFBR can no longer  (or again) be fulfilled for a QoS Flow during the lifetime
    of the QoS Flow (see clause 5.7.2.4 of 3GPP TS 23.501).
    It shall comply with the provisions defined in table 5.5.3.5-1.

NotificationControlRm:
  anyOf:
    - $ref: '#/components/schemas/NotificationControl'
    - $ref: '#/components/schemas/NullValue'
  description: >
    This enumeration is defined in the same way as the 'NotificationControl' enumeration, but
    with the OpenAPI 'nullable: true' property.

QosResourceType:
  anyOf:
    - type: string
      enum:
        - NON_GBR
        - NON_CRITICAL_GBR
        - CRITICAL_GBR
    - type: string
  description: >
    The enumeration QosResourceType indicates whether a QoS Flow is non-GBR, delay critical GBR,
    or non-delay critical GBR (see clauses 5.7.3.4 and 5.7.3.5 of 3GPP TS 23.501). It shall
    comply with the provisions defined in table 5.5.3.6-1.

QosResourceTypeRm:
  anyOf:
    - $ref: '#/components/schemas/QosResourceType'
    - $ref: '#/components/schemas/NullValue'
  description: >
    This enumeration is defined in the same way as the 'QosResourceType' enumeration, but
    with the OpenAPI 'nullable: true' property. "

AdditionalQosFlowInfo:
  anyOf:
    - anyOf:
        - type: string
          enum:
            - MORE_LIKELY
        - type: string
    - $ref: '#/components/schemas/NullValue'
  description: >
    The enumeration AdditionalQosFlowInfo provides additional QoS flow information (see clause
    9.3.1.12 3GPP TS 38.413 [11]). It shall comply with the provisions defined in table
    5.5.3.12-1.

PartitioningCriteria:
  anyOf:
    - type: string
      enum:
        - TAC
        - SUBPLMN
        - GEOAREA
        - SNSSAI
        - DNN
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
  description: |
    Possible values are:
    - "TAC": Type Allocation Code
    - "SUBPLMN": Subscriber PLMN ID
    - "GEOAREA": Geographical area, i.e. list(s) of TAI(s)
    - "SNSSAI": S-NSSAI
    - "DNN": DNN

PartitioningCriteriaRm:
  anyOf:
    - $ref: '#/components/schemas/PartitioningCriteria'
    - $ref: '#/components/schemas/NullValue'
```

```
      description: >
        This data type is defined in the same way as the ' PartitioningCriteria ' data type, but
        with the OpenAPI 'nullable: true' property.
#
#
# STRUCTURED DATA TYPES
#

    Arp:
      description: Contains Allocation and Retention Priority information.
      type: object
      properties:
        priorityLevel:
          $ref: '#/components/schemas/ArpPriorityLevel'
        preemptCap:
          $ref: '#/components/schemas/PreemptionCapability'
        preemptVuln:
          $ref: '#/components/schemas/PreemptionVulnerability'
      required:
        - priorityLevel
        - preemptCap
        - preemptVuln

    Ambr:
      description: Contains the maximum aggregated uplink and downlink bit rates.
      type: object
      properties:
        uplink:
          $ref: '#/components/schemas/BitRate'
        downlink:
          $ref: '#/components/schemas/BitRate'
      required:
        - uplink
        - downlink

    Dynamic5Qi:
      description: >
        It indicates the QoS Characteristics for a Non-standardised or not pre-configured 5QI
        for downlink and uplink.
      type: object
      properties:
        resourceType:
          $ref: '#/components/schemas/QosResourceType'
        priorityLevel:
          $ref: '#/components/schemas/5QiPriorityLevel'
        packetDelayBudget:
          $ref: '#/components/schemas/PacketDelBudget'
        packetErrRate:
          $ref: '#/components/schemas/PacketErrRate'
        averWindow:
          $ref: '#/components/schemas/AverWindow'
        maxDataBurstVol:
          $ref: '#/components/schemas/MaxDataBurstVol'
        extMaxDataBurstVol:
          $ref: '#/components/schemas/ExtMaxDataBurstVol'
        extPacketDelBudget:
          $ref: '#/components/schemas/ExtPacketDelBudget'
        cnPacketDelayBudgetDl:
          $ref: '#/components/schemas/ExtPacketDelBudget'
        cnPacketDelayBudgetUl:
          $ref: '#/components/schemas/ExtPacketDelBudget'
      required:
        - resourceType
        - priorityLevel
        - packetDelayBudget
        - packetErrRate

    NonDynamic5Qi:
      description: >
        It indicates the QoS Characteristics for a standardized or pre-configured 5QI for downlink
        and uplink.
      type: object
      properties:
        priorityLevel:
          $ref: '#/components/schemas/5QiPriorityLevel'
        averWindow:
          $ref: '#/components/schemas/AverWindow'
        maxDataBurstVol:
```

```
          $ref: '#/components/schemas/MaxDataBurstVol'
        extMaxDataBurstVol:
          $ref: '#/components/schemas/ExtMaxDataBurstVol'
        cnPacketDelayBudgetDl:
          $ref: '#/components/schemas/ExtPacketDelBudget'
        cnPacketDelayBudgetUl:
          $ref: '#/components/schemas/ExtPacketDelBudget'
      minProperties: 0

    ArpRm:
      anyOf:
        - $ref: '#/components/schemas/Arp'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'Arp' data type, but with the
        OpenAPI 'nullable: true' property.

    AmbrRm:
      anyOf:
        - $ref: '#/components/schemas/Ambr'
        - $ref: '#/components/schemas/NullValue'
      description: >
        This data type is defined in the same way as the 'Ambr' data type, but with the
        OpenAPI 'nullable: true' property."

    SliceMbr:
      description: MBR related to slice
      type: object
      properties:
        uplink:
          $ref: '#/components/schemas/BitRate'
        downlink:
          $ref: '#/components/schemas/BitRate'
      required:
        - uplink
        - downlink

    SliceMbrRm:
      description: "SliceMbr with nullable: true"

      anyOf:
        - $ref: '#/components/schemas/SliceMbr'
        - $ref: '#/components/schemas/NullValue'

#
# Data Types related to 5G Trace as defined in clause 5.6
#

#
# SIMPLE DATA TYPES
#
    PhysCellId:
      type: integer
      minimum: 0
      maximum: 1007
      description: >
        Integer value identifying the physical cell identity (PCI), as definition of "PhysCellId" IE
        in clause 6.3.2 of 3GPP TS 38.331.
    ArfcnValueNR:
      type: integer
      minimum: 0
      maximum: 3279165
      description: >
        Integer value indicating the ARFCN applicable for a downlink, uplink or bi-directional (TDD)
        NR global frequency raster,
        as definition of "ARFCN-ValueNR" IE in clause 6.3.2 of 3GPP TS 38.331.
#
#
# Enumerations
#
    TraceDepth:
      anyOf:
        - type: string
          enum:
            - MINIMUM
            - MEDIUM
            - MAXIMUM
            - MINIMUM_WO_VENDOR_EXTENSION
```

```
        - MEDIUM_WO_VENDOR_EXTENSION
        - MAXIMUM_WO_VENDOR_EXTENSION
    - type: string
  description: >
    The enumeration TraceDepth defines how detailed information should be recorded in the trace.
    See 3GPP TS 32.422 for further description of the values. It shall comply with the
    provisions defined in table 5.6.3.1-1
TraceDepthRm:
  anyOf:
    - $ref: '#/components/schemas/TraceDepth'
    - $ref: '#/components/schemas/NullValue'
  description: >
    This enumeration is defined in the same way as the 'TraceDepth' enumeration, but with
    the OpenAPI 'nullable: true' property.

JobType:
  anyOf:
    - type: string
      enum:
        - IMMEDIATE_MDT_ONLY
        - LOGGED_MDT_ONLY
        - TRACE_ONLY
        - IMMEDIATE_MDT_AND_TRACE
        - RLF_REPORTS_ONLY
        - RCEF_REPORTS_ONLY
        - LOGGED_MBSFN_MDT
    - type: string
  description: >
    The enumeration JobType defines Job Type in the trace. See 3GPP TS 32.422 for further
    description of the values. It shall comply with the provisions defined in table 5.6.3.3-1.

ReportTypeMdt:
  anyOf:
    - type: string
      enum:
        - PERIODICAL
        - EVENT_TRIGGED
    - type: string
  description: >
    The enumeration ReportTypeMdt defines Report Type for logged MDT in the trace. See 3GPP TS
    32.422 for further description of the values. It shall comply with the provisions defined
    in table 5.6.3.4-1.

MeasurementLteForMdt:
  anyOf:
    - type: string
      enum:
        - M1
        - M2
        - M3
        - M4_DL
        - M4_UL
        - M5_DL
        - M5_UL
        - M6_DL
        - M6_UL
        - M7_DL
        - M7_UL
        - M8
        - M9
    - type: string
  description: >
    The enumeration MeasurementLteForMdt defines Measurements used for MDT in LTE in the trace.
    See 3GPP TS 32.422 for further description of the values. It shall comply with the
    provisions defined in table 5.6.3.5-1.

MeasurementNrForMdt:
  anyOf:
    - type: string
      enum:
        - M1
        - M2
        - M3
        - M4_DL
        - M4_UL
        - M5_DL
        - M5_UL
        - M6_DL
```

```
            - M6_UL
            - M7_DL
            - M7_UL
            - M8
            - M9
        - type: string
      description: >
        The enumeration MeasurementNrForMdt defines Measurements used for MDT in NR in the trace.
        See 3GPP TS 32.422 for further description of the values. It shall comply with the
provisions
        defined in table 5.6.3.6-1.

    SensorMeasurement:
      anyOf:
        - type: string
          enum:
            - BAROMETRIC_PRESSURE
            - UE_SPEED
            - UE_ORIENTATION
        - type: string
      description: >
        The enumeration SensorMeasurement defines sensor measurement type for MDT in the trace. See
3GPP
        TS 32.422 for further description of the values. It shall comply with the provisions defined
        in table 5.6.3.7-1.

    ReportingTrigger:
      anyOf:
        - type: string
          enum:
            - PERIODICAL
            - EVENT_A2
            - EVENT_A2_PERIODIC
            - ALL_RRM_EVENT_TRIGGERS
        - type: string
      description: >
        The enumeration ReportingTrigger defines Reporting Triggers for MDT in the trace. See 3GPP
        TS 32.42] for further  description of the values. It shall comply with the provisions
        defined in table 5.6.3.8-1.

    ReportIntervalMdt:
      anyOf:
        - type: string
          enum:
            - 120
            - 240
            - 480
            - 640
            - 1024
            - 2048
            - 5120
            - 10240
            - 60000
            - 360000
            - 720000
            - 1800000
            - 3600000
        - type: string
      description: >
        The enumeration ReportIntervalMdt defines Report Interval for MDT in the trace. See 3GPP
        TS 32.422 for further description of the values. It shall comply with
        the provisions defined in table 5.6.3.9-1.

    ReportAmountMdt:
      anyOf:
        - type: string
          enum:
            - 1
            - 2
            - 4
            - 8
            - 16
            - 32
            - 64
            - infinity
        - type: string
      description: >
        The enumeration ReportAmountMdt defines Report Amount for MDT in the trace. See 3GPP
```

```
      TS 32.422 for further description of the values. It shall comply with the provisions
      defined in table 5.6.3.10-1.

    EventForMdt:
      anyOf:
        - type: string
          enum:
            - OUT_OF_COVERAG
            - A2_EVENT
        - type: string
      description: >
        The enumeration EventForMdt defines events triggered measurement for logged MDT in the
        trace. See 3GPP TS 32.422 for further description of the values. It shall comply with
        the provisions defined in table 5.6.3.11-1

    LoggingIntervalMdt:
      anyOf:
        - type: string
          enum:
            - 128
            - 256
            - 512
            - 1024
            - 2048
            - 3072
            - 4096
            - 6144
        - type: string
      description: >
        The enumeration LoggingIntervalMdt defines Logging Interval for MDT in the trace. See 3GPP
        TS 32.422 for further description of the values. It shall comply with the provisions
        defined in table 5.6.3.12-1.

    LoggingDurationMdt:
      anyOf:
        - type: string
          enum:
            - 600
            - 1200
            - 2400
            - 3600
            - 5400
            - 7200
        - type: string
      description: >
        The enumeration LoggingIntervalMdt defines Logging Interval for MDT in the trace. See 3GPP
        TS 32.422 for further description of the values. It shall comply with the provisions
        defined in table 5.6.3.12-1.

    PositioningMethodMdt:
      anyOf:
        - type: string
          enum:
            - GNSS
            - E_CELL_ID
        - type: string
      description: >
        The enumeration LoggingDurationMdt defines Logging Duration for MDT in the trace. See 3GPP
        TS 32.422 for further description of the values. It shall comply with the provisions
        defined in table 5.6.3.13-1.

    CollectionPeriodRmmLteMdt:
      anyOf:
        - type: string
          enum:
            - 1024
            - 1280
            - 2048
            - 2560
            - 5120
            - 10240
            - 60000
        - type: string
      description: >
        The enumeration CollectionPeriodRmmLteMdt defines Collection period for RRM measurements
        LTE for MDT in the trace. See 3GPP TS 32.422 for further description of the values. It shall
        comply with the provisions defined in table 5.6.3.15-1.
```

```
    MeasurementPeriodLteMdt:
      anyOf:
        - type: string
          enum:
            - 1024
            - 1280
            - 2048
            - 2560
            - 5120
            - 10240
            - 60000
        - type: string
      description: >
        The enumeration MeasurementPeriodLteMdt defines Measurement period LTE for MDT in the trace.
        See 3GPP TS 32.422 for further description of the values. It shall comply with the
        provisions defined in table 5.6.3.16-1.

    ReportIntervalNrMdt:
      anyOf:
        - type: string
          enum:
            - 120
            - 240
            - 480
            - 640
            - 1024
            - 2048
            - 5120
            - 10240
            - 20480
            - 40960
            - 60000
            - 360000
            - 720000
            - 1800000
            - 3600000
        - type: string
      description: >
        The enumeration ReportIntervalNrMdt defines Report Interval in NR for MDT in the trace. See
        3GPP TS 32.422 for further description of the values. It shall comply with the provisions
        defined in table 5.6.3.17-1.

    LoggingIntervalNrMdt:
      anyOf:
        - type: string
          enum:
            - 128
            - 256
            - 512
            - 1024
            - 2048
            - 3072
            - 4096
            - 6144
            - 320
            - 640
            - infinity
        - type: string
      description: >
        The enumeration LoggingIntervalNrMdt defines Logging Interval in NR for MDT in the trace.
        See 3GPP TS 32.422 for further description of the values. It shall comply with the
        provisions defined in table 5.6.3.18-1.

    CollectionPeriodRmmNrMdt:
      anyOf:
        - type: string
          enum:
            - 1024
            - 2048
            - 5120
            - 10240
            - 60000
        - type: string
      description: >
        The enumeration CollectionPeriodRmmNrMdt defines Collection period for RRM measurements NR
for MDT in the trace.
        See 3GPP TS 32.422 for further description of the values. It shall comply with the
provisions defined in table 5.6.3.19-1
```

```
    LoggingDurationNrMdt:
      anyOf:
        - type: string
          enum:
            - 600
            - 1200
            - 2400
            - 3600
            - 5400
            - 7200
        - type: string
      description: >
        The enumeration LoggingDurationMdt defines Logging Duration in NR for MDT in the trace. See
        3GPP TS 32.422 for further description of the values. It shall comply with the provisions
        defined in table 5.6.3.20-1.
#
# STRUCTURED DATA TYPES
#
    TraceData:
      description: contains Trace control and configuration parameters.
      type: object
      nullable: true
      properties:
        traceRef:
          type: string
          pattern: '^[0-9]{3}[0-9]{2,3}-[A-Fa-f0-9]{6}$'
          description: >
            Trace Reference (see 3GPP TS 32.422).It shall be encoded as the concatenation of MCC,
            MNC and Trace ID as follows: 'MCC'<MNC'-'Trace ID'The Trace ID shall be encoded as a 3
octet string in hexadecimal
            representation. Each character in the Trace ID string shall take a value of "0" to "9",
            "a" to "f" or "A" to "F" and shall represent 4 bits.
            The most significant character representing the 4 most significant bits of the Trace ID
            shall appear first  in the string, and the character representing the 4 least
significant
            bit of the Trace ID shall appear last in the string.

        traceDepth:
          $ref: '#/components/schemas/TraceDepth'
        neTypeList:
          type: string
          pattern: '^[A-Fa-f0-9]+$'
          description: >
            List of NE Types (see 3GPP TS 32.422).It shall be encoded as an octet string in
            hexadecimal representation.
            Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F"
            and shall represent 4 bits.
            The most significant character representing the 4 most significant bits shall appear
            first in the string, and the character representing the
            4 least significant bit shall appear last in the string.Octets shall be coded
            according to 3GPP TS 32.422.
        eventList:
          type: string
          pattern: '^[A-Fa-f0-9]+$'
          description: >
            Triggering events (see 3GPP TS 32.422).It shall be encoded as an octet string in
            hexadecimal representation. Each character in the string shall take a value of "0"
            to "9", "a" to "f" or "A" to "F" and shall represent 4 bits.
            The most significant character representing the 4 most significant bits shall appear
            first in the string, and the character representing the 4 least significant bit shall
            appear last in the string. Octets shall be coded according to 3GPP TS 32.422.
        collectionEntityIpv4Addr:
          $ref: '#/components/schemas/Ipv4Addr'
        collectionEntityIpv6Addr:
          $ref: '#/components/schemas/Ipv6Addr'
        interfaceList:
          type: string
          pattern: '^[A-Fa-f0-9]+$'
          description: >
            List of Interfaces (see 3GPP TS 32.422).It shall be encoded as an octet string in
            hexadecimal representation.
            Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F"
            and shall represent 4 bits. The most significant character representing the 4 most
            significant bits shall appear first in the string, and the character representing the
            4 least significant bit shall appear last in the string. Octets shall be coded
            according to 3GPP TS 32.422. If this attribute is not present, all the interfaces
            applicable to the list of NE types indicated in the neTypeList attribute should
```

```
        be traced.
    required:
      - traceRef
      - traceDepth
      - neTypeList
      - eventList

  MdtConfiguration:
    description: contains contain MDT configuration data.
    type: object
    required:
      - jobType
    properties:
      jobType:
        $ref: '#/components/schemas/JobType'
      reportType:
        $ref: '#/components/schemas/ReportTypeMdt'
      areaScope:
        $ref: '#/components/schemas/AreaScope'
      measurementLteList:
        type: array
        items:
          $ref: '#/components/schemas/MeasurementLteForMdt'
      measurementNrList:
        type: array
        items:
          $ref: '#/components/schemas/MeasurementNrForMdt'
        minItems: 1
      sensorMeasurementList:
        type: array
        items:
          $ref: '#/components/schemas/SensorMeasurement'
        minItems: 1
      reportingTriggerList:
        type: array
        items:
          $ref: '#/components/schemas/ReportingTrigger'
        minItems: 1
      reportInterval:
        $ref: '#/components/schemas/ReportIntervalMdt'
      reportIntervalNr:
        $ref: '#/components/schemas/ReportIntervalNrMdt'
      reportAmount:
        $ref: '#/components/schemas/ReportAmountMdt'
      eventThresholdRsrp:
        type: integer
        minimum: 0
        maximum: 97
        description: >
          This IE shall be present if the report trigger parameter is configured for A2 event
          reporting or A2 event triggered periodic reporting and the job type parameter is
          configured for Immediate MDT or combined Immediate MDT and Trace in LTE.
          When present, this IE shall indicate the Event Threshold for RSRP, and the value shall
          be between 0-97.

      eventThresholdRsrpNr:
        type: integer
        minimum: 0
        maximum: 127
        description: >
          This IE shall be present if the report trigger parameter is configured for A2 event
          reporting or A2 event triggered periodic reporting and the job type parameter is
          configured for Immediate MDT or combined Immediate MDT
          and Trace in NR. When present,
          this IE shall indicate the Event Threshold for RSRP, and the value shall be
          between 0-127.
      eventThresholdRsrq:
        type: integer
        minimum: 0
        maximum: 34
        description: >
          This IE shall be present if the report trigger parameter is configured for A2 event
          reporting or A2 event triggered periodic reporting and the job type parameter is
          configured for Immediate MDT or combined Immediate MDT and Trace in LTE.When present,
          this IE shall indicate the Event Threshold for RSRQ, and the value shall be
          between 0-34.
      eventThresholdRsrqNr:
        type: integer
```

```
        minimum: 0
        maximum: 127
        description: >
          This IE shall be present if the report trigger parameter is configured for A2 event
          reporting or A2 event triggered periodic reporting and the job type parameter is
          configured for Immediate MDT or combined Immediate MDT and Trace in NR.When present,
          this IE shall indicate the Event Threshold for RSRQ, and the value shall be
          between 0-127.
      eventList:
        type: array
        items:
          $ref: '#/components/schemas/EventForMdt'
        minItems: 1
      loggingInterval:
        $ref: '#/components/schemas/LoggingIntervalMdt'
      loggingIntervalNr:
        $ref: '#/components/schemas/LoggingIntervalNrMdt'
      loggingDuration:
        $ref: '#/components/schemas/LoggingDurationMdt'
      loggingDurationNr:
        $ref: '#/components/schemas/LoggingDurationNrMdt'
      positioningMethod:
        $ref: '#/components/schemas/PositioningMethodMdt'
      addPositioningMethodList:
        type: array
        items:
          $ref: '#/components/schemas/PositioningMethodMdt'
        minItems: 1
      collectionPeriodRmmLte:
        $ref: '#/components/schemas/CollectionPeriodRmmLteMdt'
      collectionPeriodRmmNr:
        $ref: '#/components/schemas/CollectionPeriodRmmNrMdt'
      measurementPeriodLte:
        $ref: '#/components/schemas/MeasurementPeriodLteMdt'
      mdtAllowedPlmnIdList:
        type: array
        items:
          $ref: '#/components/schemas/PlmnId'
        minItems: 1
        maxItems: 16
      mbsfnAreaList:
        type: array
        items:
          $ref: '#/components/schemas/MbsfnArea'
        minItems: 1
        maxItems: 8
      interFreqTargetList:
        type: array
        items:
          $ref: '#/components/schemas/InterFreqTargetInfo'
        minItems: 1
        maxItems: 8

  AreaScope:
    description: Contain the area based on Cells or Tracking Areas.
    type: object
    properties:
      eutraCellIdList:
        type: array
        items:
          $ref: '#/components/schemas/EutraCellId'
        minItems: 1
      nrCellIdList:
        type: array
        items:
          $ref: '#/components/schemas/NrCellId'
        minItems: 1
      tacList:
        type: array
        items:
          $ref: '#/components/schemas/Tac'
        minItems: 1
      tacInfoPerPlmn:
        type: object
        additionalProperties:
          $ref: '#/components/schemas/TacInfo'
        minProperties: 1
        description: >
```

```
          A map (list of key-value pairs) where PlmnId converted to a string serves as key

    TacInfo:
      description: contains tracking area information (tracking area codes).
      type: object
      required:
        - tacList
      properties:
        tacList:
          type: array
          items:
            $ref: '#/components/schemas/Tac'
          minItems: 1

    MbsfnArea:
      description: Contains an MBSFN area information.
      type: object
      properties:
        mbsfnAreaId:
          type: integer
          minimum: 0
          maximum: 255
          description: This IE shall contain the MBSFN Area ID.
        carrierFrequency:
          type: integer
          minimum: 0
          maximum: 262143
          description: When present, this IE shall contain the Carrier Frequency (EARFCN).

    InterFreqTargetInfo:
      description: Indicates the Inter Frequency Target information.
      required:
        - dlCarrierFreq
      type: object
      properties:
        dlCarrierFreq:
          $ref: '#/components/schemas/ArfcnValueNR'
        cellIdList:
          type: array
          items:
            $ref: '#/components/schemas/PhysCellId'
          minItems: 1
          maxItems: 32
          description: >
            When present, this IE shall contain a list of the physical cell identities where the
            UE is requested to perform measurement logging for the indicated frequency.


# Data Types related to 5G ODB as defined in clause 5.7

#
# SIMPLE DATA TYPES
#
#
#
# Enumerations
#
    RoamingOdb:
      anyOf:
        - type: string
          enum:
            - OUTSIDE_HOME_PLMN
            - OUTSIDE_HOME_PLMN_COUNTRY
        - type: string
      description: >
        The enumeration RoamingOdb defines the Barring of Roaming as. See 3GPP TS 23.015 for further
        description. It shall comply with the provisions defined in table 5.7.3.1-1.

    OdbPacketServices:
      anyOf:
        - anyOf:
            - type: string
              enum:
                - ALL_PACKET_SERVICES
                - ROAMER_ACCESS_HPLMN_AP
                - ROAMER_ACCESS_VPLMN_AP
            - type: string
        - $ref: '#/components/schemas/NullValue'
```

```
      description: >
        The enumeration OdbPacketServices defines the Barring of Packet Oriented Services.
        See 3GPP TS 23.015 for further description. It shall comply with the provisions defined
        in table 5.7.3.2-1

#
# STRUCTURED DATA TYPES
#

    OdbData:
      description: Contains information regarding operater  determined  barring.
      type: object
      properties:
        roamingOdb:
          $ref: '#/components/schemas/RoamingOdb'

#
# Data Types related to Charging as defined in clause 5.8
#

#
# SIMPLE DATA TYPES
#
#
    ChargingId:
      deprecated: true
      type: integer
      minimum: 0
      maximum: 4294967295 #(2^32)-1
      description: >
        Integer where the allowed values correspond to the value range of an unsigned 32-bit
        integer.


    ApplicationChargingId:
      type: string
      description: Application provided charging identifier allowing correlation of charging
information.

    RatingGroup:
      $ref: '#/components/schemas/Uint32'

    ServiceId:
      $ref: '#/components/schemas/Uint32'


#
# Enumerations
#

#
# STRUCTURED DATA TYPES
#
    SecondaryRatUsageReport:
      description: Secondary RAT Usage Report to report usage data for a secondary RAT for QoS
flows.
      type: object
      properties:
        secondaryRatType:
          $ref: '#/components/schemas/RatType'
        qosFlowsUsageData:
          type: array
          items:
            $ref: '#/components/schemas/QosFlowUsageReport'
          minItems: 1
      required:
        - secondaryRatType
        - qosFlowsUsageData

    QosFlowUsageReport:
      description: Contains QoS flows usage data information.
      type: object
      properties:
        qfi:
          $ref: '#/components/schemas/Qfi'
        startTimeStamp:
          $ref: '#/components/schemas/DateTime'
        endTimeStamp:
```

```
          $ref: '#/components/schemas/DateTime'
        downlinkVolume:
          $ref: '#/components/schemas/Int64'
        uplinkVolume:
          $ref: '#/components/schemas/Int64'
      required:
        - qfi
        - startTimeStamp
        - endTimeStamp
        - downlinkVolume
        - uplinkVolume

    SecondaryRatUsageInfo:
      description: >
        Secondary RAT Usage Information to report usage data for a secondary RAT for QoS flows
        and/or the whole PDU session.
      type: object
      properties:
        secondaryRatType:
          $ref: '#/components/schemas/RatType'
        qosFlowsUsageData:
          type: array
          items:
            $ref: '#/components/schemas/QosFlowUsageReport'
          minItems: 1
        pduSessionUsageData:
          type: array
          items:
            $ref: '#/components/schemas/VolumeTimedReport'
          minItems: 1
      required:
        - secondaryRatType

    VolumeTimedReport:
      description: Contains Usage data information.
      type: object
      properties:
        startTimeStamp:
          $ref: '#/components/schemas/DateTime'
        endTimeStamp:
          $ref: '#/components/schemas/DateTime'
        downlinkVolume:
          $ref: '#/components/schemas/Int64'
        uplinkVolume:
          $ref: '#/components/schemas/Int64'
      required:
        - startTimeStamp
        - endTimeStamp
        - downlinkVolume
        - uplinkVolume


# Data Types related to MBS as defined in clause 5.9
#

#
# SIMPLE DATA TYPES
#
#

    AreaSessionId:
      $ref: '#/components/schemas/Uint16'

    MbsFsaId:
      description: MBS Frequency Selection Area Identifier
      type: string
      pattern: '^[A-Fa-f0-9]{6}$'



#
# Enumerations
#
#
    MbsServiceType:
      description: Indicates the MBS service type of an MBS session
      anyOf:
        - type: string
```

```
          enum:
            - MULTICAST
            - BROADCAST
        - type: string

    MbsSessionActivityStatus:
      description: Indicates the MBS session's activity status
      anyOf:
        - type: string
          enum:
            - ACTIVE
            - INACTIVE
        - type: string

    MbsSessionEventType:
      description: MBS Session Event Type
      anyOf:
      - type: string
        enum:
          - MBS_REL_TMGI_EXPIRY
          - BROADCAST_DELIVERY_STATUS
          - INGRESS_TUNNEL_ADD_CHANGE
      - type: string

    BroadcastDeliveryStatus:
      description: Broadcast MBS Session's Delivery Status
      anyOf:
      - type: string
        enum:
          - STARTED
          - TERMINATED
      - type: string

#
# STRUCTURED DATA TYPES
#
    MbsSessionId:
      description: MBS Session Identifier
      type: object
      properties:
        tmgi:
          $ref: '#/components/schemas/Tmgi'
        ssm:
          $ref: '#/components/schemas/Ssm'
        nid:
          $ref: '#/components/schemas/Nid'
      anyOf:
        - required: [ tmgi ]
        - required: [ ssm ]

    Tmgi:
      description: Temporary Mobile Group Identity
      type: object
      properties:
        mbsServiceId:
          type: string
          pattern: '^[A-Fa-f0-9]{6}$'
          description: MBS Service ID
        plmnId:
          $ref: '#/components/schemas/PlmnId'
      required:
        - mbsServiceId
        - plmnId

    Ssm:
      description: Source specific IP multicast address
      type: object
      properties:
        sourceIpAddr:
          $ref: '#/components/schemas/IpAddr'
        destIpAddr:
          $ref: '#/components/schemas/IpAddr'
      required:
        - sourceIpAddr
        - destIpAddr

    MbsServiceArea:
      description: MBS Service Area
```

```
      type: object
      properties:
        ncgiList:
          type: array
          items:
            $ref: '#/components/schemas/NcgiTai'
          minItems: 1
          description: List of NR cell Ids
        taiList:
          type: array
          items:
            $ref: '#/components/schemas/Tai'
          minItems: 1
          description: List of tracking area Ids
      anyOf:
        - required: [ ncgiList ]
        - required: [ taiList ]

    NcgiTai:
      description: List of NR cell ids, with their pertaining TAIs
      type: object
      properties:
        tai:
          $ref: '#/components/schemas/Tai'
        cellList:
          type: array
          items:
            $ref: '#/components/schemas/Ncgi'
          minItems: 1
          description: List of List of NR cell ids
      required:
        - tai
        - cellList

    MbsSession:
      description: Individual MBS session
      type: object
      properties:
        mbsSessionId:
          $ref: '#/components/schemas/MbsSessionId'
        tmgiAllocReq:
          type: boolean
          default: false
          writeOnly: true
        tmgi:
          $ref: '#/components/schemas/Tmgi'
          readOnly: true
        expirationTime:
          $ref: '#/components/schemas/DateTime'
          readOnly: true
        serviceType:
          $ref: '#/components/schemas/MbsServiceType'
          writeOnly: true
        locationDependent:
          type: boolean
          default: false
        areaSessionId:
          $ref: '#/components/schemas/AreaSessionId'
          readOnly: true
        ingressTunAddrReq:
          type: boolean
          default: false
          writeOnly: true
        ingressTunAddr:
          type: array
          items:
            $ref: '#/components/schemas/TunnelAddress'
          minItems: 1
          readOnly: true
        ssm:
          $ref: '#/components/schemas/Ssm'
          writeOnly: true
        mbsServiceArea:
          $ref: '#/components/schemas/MbsServiceArea'
          writeOnly: true
        extMbsServiceArea:
          $ref: '#/components/schemas/ExternalMbsServiceArea'
          writeOnly: true
```

```
      dnn:
        $ref: '#/components/schemas/Dnn'
        writeOnly: true
      snssai:
        $ref: '#/components/schemas/Snssai'
        writeOnly: true
      activationTime:
        deprecated: true
        format: date-time
        type: string
      startTime:
        $ref: '#/components/schemas/DateTime'
      terminationTime:
        $ref: '#/components/schemas/DateTime'
      mbsServInfo:
        $ref: '#/components/schemas/MbsServiceInfo'
      mbsSessionSubsc:
        $ref: '#/components/schemas/MbsSessionSubscription'
      activityStatus:
        $ref: '#/components/schemas/MbsSessionActivityStatus'
      anyUeInd:
        type: boolean
        default: false
        writeOnly: true
      mbsFsaIdList:
        type: array
        items:
          $ref: '#/components/schemas/MbsFsaId'
        minItems: 1
    required:
      - serviceType
    anyOf:
      - required: [ mbsSessionId ]
      - required: [ tmgiAllocReq ]


  MbsSessionSubscription:
    description: MBS session subscription
    type: object
    properties:
      mbsSessionId:
        $ref: '#/components/schemas/MbsSessionId'
      areaSessionId:
        $ref: '#/components/schemas/AreaSessionId'
      eventList:
        type: array
        items:
          $ref: '#/components/schemas/MbsSessionEvent'
        minItems: 1
      notifyUri:
        $ref: '#/components/schemas/Uri'
      notifyCorrelationId:
        type: string
      expiryTime:
        $ref: '#/components/schemas/DateTime'
      nfcInstanceId:
        $ref: '#/components/schemas/NfInstanceId'
      mbsSessionSubscUri:
        $ref: '#/components/schemas/Uri'
        readOnly: true
    required:
      - eventList
      - notifyUri

  MbsSessionEventReportList:
    description: MBS session event report list
    type: object
    properties:
      eventReportList:
        type: array
        items:
          $ref: '#/components/schemas/MbsSessionEventReport'
        minItems: 1
      notifyCorrelationId:
        type: string
    required:
      - eventReportList
```

```
    MbsSessionEvent:
      description: MBS session event
      type: object
      properties:
        eventType:
          $ref: '#/components/schemas/MbsSessionEventType'
      required:
        - eventType

    MbsSessionEventReport:
      description: MBS session event report
      type: object
      properties:
        eventType:
          $ref: '#/components/schemas/MbsSessionEventType'
        timeStamp:
          $ref: '#/components/schemas/DateTime'
        ingressTunAddrInfo:
          $ref: '#/components/schemas/IngressTunAddrInfo'
        broadcastDelStatus:
          $ref: '#/components/schemas/BroadcastDeliveryStatus'
      required:
        - eventType

    ExternalMbsServiceArea:
      description: List of geographic area or list of civic address info for MBS Service Area
      type: object
      properties:
        geographicAreaList:
          type: array
          items:
            $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
          minItems: 1
        civicAddressList:
          type: array
          items:
            $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
          minItems: 1
      oneOf:
        - required: [ geographicAreaList ]
        - required: [ civicAddressList ]



    MbsSecurityContext:
      type: object
      properties:
        keyList:
          description: A map (list of key-value pairs) where a (unique) valid JSON string serves as
key of MbsSecurityContext
          type: object
          additionalProperties:
            $ref: '#/components/schemas/MbsKeyInfo'
          minProperties: 1
      required:
        - keyList

    MbsKeyInfo:
      description: MBS Security Key Data Structure
      type: object
      properties:
        keyDomainId:
          $ref: '#/components/schemas/Bytes'
        mskId:
          $ref: '#/components/schemas/Bytes'
        msk:
          $ref: '#/components/schemas/Bytes'
        mskLifetime:
          $ref: '#/components/schemas/DateTime'
        mtkId:
          $ref: '#/components/schemas/Bytes'
        mtk:
          $ref: '#/components/schemas/Bytes'
      required:
        - keyDomainId
        - mskId

    IngressTunAddrInfo:
```

```
    description: Ingress Tunnel Address Information
    type: object
    properties:
      ingressTunAddr:
        type: array
        items:
          $ref: '#/components/schemas/TunnelAddress'
        minItems: 1
    required:
      - ingressTunAddr


  MbsServiceAreaInfo:
    description: MBS Service Area Information for location dependent MBS session
    type: object
    properties:
      areaSessionId:
        $ref: '#/components/schemas/AreaSessionId'
      mbsServiceArea:
        $ref: '#/components/schemas/MbsServiceArea'
    required:
      - areaSessionId
      - mbsServiceArea

  MbsServiceInfo:
    description: Represent MBS Service Information.
    type: object
    properties:
      mbsMediaComps:
        type: object
        additionalProperties:
          $ref: '#/components/schemas/MbsMediaCompRm'
        minProperties: 1
      mbsSdfResPrio:
        $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/ReservPriority'
      afAppId:
        $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/AfAppId'
      mbsSessionAmbr:
        $ref: '#/components/schemas/BitRate'
    required:
      - mbsMediaComps

  MbsMediaComp:
    description: Represents an MBS Media Component.
    type: object
    properties:
      mbsMedCompNum:
        type: integer
      mbsFlowDescs:
        type: array
        items:
          $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/FlowDescription'
        minItems: 1
      mbsSdfResPrio:
        $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/ReservPriority'
      mbsMediaInfo:
        $ref: '#/components/schemas/MbsMediaInfo'
      qosRef:
        type: string
      mbsQoSReq:
        $ref: '#/components/schemas/MbsQoSReq'
    required:
      - mbsMedCompNum

  MbsMediaCompRm:
    description: >
      This data type is defined in the same way as the MbsMediaComp data type, but with the
      OpenAPI nullable property set to true.
    anyOf:
      - $ref: '#/components/schemas/MbsMediaComp'
      - $ref: '#/components/schemas/NullValue'

  MbsQoSReq:
    description: Represent MBS QoS requirements.
    type: object
    properties:
      5qi:
        $ref: '#/components/schemas/5Qi'
```

```
        guarBitRate:
          $ref: '#/components/schemas/BitRate'
        maxBitRate:
          $ref: '#/components/schemas/BitRate'
        averWindow:
          $ref: '#/components/schemas/AverWindow'
        reqMbsArp:
          $ref: '#/components/schemas/Arp'
      required:
        - 5qi

    MbsMediaInfo:
      description: Represent MBS Media Information.
      type: object
      properties:
        mbsMedType:
          $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/MediaType'
        maxReqMbsBwDl:
          $ref: '#/components/schemas/BitRate'
        minReqMbsBwDl:
          $ref: '#/components/schemas/BitRate'
        codecs:
          type: array
          items:
            $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/CodecData'
          minItems: 1
          maxItems: 2

#
# HTTP responses
#

  responses:
    '307':
      description: Temporary Redirect
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/RedirectResponse'
      headers:
        Location:
          description: 'The URI pointing to the resource located on the redirect target'
          required: true
          schema:
            type: string
        3gpp-Sbi-Target-Nf-Id:
          description: 'Identifier of target NF (service) instance towards which the request is
redirected'
          schema:
            type: string
    '308':
      description: Permanent Redirect
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/RedirectResponse'
      headers:
        Location:
          description: 'The URI pointing to the resource located on the redirect target'
          required: true
          schema:
            type: string
        3gpp-Sbi-Target-Nf-Id:
          description: >
            'Identifier of target NF (service) instance towards which the request is redirected'
          schema:
            type: string
    '400':
      description: Bad request
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '401':
      description: Unauthorized
      content:
        application/problem+json:
          schema:
```

```
        $ref: '#/components/schemas/ProblemDetails'
    '403':
      description: Forbidden
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '404':
      description: Not Found
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '405':
      description: Method Not Allowed
    '408':
      description: Request Timeout
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '406':
      description: 406 Not Acceptable
    '409':
      description: Conflict
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '410':
      description: Gone
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '411':
      description: Length Required
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '412':
      description: Precondition Failed
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '413':
      description: Payload Too Large
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '414':
      description: URI Too Long
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '415':
      description: Unsupported Media Type
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '429':
      description: Too Many Requests
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '500':
      description: Internal Server Error
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '501':
```

```
      description: Not Implemented
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '502':
      description: Bad Gateway
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '503':
      description: Service Unavailable
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    '504':
      description: Gateway Timeout
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ProblemDetails'
    default:
      description: Generic Error
```

# Annex B (informative): Change history

| Change history | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2017-10 | CT4#80 | C4-175048 | | | | Initial Draft. | 0.1.0 |
| 2017-10 | CT4#80 | C4-175400 | | | | Skeleton and scope | 0.2.0 |
| 2017-12 | CT4#81 | C4-176442 | | | | After CT4#81 | 0.3.0 |
| 2018-01 | CT4#82 | C4-181395 | | | | After CT4#82 | 0.4.0 |
| 2018-03 | CT4#83 | C4-182440 | | | | After CT4#83 | 0.5.0 |
| 2018-04 | CT4#84 | C4-183521 | | | | After CT4#84 | 0.6.0 |
| 2018-05 | CT4#85 | C4-184635 | | | | After CT4#85 | 0.7.0 |
| 2018-06 | CT#80 | CP-181110 | | | | Presented for information and approval | 1.0.0 |
| 2018-06 | CT#80 | | | | | Approved in CT#80 | 15.0.0 |
| 2018-09 | CT#81 | CP-182065 | 0001 | | F | ProblemDetails | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0002 | | F | Structure of AmfId | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0012 | | B | DNAI change notification type | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0015 | | F | RatType | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0017 | | B | Definition of DNAI | 15.1.0 |
| 2018-09 | CT#81 | CP-182068 | 0008 | 1 | B | Add support for 5G Trace | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0010 | 1 | F | OpenAPI Corrections | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0013 | 1 | B | Structure of ECGI and NCGI | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0007 | 1 | F | Averaging Window | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0020 | 1 | F | sd pattern | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0021 | 1 | F | Correction of the title of clauses 5.2.4.4 _LinksValueSchema and 5.2.4.5 _ SelfLink | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0023 | | F | NAI format in 5G System | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0031 | | F | GroupId Definition | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0009 | 1 | F | Removal of systematic references to the "format" keyword in data type definitions | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0033 | | F | Naming Conventions | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0027 | 1 | F | 5GMMCause and NGAP Cause | 15.1.0 |
| 2018-09 | CT#81 | CP-182173 | 0006 | 3 | F | BackUp AMF Info | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0035 | | F | URI Scheme | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0024 | 2 | F | Cleanup of the specification | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0025 | 1 | F | Correction to Regular Expression Pattern of GPSI | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0005 | 4 | F | Common data types: NonDynamic5qi and Dynamic5qi | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0028 | 1 | F | Common data type used in both TS 29.505 and TS 29.519 | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0029 | 1 | B | n6 Traffic Routing Information data type | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0019 | 4 | F | DefaultQosInformation | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0034 | 1 | F | Update of N3gaLocation data type | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0016 | 3 | F | Mobility Restriction | 15.1.0 |
| 2018-09 | CT#81 | CP-182042 | 0030 | 3 | F | Adding "nullable" property to OpenAPI definitions of data types | 15.1.0 |
| 2018-09 | CT#81 | CP-182174 | 0026 | 3 | F | Presence Reporting Area | 15.1.0 |
| 2018-09 | CT#81 | CP-182011 | 0032 | 4 | F | Adding age of location, geographic information and other missing ones in the UserLocation type | 15.1.0 |
| 2018-09 | CT#81 | CP-182183 | 0036 | 1 | B | Common data type for data change notification | 15.1.0 |
| 2018-09 | CT#81 | CP-182065 | 0037 | | F | API version number update | 15.1.0 |
| 2018-12 | CT#82 | CP-183024 | 0040 | | F | Application ID | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0049 | | F | Corrections to PDU Session Id, PDU Session Type and SupportedFeatures | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0038 | 1 | F | Area definition | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0047 | 1 | F | DNN | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0044 | 1 | F | Update of missing status code 429 in TS 29.571 | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0057 | 1 | F | 29571 CR cardinality | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0045 | 2 | F | The ARP in Default QoS | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0058 | 1 | F | Snssai pattern | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0039 | 1 | F | GroupId pattern | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0059 | | F | Adding of HTTP status code "406 Not Acceptable" | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0041 | 1 | F | VarUeId definition | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0061 | | F | ProblemDetails for 501 | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0063 | | F | ChangeItem alignment | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0046 | 2 | F | Regular Expression Patterns | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0048 | 3 | F | Alignments with NGAP | 15.2.0 |
| 2018-12 | CT#82 | CP-183168 | 0065 | 1 | F | Secondary RAT usage data reporting | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0060 | 1 | F | Data types associated with Subscribed and Authorized Default QoS for Default QoS Flow | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0042 | 3 | F | Alignment of pattern for data types with "nullable" property | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0062 | 1 | F | NF Group Id | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0053 | 2 | F | data type for complex query expression | 15.2.0 |
| 2018-12 | CT#82 | CP-183161 | 0064 | 2 | F | NgRanIdentifier and PresenceInfo | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0068 | | F | Addition of HTTP status code "412 Precondition Failed" | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0051 | 3 | F | Introduction of Barring of Roaming in 5GC | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0066 | 1 | F | Service Area Restriction | 15.2.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2018-12 | CT#82 | CP-183024 | 0067 | 1 | F | Charging related types | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0070 | | F | Correction of the reference for the SupportedFeatures Data Type | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0072 | 1 | F | Update open API version | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0073 | | F | ExternalDoc update | 15.2.0 |
| 2019-03 | CT#83 | CP-190029 | 0075 | 3 | F | Corrections on subscribed Priority | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0076 | 1 | F | AmfRegionId and AmfSetId | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0077 | 2 | F | Supported features | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0078 | 2 | F | Corrections on n3iwf Id | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0079 | 2 | F | Corrections on the encoding of bit string | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0081 | 2 | F | Corrections on Type RouteToLocation | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0082 | 1 | F | ODB correction | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0083 | | F | 3GPP TS 29.571 API version update | 15.3.0 |
| 2019-06 | CT#84 | CP-191041 | 0077 | 3 | F | CR not implemented – Supported Features | 15.4.0 |
| 2019-06 | CT#84 | CP-191041 | 0084 | 1 | F | Service Area Restriction | 15.4.0 |
| 2019-06 | CT#84 | CP-191041 | 0087 | 1 | F | ChangeItem Indicating Complete Resource Creation or Removal | 15.4.0 |
| 2019-06 | CT#84 | CP-191041 | 0089 | 2 | F | Storage of OpenAPI specification files | 15.4.0 |
| 2019-06 | CT#84 | CP-191041 | 0090 | 1 | F | Clarificaiton on Universal Matching Pattern Schema | 15.4.0 |
| 2019-06 | CT#84 | CP-191041 | 0086 | 2 | F | Correct the discription of 5qi in SubscribedDefaultQos | 15.4.0 |
| 2019-06 | CT#84 | CP-191041 | 0097 | | F | AreaCode | 15.4.0 |
| 2019-06 | CT#84 | CP-191041 | 0094 | 1 | F | Required attributes in NotifyItem | 15.4.0 |
| 2019-06 | CT#84 | CP-191041 | 0095 | 1 | F | Regular Expression Pattern of DiameterIdentity | 15.4.0 |
| 2019-06 | CT#84 | CP-191041 | 0096 | 1 | F | Secondary RAT Usage reporting at PDU session level | 15.4.0 |
| 2019-06 | CT#84 | CP-191041 | 0099 | 2 | F | Copyright Note in YAML file | 15.4.0 |
| 2019-06 | CT#84 | CP-191048 | 0100 | 1 | B | 3GPP TS 29.571 API version update | 16.0.0 |
| 2019-06 | CT#84 | CP-191050 | 0093 | | B | Definition of MTC provider Information | 16.0.0 |
| 2019-06 | CT#84 | CP-191050 | 0098 | 1 | B | Extend value of RAT Type to add NBIOT | 16.0.0 |
| 2019-06 | CT#84 | CP-191051 | 0088 | 3 | B | Common Data Type for ATSSS Capability | 16.0.0 |
| 2019-06 | CT#84 | CP-191052 | 0085 | 1 | B | Addition of Event Reporting Information Parameters for network data analytics | 16.0.0 |
| 2019-06 | CT#84 | CP-191055 | 0091 | 2 | B | NF discovery factors | 16.0.0 |
| 2019-09 | CT#85 | CP-192194 | 0102 | 3 | B | NF Set and NF Service Set | 16.1.0 |
| 2019-09 | CT#85 | CP-192133 | 0103 | | B | PlmnId | 16.1.0 |
| 2019-09 | CT#85 | CP-192133 | 0104 | 1 | B | Closed Access Group | 16.1.0 |
| 2019-09 | CT#85 | CP-192028 | 0113 | 2 | B | Network Identifier for SNPN | 16.1.0 |
| 2019-09 | CT#85 | CP-192211 | 0105 | 2 | B | Common Data Type for 5G SRVCC | 16.1.0 |
| 2019-09 | CT#85 | CP-192115 | 0107 | 1 | A | PRA ID encoding | 16.1.0 |
| 2019-09 | CT#85 | CP-192123 | 0108 | 1 | F | DNN Format correction | 16.1.0 |
| 2019-09 | CT#85 | CP-192123 | 0111 | 2 | B | PatchResult data type | 16.1.0 |
| 2019-09 | CT#85 | CP-192120 | 0116 | 3 | F | Extended PDU Session ID used in Core Network | 16.1.0 |
| 2019-09 | CT#85 | CP-192195 | 0121 | 2 | B | Small Data Rate Control Status | 16.1.0 |
| 2019-09 | CT#85 | CP-192130 | 0122 | 2 | B | Updates for 5WWC with HFC wireline access | 16.1.0 |
| 2019-09 | CT#85 | CP-192120 | 0124 | | F | 3GPP TS 29.571 API version update | 16.1.0 |
| 2019-09 | CT#85 | CP-192210 | 0125 | | F | Correction and alignment of Sampling Ratio | 16.1.0 |
| 2019-12 | CT#86 | CP-193032 | 0130 | | A | N3IWF ID encoding | 16.2.0 |
| 2019-12 | CT#86 | CP-193032 | 0138 | | A | Correction to GNbId | 16.2.0 |
| 2019-12 | CT#86 | CP-193057 | 0126 | 1 | B | Format of NF (Service) Set ID | 16.2.0 |
| 2019-12 | CT#86 | CP-193046 | 0142 | 1 | F | MAC Address as PEI format | 16.2.0 |
| 2019-12 | CT#86 | CP-193050 | 0143 | 1 | F | Alternative 1 for global uniqueness of universally managed NID - simple data types correction | 16.2.0 |
| 2019-12 | CT#86 | CP-193046 | 0135 | 2 | B | Definition of TNAP ID | 16.2.0 |
| 2019-12 | CT#86 | CP-193063 | 0131 | 1 | B | HAL-forms data type | 16.2.0 |
| 2019-12 | CT#86 | CP-193057 | 0127 | 3 | B | Delegated Discovery Parameters Conveyance in HTTP/2 headers | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0149 | | B | LTE-M RAT Type | 16.2.0 |
| 2019-12 | CT#86 | CP-193062 | 0148 | 1 | B | Common Data Type for RACS | 16.2.0 |
| 2019-12 | CT#86 | CP-193063 | 0161 | 1 | B | DNN Network Identifier and Operator Identifier | 16.2.0 |
| 2019-12 | CT#86 | CP-193036 | 0114 | 5 | B | Increasing the maximum MDBV value | 16.2.0 |
| 2019-12 | CT#86 | CP-193031 | 0160 | 1 | A | Wildcard DNN | 16.2.0 |
| 2019-12 | CT#86 | CP-193032 | 0163 | 1 | A | Correction to charging identifiers | 16.2.0 |
| 2019-12 | CT#86 | CP-193036 | 0156 | 2 | F | TAI and CGI in UserLocation | 16.2.0 |
| 2019-12 | CT#86 | CP-193046 | 0158 | 2 | B | Definition of HFC node Id and User Location information for HFC | 16.2.0 |
| 2019-12 | CT#86 | CP-193225 | 0159 | 3 | B | Wireline Service Area Restrictions | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0144 | 1 | B | Defining new data type for the Rate Control | 16.2.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2019-12 | CT#86 | CP-193049 | 0153 | 1 | B | Expected UE Behaviour parameters | 16.2.0 |
| 2019-12 | CT#86 | CP-193036 | 0150 | 2 | B | Adding support for NR and E-UTRA accessing through unlicensed bands | 16.2.0 |
| 2019-12 | CT#86 | CP-193063 | 0152 | 3 | B | PRA for LTE UE | 16.2.0 |
| 2019-12 | CT#86 | CP-193046 | 0154 | 3 | B | ACS information | 16.2.0 |
| 2019-12 | CT#86 | CP-193046 | 0136 | 4 | B | QoS for wireline access network | 16.2.0 |
| 2019-12 | CT#86 | CP-193046 | 0165 | | B | IPv4AddrMask | 16.2.0 |
| 2019-12 | CT#86 | CP-193063 | 0145 | 1 | B | InvalidParam Data Type | 16.2.0 |
| 2019-12 | CT#86 | CP-193044 | 0167 | | F | API version and External doc update | 16.2.0 |
| 2020-03 | CT#87E | CP-200032 | 0168 | 1 | C | NID | 16.3.0 |
| 2020-03 | CT#87E | CP-200020 | 0170 | 1 | F | Enumerations and "nullable" keyword | 16.3.0 |
| 2020-03 | CT#87E | CP-200032 | 0176 | 1 | F | CAG-ID size | 16.3.0 |
| 2020-03 | CT#87E | CP-200035 | 0172 | 2 | B | New RAT Type values for Non-3GPP accesses | 16.3.0 |
| 2020-03 | CT#87E | CP-200033 | 0180 | | B | External Group Identifier | 16.3.0 |
| 2020-03 | CT#87E | CP-200031 | 0182 | | B | Remove Unused MaPduCapbility Data Type | 16.3.0 |
| 2020-03 | CT#87E | CP-200035 | 0185 | | B | HFC NODE ID | 16.3.0 |
| 2020-03 | CT#87E | CP-200133 | 0190 | 1 | B | CS/PS location | 16.3.0 |
| 2020-03 | CT#87E | CP-200018 | 0192 | | B | LCS service authorization | 16.3.0 |
| 2020-03 | CT#87E | CP-200033 | 0175 | 2 | F | Status type definition | 16.3.0 |
| 2020-03 | CT#87E | CP-200035 | 0194 | | B | SupiOrSuci | 16.3.0 |
| 2020-03 | CT#87E | CP-200020 | 0191 | 1 | F | Pattern of Ipv4AddrMask | 16.3.0 |
| 2020-03 | CT#87E | CP-200267 | 0183 | 3 | B | Common data types for V2X service | 16.3.0 |
| 2020-03 | CT#87E | CP-200035 | 0173 | 4 | B | User Location for wireliness and trusted non-3GPP accesses | 16.3.0 |
| 2020-03 | CT#87E | CP-200035 | 0174 | 3 | B | PEI for 5G-RG/FN-RG and for UEs not supporting any 3GPP access technologies | 16.3.0 |
| 2020-03 | CT#87E | CP-200035 | 0189 | 1 | B | SUPI definition for 5G-RG and FN-RG | 16.3.0 |
| 2020-03 | CT#87E | CP-200021 | 0188 | 1 | B | Remove the common data type Software Version Number | 16.3.0 |
| 2020-03 | CT#87E | CP-200181 | 0179 | 4 | B | Downlink data delivery status | 16.3.0 |
| 2020-03 | CT#87E | CP-200033 | 0181 | 2 | B | MO Exception Data Counter | 16.3.0 |
| 2020-03 | CT#87E | CP-200052 | 0195 | | F | API version and External doc update | 16.3.0 |
| 2020-06 | CT#88E | CP-201030 | 0198 | | F | HTTP redirection for indirect communication | 16.4.0 |
| 2020-06 | CT#88E | CP-201066 | 0201 | 1 | F | Clarification of NF Instance ID encoding | 16.4.0 |
| 2020-06 | CT#88E | CP-201067 | 0196 | 1 | B | MDT Configuration data for 5G g | 16.4.0 |
| 2020-06 | CT#88E | CP-201047 | 0202 | 1 | B | Authentication and Authorization status | 16.4.0 |
| 2020-06 | CT#88E | CP-201048 | 0203 | 1 | F | User Location of TWAP ID or TNAP ID | 16.4.0 |
| 2020-06 | CT#88E | CP-201034 | 0199 | 3 | F | Slice Differentiator Ranges and Wildcard | 16.4.0 |
| 2020-06 | CT#88E | CP-201048 | 0197 | 1 | F | User Location for W-5GBAN | 16.4.0 |
| 2020-06 | CT#88E | CP-201066 | 0205 | 1 | F | Correction on unsigned integer types | 16.4.0 |
| 2020-06 | CT#88E | CP-201045 | 0207 | 1 | F | Nid shall be present in data types of Tai/Ncgi/GlobalRanNodeId in case of SNPN | 16.4.0 |
| 2020-06 | CT#88E | CP-201045 | 0206 | 2 | F | Identify for AMF in SNPN | 16.4.0 |
| 2020-06 | CT#88E | CP-201032 | 0208 | 1 | F | Revising the defination of LcsServiceAuth data type | 16.4.0 |
| 2020-06 | CT#88E | CP-201048 | 0209 | 1 | F | Extend GlobalRanNodeId to Support W-AGF and TNGF | 16.4.0 |
| 2020-06 | CT#88E | CP-201034 | 0210 | 1 | F | Nullvalue and "nullable" keyword | 16.4.0 |
| 2020-06 | CT#88E | CP-201034 | 0222 | 1 | F | Editorial corrections | 16.4.0 |
| 2020-06 | CT#88E | CP-201034 | 0223 | 1 | F | Correct the data type in Pc5QosFlowItem | 16.4.0 |
| 2020-06 | CT#88E | CP-201034 | 0212 | 1 | F | NotifyItem | 16.4.0 |
| 2020-06 | CT#88E | CP-201044 | 0214 | 3 | B | UPF Supports RTT Measurements without PMF | 16.4.0 |
| 2020-06 | CT#88E | CP-201045 | 0227 | | F | Clarifications to TAI / ECGI / NCGI for SNPNs | 16.4.0 |
| 2020-06 | CT#88E | CP-201046 | 0225 | 1 | F | Aligning "MO Exception data" handling with stage 2 - Data types | 16.4.0 |
| 2020-06 | CT#88E | CP-201048 | 0218 | 1 | F | Removal of RG-TMBR | 16.4.0 |
| 2020-06 | CT#88E | CP-201048 | 0219 | 1 | F | Update the RAT type definition | 16.4.0 |
| 2020-06 | CT#88E | CP-201048 | 0217 | 1 | F | Reference for RgWirelineCharacteristics | 16.4.0 |
| 2020-06 | CT#88E | CP-201066 | 0220 | | F | Storage of YAML files in ETSI Forge | 16.4.0 |
| 2020-06 | CT#88E | CP-201066 | 0221 | | F | Binary IE Encoding | 16.4.0 |
| 2020-06 | CT#88E | CP-201066 | 0226 | 1 | F | Correcting wrong reference | 16.4.0 |
| 2020-06 | CT#88E | CP-201073 | 0228 | | F | API version and External doc update | 16.4.0 |
| 2020-09 | CT#89E | CP-202107 | 0236 | 1 | F | Dynamic CN PDB | 16.5.0 |
| 2020-09 | CT#89E | CP-202100 | 0232 | 1 | F | Error corrections | 16.5.0 |
| 2020-09 | CT#89E | CP-202100 | 0234 | 1 | F | Additional PRA ID | 16.5.0 |
| 2020-09 | CT#89E | CP-202103 | 0233 | 1 | F | N5GC Location | 16.5.0 |
| 2020-09 | CT#89E | CP-202506 | 0231 | 1 | F | Ncgi typo correction | 16.5.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2020-09 | CT#89E | CP-202109 | 0229 | 1 | F | Adding missing Reference to SUPI definition | 16.5.0 |
| 2020-09 | CT#89E | CP-202096 | 0237 | | F | Rel-16 API version and External doc update | 16.5.0 |
| 2020-12 | CT#90E | CP-203035 | 0239 | | F | Removal of the reference to ETSI forge | 16.6.0 |
| 2020-12 | CT#90E | CP-203031 | 0240 | | F | Correction for implementation error 29.571 | 16.6.0 |
| 2020-12 | CT#90E | CP-203031 | 0243 | | F | Incomplete references and wrong table header | 16.6.0 |
| 2020-12 | CT#90E | CP-203039 | 0245 | | F | Alignment with TR-456 / TR-470 (BBF technical specifications) | 16.6.0 |
| 2020-12 | CT#90E | CP-203048 | 0241 | 1 | F | ssid typo in yaml | 16.6.0 |
| 2020-12 | CT#90E | CP-203031 | 0246 | 1 | F | MDT LTE Measurements | 16.6.0 |
| 2020-12 | CT#90E | CP-203068 | 0247 | 2 | F | MDT Parameters for NR | 16.6.0 |
| 2020-12 | CT#90E | CP-203036 | 0248 | | F | Rel-16 API version and External doc update | 16.6.0 |
| 2020-12 | CT#90E | CP-203061 | 0238 | 1 | F | Clarification to IPv6Prefix type | 17.0.0 |
| 2021-03 | CT#91E | CP-210037 | 0255 | | A | Error handling when the SCP fails to obtain an access token | 17.1.0 |
| 2021-03 | CT#91E | CP-210047 | 0254 | | A | NF Set ID and NF Service Set ID Definition for SNPN | 17.1.0 |
| 2021-03 | CT#91E | CP-210058 | 0256 | 1 | A | Corrections on MDT parameters | 17.1.0 |
| 2021-03 | CT#91E | CP-210034 | 0257 | 1 | F | OpenAPI Reference and description field for map data types | 17.1.0 |
| 2021-03 | CT#91E | CP-210021 | 0257 | 1 | F | ProblemDetails content in responses to PATCH requests | 17.1.0 |
| 2021-03 | CT#91E | CP-210021 | 0260 | | F | 29.571 Rel-17 API version and External doc update | 17.1.0 |
| 2021-06 | CT#92E | CP-211027 | 0265 | | B | Non-3GPP TAI | 17.2.0 |
| 2021-06 | CT#92E | CP-211080 | 0267 | | A | TAI in EutraLocation | 17.2.0 |
| 2021-06 | CT#92E | CP-211036 | 0272 | 1 | B | Support of Mute Reporting | 17.2.0 |
| 2021-06 | CT#92E | CP-211059 | 0273 | 1 | A | RedirectResponse data type definition | 17.2.0 |
| 2021-06 | CT#92E | CP-211040 | 0258 | | B | Support for satellite access RAT types | 17.2.0 |
| 2021-06 | CT#92E | CP-211039 | 0268 | 2 | B | Add ProseServiceAuth | 17.2.0 |
| 2021-06 | CT#92E | CP-211036 | 0271 | 2 | B | Common Partitioning criteria added | 17.2.0 |
| 2021-06 | CT#92E | CP-211028 | 0262 | 1 | F | ChangeItem operation definition | 17.2.0 |
| 2021-06 | CT#92E | CP-211031 | 0269 | 1 | B | CS Address Information | 17.2.0 |
| 2021-06 | CT#92E | CP-211102 | 0274 | 1 | F | Remove double definition and cleanup of the OpenAPI part | 17.2.0 |
| 2021-06 | CT#92E | CP-211103 | 0278 | 1 | F | Additions of description in OpenAPI | 17.2.0 |
| 2021-06 | CT#92E | CP-211060 | 0280 | | A | Essential Correction to GeraLocation, LAC/RAC/SAC and Cell ID data types | 17.2.0 |
| 2021-06 | CT#92E | CP-211028 | 0281 | | B | EmptyObject definition | 17.2.0 |
| 2021-06 | CT#92E | CP-211048 | 0283 | 1 | B | Extention of userLocationInfo attribute to support GERAN/UTRAN access | 17.2.0 |
| 2021-06 | CT#92E | CP-211031 | 0284 | 1 | B | New NSAC related data types | 17.2.0 |
| 2021-06 | CT#92E | CP-211030 | 0277 | 1 | B | Definition of UE-slice-MBR | 17.2.0 |
| 2021-06 | CT#92E | CP-211034 | 0275 | | F | Home Network Identifier for SNPN | 17.2.0 |
| 2021-06 | CT#92E | CP-211050 | 0285 | | F | 29.571 Rel-17 API version and External doc update | 17.2.0 |
| 2021-09 | CT#93E | CP-212054 | 0287 | 1 | F | Adding missing descriptions | 17.3.0 |
| 2021-09 | CT#93E | CP-212030 | 0289 | 2 | B | Clarification to SACInfo | 17.3.0 |
| 2021-09 | CT#93E | CP-212031 | 0290 | | B | Spatial Validity Condition | 17.3.0 |
| 2021-09 | CT#93E | CP-212035 | 0291 | 1 | B | Common Data Types for MBS | 17.3.0 |
| 2021-09 | CT#93E | CP-212030 | 0292 | | B | NSSRG value | 17.3.0 |
| 2021-09 | CT#93E | CP-212079 | 0295 | 2 | A | UE Transport Protocol Indication for N3GPP Location | 17.3.0 |
| 2021-09 | CT#93E | CP-212035 | 0296 | | B | ProseServiceAuth | 17.3.0 |
| 2021-09 | CT#93E | CP-212059 | 0298 | | F | 29.571 Rel-17 API version and External doc update | 17.3.0 |
| 2021-12 | CT#94E | CP-213100 | 0302 | 1 | B | Provisioning Server Information | 17.4.0 |
| 2021-12 | CT#94E | CP-213097 | 0303 | 1 | B | Additional common data types for MBS | 17.4.0 |
| 2021-12 | CT#94E | CP-213097 | 0304 | 1 | B | NCGI list of MBS Service Area | 17.4.0 |
| 2021-12 | CT#94E | CP-213097 | 0305 | | B | Missing 502 response and description property in common data types for MBS | 17.4.0 |
| 2021-12 | CT#94E | CP-213199 | 0308 | 2 | F | Remove Siblings of $ref attributes in OpenAPI | 17.4.0 |
| 2021-12 | CT#94E | CP-213108 | 0309 | | B | Common Data Types for SM Policy Association Establishment/Termination Events | 17.4.0 |
| 2021-12 | CT#94E | CP-213103 | 0310 | 1 | B | Update the RAT Type to support NR RedCap | 17.4.0 |
| 2021-12 | CT#94E | CP-213093 | 0311 | | F | Correction of Spatial Validity Condition | 17.4.0 |
| 2021-12 | CT#94E | CP-213124 | 0315 | | F | Extention of userLocationInfo attribute to support GERAN/UTRAN access | 17.4.0 |
| 2021-12 | CT#94E | CP-213092 | 0316 | | F | Immediate Report | 17.4.0 |
| 2021-12 | CT#94E | CP-213088 | 0319 | | A | SEPP Redirection | 17.4.0 |
| 2021-12 | CT#94E | CP-213137 | 0317 | | B | Adding EAS IP replacement information | 17.4.0 |
| 2021-12 | CT#94E | CP-213111 | 0312 | 1 | B | Common Data Type for Satellite Backhaul Category | 17.4.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2021-12 | CT#94E | CP-213088 | 0313 | 1 | A | SnssaiExtension data type definition | 17.4.0 |
| 2021-12 | CT#94E | CP-213121 | 0320 | | F | 29.571 Rel-17 API version and External doc update | 17.4.0 |
| 2022-03 | CT#95E | CP-220047 | 0323 | 4 | F | SNPN impacts - new common type RoamingRestrictions | 17.5.0 |
| 2022-03 | CT#95E | CP-220023 | 0325 | | F | BitRate Units | 17.5.0 |
| 2022-03 | CT#95E | CP-220024 | 0326 | 2 | F | Fqdn data type definition | 17.5.0 |
| 2022-03 | CT#95E | CP-220023 | 0327 | | F | PatchItem definition | 17.5.0 |
| 2022-03 | CT#95E | CP-220306 | 0328 | 4 | F | PVS Info | 17.5.0 |
| 2022-03 | CT#95E | CP-220030 | 0329 | 1 | F | SACInfo in periodic notificatio | 17.5.0 |
| 2022-03 | CT#95E | CP-220025 | 0330 | 1 | F | Alignment of desription fields | 17.5.0 |
| 2022-03 | CT#95E | CP-220079 | 0332 | | A | Correction to wrong CR implementation | 17.5.0 |
| 2022-03 | CT#95E | CP-220035 | 0334 | 1 | F | MbsSession data type for MBS session creation response | 17.5.0 |
| 2022-03 | CT#95E | CP-220125 | 0335 | 2 | F | MBS Session Status subscriptions and notifications | 17.5.0 |
| 2022-03 | CT#95E | CP-220035 | 0336 | | B | Extensions for Location dependent MBS session | 17.5.0 |
| 2022-03 | CT#95E | CP-220035 | 0337 | 1 | F | MbsServiceArea data type extension | 17.5.0 |
| 2022-03 | CT#95E | CP-220025 | 0338 | 1 | F | Clarifications to the SupportedFeatures Type encoding | 17.5.0 |
| 2022-03 | CT#95E | CP-220066 | 0340 | | F | 29.571 Rel-17 API version and External doc update | 17.5.0 |
| 2022-06 | CT#96 | CP-221024 | 0342 | 4 | F | MBS Security Context (MSK/MTK) Definitions | 17.6.0 |
| 2022-06 | CT#96 | CP-221043 | 0343 | 2 | F | Relay Service Code | 17.6.0 |
| 2022-06 | CT#96 | CP-221023 | 0344 | | F | MBS Frequency Selection Area Identifier | 17.6.0 |
| 2022-06 | CT#96 | CP-221023 | 0346 | | F | MBS Service Area Information for Location dependent MBS session | 17.6.0 |
| 2022-06 | CT#96 | CP-22103 | 0347 | | F | Broadcast Delivery Status event | 17.6.0 |
| 2022-06 | CT#96 | CP-221024 | 0348 | 1 | F | Ingress Tunnel Address Change Status Event | 17.6.0 |
| 2022-06 | CT#96 | CP-221036 | 0349 | | F | SUCI Regular Expression Pattern | 17.6.0 |
| 2022-06 | CT#96 | CP-221028 | 0350 | 4 | F | Applying the agreed formatting to the 'description' fields in A.2 | 17.6.0 |
| 2022-06 | CT#96 | CP-221027 | 0351 | | F | BitRate | 17.6.0 |
| 2022-06 | CT#96 | CP-221045 | 0352 | | F | Obsolete ChargingId Data Type | 17.6.0 |
| 2022-06 | CT#96 | CP-221024 | 0353 | 3 | F | Correction to the 'ingressTunAddr' type | 17.6.0 |
| 2022-06 | CT#96 | CP-221029 | 0354 | 3 | F | MNC Encoding in NfSetId and NfServiceSetId | 17.6.0 |
| 2022-06 | CT#96 | CP-221055 | 0355 | 5 | B | NSAG ID | 17.6.0 |
| 2022-06 | CT#96 | CP-221071 | 0361 | | F | Incomplete CR implementation for RouteToLocation | 17.6.0 |
| 2022-06 | CT#96 | CP-221034 | 0362 | 1 | B | FQDN Pattern Matching Rule | 17.6.0 |
| 2022-06 | CT#96 | CP-221051 | 0365 | | F | 29.571 Rel-17 API version and External doc update | 17.6.0 |
| 2022-09 | CT#97 | CP-222031 | 0366 | 1 | F | Defining the MBS Service Requirements | 17.7.0 |
| 2022-09 | CT#97 | CP-222029 | 0368 | 1 | F | Spatial Validity Condition | 17.7.0 |
| 2022-09 | CT#97 | CP-222048 | 0369 | 1 | F | WLAN location information for interworking between ePDG connected to EPC and 5GS | 17.7.0 |
| 2022-09 | CT#97 | CP-222026 | 0370 | | F | PlmnIdNid conversion to string (e.g. when used in maps as key) | 17.7.0 |
| 2022-09 | CT#97 | CP-222026 | 0371 | 1 | F | Clarification on GUAMI List in BackupAmfInfo | 17.7.0 |
| 2022-09 | CT#97 | CP-222031 | 0372 | 1 | F | Clarification for the keyDomainId with SNPN | 17.7.0 |
| 2022-09 | CT#97 | CP-222214 | 0373 | 2 | F | 5GPRUK ID Common Data Type | 17.7.0 |
| 2022-09 | CT#97 | CP-222069 | 0375 | | F | Missing Reference RFC 7542 | 17.7.0 |
| 2022-09 | CT#97 | CP-22229 | 0376 | 1 | F | Correction of ECS Configuration Information | 17.7.0 |
| 2022-09 | CT#97 | CP-222031 | 0377 | 1 | F | Updates and corrections to the common MBS data model | 17.7.0 |
| 2022-09 | CT#97 | CP-222058 | 0378 | | F | 29.571 Rel-17 API version and External doc update | 17.7.0 |
| 2022-12 | CT#98 | CP-223036 | 0382 | | F | Corrections to MBS data types | 17.8.0 |
| 2022-12 | CT#98 | CP-223054 | 0384 | 2 | F | 5GPRUK Name Alignment | 17.8.0 |
| 2022-12 | CT#98 | CP-223066 | 0392 | | F | 29.571 Rel-17 API version and External doc update | 17.8.0 |
| 2023-03 | CT#99 | CP-230080 | 0395 | | F | PduSessionInfo | 17.9.0 |
| 2023-03 | CT#99 | CP-230081 | 0404 | 1 | F | Update ProseServiceAuth to support the authorization of UE-to-Network relay | 17.9.0 |
| 2023-03 | CT#99 | CP-230089 | 0411 | | F | 29.571 Rel-17 API version and External doc update | 17.9.0 |

# History

| Document history | | |
|---|---|---|
| V17.5.0 | May 2022 | Publication |
| V17.6.0 | July 2022 | Publication |
| V17.7.0 | October 2022 | Publication |
| V17.8.0 | January 2023 | Publication |
| V17.9.0 | April 2023 | Publication |