**3GPP TSG-SA5 Meeting #131e *S5-203194Rev1***

**e-meeting 25th May-3rd June 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **28.541** | **CR** | **0304** | **rev** | **-** | **Current version:** | **15.5.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

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| ***Title:*** | Correction of references | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Oy LM Ericsson AB | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI15 | | | | |  | ***Date:*** | | | 2020-05-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-15 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Several references are not correct or not exist, or TS withdrawn (examples: TS 38.101 is withdrawn, reference [50] and [52] are the same) | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Correct faulty references | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Specification will continue to have wrong references. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 4.4.1, 4.5, 5.4.1, 5.5, E.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

***First change***

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

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

[3] 3GPP TS 38.300: "NR; Overall description; Stage-2".

[4] 3GPP TS 38.401: "NG-RAN; Architecture description".

[5] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[6] 3GPP TS 38.420: "NG-RAN; Xn general aspects and principles".

[7] 3GPP TS 38.470: "NG-RAN; F1 general aspects and principles".

[8] 3GPP TS 38.473: "NG-RAN; F1 application protocol (F1AP)".

[9] 3GPP TS 37.340: "NR; Multi-connectivity; Overall description; Stage 2".

[10] 3GPP TS 28.540: "Management and orchestration; 5G Network Resource Model (NRM); Stage 1".

[11] 3GPP TS 28.662: "Telecommunication management; Generic Radio Access Network (RAN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS) ".

[12] 3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception".

[13] 3GPP TS 23.003: "Numbering, Addressing and Identification".

[14] 3GPP TS 36.410: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 general aspects and principles".

[15] 3GPP TS 36.423: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 application protocol".

[16] 3GPP TS 36.425: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 interface user plane protocol".

[17] 3GPP TS 28.625: "State Management Data Definition Integration Reference Point (IRP); Information Service (IS)".

[18] ITU-T Recommendation X.731: "Information technology - Open Systems Interconnection - Systems Management: State management function".

[19] 3GPP TS 28.658: "Telecommunications management; Evolved Universal Terrestrial Radio Access Network (E-UTRAN) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)".

[20] 3GPP TS 28.702: "Core Network (CN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[21] 3GPP TS 28.708: "Telecommunication management; Evolved Packet Core (EPC) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)".

[22] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[23] 3GPP TS 29.510: "5G system; Network Function Repository Services; Stage 3".

[24] 3GPP TS 29.531: "5G System; Network Slice Selection Services Stage 3".

[25] Void.

[26] 3GPP TS 28.531: "Management and orchestration; Provisioning".

[27] 3GPP TS 28.554: "Management and orchestration; 5G End to end Key Performance Indicators (KPI)".

[28] 3GPP TS 22.261: "Service requirements for next generation new services and markets".

[29] ETSI GS NFV-IFA 013 V2.4.1 (2018-02) "Network Function Virtualisation (NFV); Management and Orchestration; Os-Ma-nfvo Reference Point - Interface and Information Model Specification".

[30] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[31] Void.

[32] 3GPP TS 38.211: "NR; Physical channels and modulation".

[33] 3GPP TS 32.616: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP); Solution Set (SS) definitions".

[34] 3GPP TS 28.623: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions".

[35] 3GPP TS 28.532: "Management and orchestration; Management services".

[36] Void.

[37] IETF RFC 791: "Internet Protocol".

[38] IETF RFC 2373: "IP Version 6 Addressing Architecture".

[39] IEEE 802.1Q: "Media Access Control Bridges and Virtual Bridged Local Area Networks".

[40] ETSI GR NFV-IFA 015 (V2.4.1): "Network Function Virtualisation (NFV) Release 2; Management and Orchestration; Report on NFV Information Model".

[41] 3GPP TS 38.213: "NR; Physical layer procedures for control".

[42] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".

[43] 3GPP TS 32.156: "Telecommunication management; Fixed Mobile Convergence (FMC) model repertoire".

[44] 3GPP TS 38.304: "NR; User Equipment (UE) procedures in Idle mode and RRC Inactive state".

[45] IETF RFC 8340: "YANG Tree Diagrams".

[46] 3GPP TS 32.160: "Management and orchestration; Management Service Template".

[47] IETF RFC 8528: "YANG Schema Mount".

[48] 3GPP TS 38.463: "NG-RAN; E1 application protocol (E1AP)".

[49] 3GPP TS 38.901: "Study on channel model for frequencies from 0.5 to 100 GHz ".

[50] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[51] 3GPP TS 38.215: "NR; Physical layer measurements".

[52] Void

***Next change***

## 4.4 Attribute definitions

### 4.4.1 Attribute properties

| Attribute Name | Documentation and Allowed Values | Properties |
| --- | --- | --- |
| administrativeState | It indicates the administrative state of the NRCellDU. It describes the permission to use or prohibition against using the cell, imposed through the OAM services.  allowedValues: LOCKED, SHUTTING DOWN, UNLOCKED.  The meaning of these values is as defined in ITU‑T Recommendation X.731 [18].  See Annex A for Relation between the "Pre-operation state of the gNB-DU Cell" and administrative state relevant in case of 2-split and 3-split deployment scenarios. | type: enumeration  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: Locked  isNullable: False |
| operationalState | It indicates the operational state of the NRCellDU instance. It describes whether the resource is installed and partially or fully operable (Enabled) or the resource is not installed or not operable (Disabled).  allowedValues: ENABLED, DISABLED. | type: enumeration  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| cellState | It indicates the usage state of the NRCellDU instance. It describes whether the cell is not currently in use (Idle), or currently in use but not configured to carry traffic (Inactive) or is currently in use and is configured to carry traffic (Active).  The Inactive and Active definitions are in accordance with TS 38.401 [4]:  "Inactive: the cell is known by both the gNB-DU and the gNB-CU. The cell shall not serve UEs;  Active: the cell is known by both the gNB-DU and the gNB-CU. The cell should be able to serve UEs."  allowedValues: IDLE", INACTIVE", ACTIVE. | type: enumeration  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| arfcnDL | NR Absolute Radio Frequency Channel Number (NR-ARFCN) for downlink  allowedValues:  See TS 38.104 [12] subclause 5.4.2. Note that allowed values of NR-ARFCN are specified for each band in subclause 5.4.2.3. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| arfcnUL | NR Absolute Radio Frequency Channel Number (NR-ARFCN) for uplink  allowedValues:  See TS 38.104 [12] subclause 5.4.2. Note that allowed values of NR-ARFCN are specified for each band in subclause 5.4.2.3. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| beamAzimuth | The azimuth of a beam transmission, which means the horizontal beamforming pointing angle (beam peak direction) in the (Phi) φ-axis in 1/10th degree resolution. See subclauses 3.2 in TS 38.104 [12] and 7.3 in TS 38.901 [49] as well as TS 28.662 [11]. The pointing angle is the direction equal to the geometric centre of the half-power contour of the beam relative to the reference plane. Zero degree implies explicit antenna bearing (boresight). Positive angle implies clockwise from the antenna bearing.  AllowedValues:  [-1800 ..1800] 0.1 degree | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: Null  isNullable: True |
| beamHorizWidth | The Horizontal beamWidth of a beam transmission, which means the horizontal beamforming half-power (3dB down) beamwidth in the (Phi) φ-axis in 1/10th degree resolution. See subclauses 3.2 in TS 38.104 [12] and 7.3 in TS 38.901 [49] .  AllowedValues:  [0..3599] 0.1 degree | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: Null  isNullable: True |
| beamIndex | Index of the beam.  For example, please see subclause 6.6.2 of TS 38.331 [50] where the ssb-Index in the rsIndexResults element of MeasResultNR is defined. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: Null  isNullable: True |
| beamTilt | The tilt of a beam transmission, which means the vertical beamforming pointing angle (beam peak direction) in the (Theta) θ-axis in 1/10th degree resolution. See subclauses 3.2 in TS 38.104 [12] and 7.3 in TS 38.901 [49] as well as TS 28.662 [11]. The pointing angle is the direction equal to the geometric centre of the half-power contour of the beam relative to the reference plane. Positive value implies downtilt.  AllowedValues:  [-900..900] 0.1 degree | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: Null  isNullable: True |
| beamType | The type of the beam.  allowedValues:  "SSB-BEAM" | type: IntegerString  multiplicity: 0..1  isOrdered: N/A  isUnique: N/A  defaultValue: Null  isNullable: True |
| beamVertWidth | The Vertical beamWidth of a beam transmission, which means the vertical beamforming half-power (3dB down) beamwidth in the (Theta) θ-axis in 1/10th degree resolution. See subclauses 3.2 in TS 38.104 [12] and 7.3 in TS 38.901 [49].  AllowedValues:  [0...1800] 0.1 degree | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: Null  isNullable: True |
| arfcnSUL | NR Absolute Radio Frequency Channel Number (NR-ARFCN) for supplementary uplink  allowedValues:  See TS 38.104 [12] subclause 5.4.2. Note that allowed values of NR-ARFCN are specified for each band in subclause 5.4.2.3. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| bSChannelBwDL | BS Channel BW in MHz. for downlink  allowedValues:  See BS Channel BW in TS 38.104 [12], subclause 5.3.​ | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| bSChannelBwUL | BS Channel BW in MHz.for uplink  allowedValues:  See BS Channel BW in TS 38.104 [12], subclause 5.3.​ | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| bSChannelBwSUL | BS Channel BW in MHz.for supplementary uplink  allowedValues:  See BS Channel BW in TS 38.104 [12], subclause 5.3.​ | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| configuredMaxTxPower | This is the maximum number of milliwatt possible for all downlink channels, used simultaneously in a sector-carrier, added together.  allowedValues: N/A | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| cyclicPrefix | Cyclic prefix as defined in TS 38.211 [32], subclause 4.2.  allowedValues:  NORMAL, EXTENDED. | type: enumeration  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| localAddress | This parameter specifies the localAddress including IP address and VLAN ID used for initialization of the underlying transport.  First string is IP address, IP address can be an IPv4 address (See RFC 791 [37]) or an IPv6 address (See RFC 2373 [38]).  Second string is VLAN Id. (See IEEE 802.1Q [39]), | type: String  multiplicity: 2  isOrdered: True  isUnique: N/A  defaultValue: None  isNullable: False |
| remoteAddress | Remote address including IP address used for initialization of the underlying transport.  IP address can be an IPv4 address (See RFC 791 [37]) or an IPv6 address (See RFC 2373 [38]). | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| gNBId | It identifies a gNB within a PLMN. The gNB ID is part of the NR Cell Identifier (NCI) of the gNB cells.  See "gNB Identifier (gNB ID)" of subclause 8.2 of TS 38.300 [3]. See "Global gNB ID" in subclause 9.3.1.6 of TS 38.413 [5].  allowedValues: 0..4294967295 | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| gNBIdLength | This indicates the number of bits for encoding the gNB ID. See "Global gNB ID" in subclause 9.3.1.6 of TS 38.413 [5].  allowedValues: 22 .. 32. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| gNB­DUId | It uniquely identifies the DU at least within a gNB-CU. See 'gNB-DU ID' in subclause 9.3.1.9 of 3GPP TS 38.473 [8].  allowedValues: 0..236-1 | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| gNB­CUUPId | It uniquely identifies the gNB-CU-UP at least within a gNB-CU-CP. See 'gNB-CU-UP ID' in subclause 9.3.1.15 of 3GPP TS 38.463 [48].  allowedValues: 0..236-1 | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| gNBCUName | It identifies the Central Entity of a NR node, see subclause 9.2.1.4 of 3GPP TS 38.473 [8].  allowedValues: Not applicable | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| gNBDUName | It identifies the Distributed Entity of a NR node, see subclause 9.2.1.5 of 3GPP TS 38.473 [8].  allowedValues: Not applicable | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| cellLocalId | It identifies a NR cell of a gNB.  It, together with the gNB Identifier (using gNBId of the parent GNBCUCPFunction or GNBDUFunction or ExternalCUCPFunction), identifies a NR cell within a PLMN. This is the NR Cell Identity (NCI). See subclause 8.2 of TS 38.300 [3],  The NCI can be constructed by encoding the gNB Identifier using gNBId (of the parent GNBCUCPFunction or GNBDUFunction or ExternalCUCPFunction) and cellLocalId where the gNB Identifier field is of length specified by gNBIdLength (of the parent GNBCUCPFunction or GNBDUFunction or ExternalCUCPFunction). See "Global gNB ID" in subclause 9.3.1.6 of TS 38.413 [5].  The NR Cell Global identifier (NCGI) is constructed from the PLMN identity the cell belongs to and the NR Cell Identifier (NCI) of the cell.  See relation between NCI and NCGI subclause 8.2 of TS 38.300 [3].  allowedValues: Not applicable | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| nRPCI | This holds the Physical Cell Identity (PCI) of the NR cell.  allowedValues:  See 3GPP TS 36.211 subclause 6.11 for legal values of pci. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| nRTAC | This holds the identity of the common Tracking Area Code for the PLMNs.  allowedValues:  a) It is the TAC or Extended-TAC.  b) A cell can only broadcast one TAC or Extended-TAC. See TS 36.300, subclause 10.1.7 (PLMNID and TAC relation).  c) TAC is defined in subclause 19.4.2.3 of 3GPP TS 23.003 [13] and Extended-TAC is defined in subclause 9.3.1.29 of 3GPP TS 38.473 [8].  d) For a 5G SA (Stand Alone), it has a non-null value. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: NULL  isNullable: True |
| GNBCUCPFunction.pLMNId | It specifies the PLMN identifier to be used as part of the global RAN node identity.  allowedValues: Not applicable. | Type: PLMNId  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| NRCellCU.pLMNIdList | It defines which PLMNs that can be served by the NR cell.  allowedValues: Not applicable. | type: PLMNId  multiplicity: 1..12  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| GNBCUUPFunction.pLMNIdList | This is a list of PLMN identifiers. It defines from which set of PLMNs an UE needs to have as its serving PLMN to be allowed to use the GNB-CU-UP.  allowedValues: Not applicable. | type: PLMNId  multiplicity: 1..12  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| NRCellDU.pLMNIdList | It defines which PLMNs that can be served by the NR cell. The first entry of the list is the PLMN used to construct the nCGI for the NR cell.  allowedValues: Not applicable. | type: PLMNId  multiplicity: 1..12  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| ExternalNRCellCU.pLMNIdList | It defines which PLMNs that are assumed to be served by the NR Cell in another gNB-CU-CP. This list is either updated by the managed element itself (e.g. due to ANR, signalling over Xn etc) or by consumer over the standard interface.  allowedValues: Not applicable. | Type: PLMNId  multiplicity: 1..12  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| sNSSAIList | It represents the list of S-NSSAI the managed object is supporting, NSSAI is a set of supported S-NSSAI(s), an S-NSSAI is comprised of a SST (Slice/Service type) and an optional SD (Slice Differentiator) field, (See 3GPP TS 23.003 [13]).  allowedValues: See 3GPP TS 23.003 [13] | type: <<S-NSSAI>>  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| rRMPolicyType | Type of the RRM policy.  The value 0 denotes use of the rRMPolicy.  The value 1 denotes use of the rRMPolicyNSSIId, rRMPolicyRatio  The value 2 denotes use of the rRMPolicyRatio2.  allowedValues: 0 : 65535. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| rRMPolicyNSSIId | The list of S-NSSAIs for which a rRMPolicyRatio value is specified  allowedValues: Not applicable. | type: DN  multiplicity: 1..\*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| rRMPolicyRatio | The RRM policy setting the ratio for the split of the Radio resources between the supported S-NSSAI lists A S-NSSAI list is defined in rRMPolicyNSSIId. rRMPolicyRatio is the list of target percentage values assigned to the corresponding rRMPolicyNSSIId values. Every value specifies the percentage of PRBs to be allocated to the corresponding S-NSSAIs, in average over time. The sum of the values shall be less or equal 100.  allowedValues: 0 : 100  See NOTE 3 and NOTE 4 | type: Integer  multiplicity: 1..\*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| rRMPolicyRatio2 | The attribute specifies a list of RRMPolicyRatio2 which defined as datatype. The attribute is used to set the ratios for the split of the Radio resources between the sNSSAILists for radio resources (e.g. RRC connected users, PDCP resource, etc.) in average time (see NOTE 3 and NOTE 2).  The sum of the values included in the item of rRMPolicyRatio2 shall be less or equal 100 (see NOTE 4).  allowedValues: Not applicable. | type: << dataType >>  multiplicity: 1..\*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| groupId | The attribute identifies one sNSSAIList group inside NRCellCU. The rRMPolicyRatio2 is configured for each group. The value of the groupId is unique inside one NRCellCU instance. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| quotaType | The attribute indicates the type of the quota which allows to allocate resources as strictly usable for defined S-NSSAIList ( “strict quota”) or allows that resources to be used by other S-NSSAIList when defined slice(s) do not need them ( “float quota”).  allowedValues: "STRICT", "FLOAT". | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| rRMPolicyMaxRatio | The RRM policy setting the maximum percentage of radio resources to be allocated to the corresponding S-NSSAIList.  This quota can be strict or float quota. Strict quota means the defined S-NSSAIList cannot be allocated resource if its used resource reached maxRatio. Float quota means the defined S-NSSAIList can use quota from other S-NSSAIList even if its resource has reached maxRatio, if there’s free quota from other S-NSSAIList. In addition, resources of the defined S-NSSAIList can be used by other S-NSSAIList when the defined S-NSSAIList do not need them.  Value 0 indicates that there is no maximum limit.  allowedValues:  0 : 100 | type: Integer  multiplicity: 0..1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| rRMPolicyMarginMaxRatio | Maximum quota margin ratio is applicable when maximum quota policy ratio is of type “float quota”. It defines the resource quota within maximum quota to reserve buffers for new resource requirements for the defined S-NSSAIList. With the margin ratio, unused resources of the maximum resource quota can be allocated to other S-NSSAIs when the free resources are more than resource amount indicated by the margin. The margin resource quota can only be used for the defined S-NSSAIList. Value 0 indicates that no margin is used.  allowedValues:  0 : 100 | type: Integer  multiplicity: 0..1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| rRMPolicyMinRatio | The RRM policy setting the minimum percentage of radio resources to be allocated to the corresponding S-NSSAIList, especially in congestion situation.  This quota can be strict or float quota. Strict quota means resources are not allowed for other S-NSSAIList even when they are not used by the defined S-NSSAIList. Float quota resources can be used by other S-NSSAIList when the defined S-NSSAIList do not need them.  Value 0 indicates that there is no minimum limit.  allowedValues:  0 : 100  NOTE: The averaging time interval is implementation dependent. | type: Integer  multiplicity: 0..1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| rRMPolicyMarginMinRatio | Minimum quota margin ratio is applicable when minimum quota policy ratio is of type “float quota”. It defines the resource quota within minimum quota to reserve buffers for new resource requirements for the defined S-NSSAIList. With the margin ratio, unused resources of the minimum resource quota can be allocated to other S-NSSAIList when the free resources are more than resource amount indicated by the margin. The margin resource quota can only be used for the defined S-NSSAIList. Value 0 indicates that no margin is used.  allowedValues:  0 : 100 | type: Integer  multiplicity: 0..1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| rRMPolicy | It represents RRM policy which includes guidance for split of radio resources between the S-NSSAIs that the cell supports in case when the rRMPolicyType is absent or equal to 0. The RRM policy is implementation dependent.  allowedValues: Not applicable | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| subCarrierSpacing | Subcarrier spacing configuration for a BWP. See subclause 5 in TS 38.104 [12].  AllowedValues:  [15, 30, 60, 120] depending on the frequency range FR1 or FR2. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| txDirection | Indicates if the transmission direction is downlink (DL), uplink (UL) or both downlink and uplink (DL and UL).  allowedValues: DL, UL, DL\_AND\_UL | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| bwpContext | It identifies whether the object is used for downlink, uplink or supplementary uplink.  allowedValues:DL, UL, SUL | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| isInitialBwp | It identifies whether the object is used for initial or other BWP.  allowedValues:INITIAL, OTHER | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| startRB | Offset in common resource blocks to common resource block 0 for the applicable subcarrier spacing for a BWP. This corresponds to N\_BWP\_start, see subclause 4.4.5 in TS 38.211 [32].  allowedValues:  0 to N\_grid\_size – 1, where N\_grid\_size equals the number of resource blocks for the BS channel bandwidth, given the subcarrier spacing of the BWP. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| numberOfRBs | Number of physical resource blocks for a BWP. This corresponds to N\_BWP\_size, see subclause 4.4.5 in TS 38.211 [32].  allowedValues:  1 to N\_grid\_size – startRB of the BWP. Se startRB for definition of N\_grid\_size. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| nRTCI | This is the Target NR Cell Identifier. It consists of NR Cell Identifier (NCI) and Physical Cell Identifier of the target NR cell (nRPCI).  The NRRelation.nRTCI identifies the target cell from the perspective of the NRCell, the name-containing instance of the subject NRCellCU instance.  allowedValues: Not applicable. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| adjacentCell | This attribute contains the DN of an adjacentNRCell (NRCellCU or ExternalNRCellCU).  allowedValues: Not applicable. | type: DN  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| nRFrequencyRef | This attribute contains the DN of the referenced NRFrequency.  allowedValues: Not applicable. | type: DN  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| nRSectorCarrierRef | This attribute contains the DN of the referenced NRSectorCarrier.  allowedValues: Not applicable. | type: DN  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| bWPRef | This attribute contains the DN of the referenced BWP.  allowedValues: Not applicable. | type: DN  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| sectorEquipmentFunctionRef | This attribute contains the DN of the referenced NSectorEquipmentFunction.  allowedValues: Not applicable. | type: DN  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| offsetMO | It is a list of offset values applicable to all measured cells with reference signal(s) indicated in this *MeasObjectNR*. See offsetMO of subclause 5.5.4 of TS 38.331 [50].  allowedValues: Not applicable. | type: QOffsetRangeList  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: N/A  isNullable: False |
| cellIndividualOffset | It is a list of offset values for the neighbour cell. Used when UE is in connected mode. The unit is 1dB. It is defined for rsrpOffsetSSB, rsrqOffsetSSB, sinrOffsetSSB, rsrpOffsetCSI-RS, rsrqOffsetCSI-RS and sinrOffsetCSI-RS. See TS 38.331 [50].  allowedValues: Not applicable. | type: Integer  multiplicity: 6  isOrdered: True  isUnique: N/A  defaultValue: 0  isNullable: False |
| blackListEntry | It specifies a list of PCI (physical cell identity) that are blacklisted in EUTRAN measurements as described in 3GPP TS 38.331 [50].  allowedValues: { 0…1007 } | type: Integer  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| blackListEntryIdleMode | It specifies a list of PCI (physical cell identity) that are blacklisted in SIB4 and SIB5.  allowedValues: { 0…1007 } | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| cellReselectionPriority | It is the absolute priority of the carrier frequency used by the cell reselection procedure. See *CellReselectionPriority* IE in TS 38.331 [50].  It corresponds to the parameter priority in 3GPP TS 38.304 [44].  Value 0 means lowest priority. The UE behaviour when no value is entered is specified in subclause 5.2.4.1 of 3GPP TS 38.304 [44].  The value shall not be already used by other RAT, i.e. equal priorities between RATs are not supported.  allowedValues: Not applicable. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: 0None  isNullable: False |
| cellReselectionSubPriority | It indicates a fractional value to be added to the value of cellReselectionPriority to obtain the absolute priority of the concerned carrier frequency for E-UTRA and NR. See *CellReselectionSubPriority* IE in TS 38.331 [50].  allowedValues: { 0.2, 0.4, 0.6, 0.8 }. | type: Short  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| pMax | It calculates the parameter Pcompensation (defined in 3GPP TS 38.304 [44]), at cell reselection to an Cell. Its unit is 1 dBm. It corresponds to parameter PEMAX in 3GPP TS 38.101-1 [42].  allowedValues: { -30..33 }. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| qOffsetFreq | It is the frequency specific offset applied when evaluating candidates for cell reselection. See TS 38.304 [44]. Its unit is 1 dB.  allowedValues:  { -24, -22, -20, -18, -16, -14, -12, -10, -8, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 20, 22, 24 } | type: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: 0  isNullable: False |
| qOffsetRangeList | It is used to indicate a cell, beam or measurement object specific offset to be applied when evaluating candidates for cell re-selection or when evaluating triggering conditions for measurement reporting. The value in dB. Value dB-24 corresponds to -24 dB, dB-22 corresponds to -22 dB and so on.  This is a list of enum values representing, in sequence: rsrpOffsetSSB, rsrqOffsetSSB, sinrOffsetSSB, rsrpOffsetCSI-RS, srqOffsetCSI-RS, sinrOffsetCSI-RS.  See Q-OffsetRangeList in subclause of subclause 6.3.1 of TS 38.331 [50].  allowedValues:  { -24, -22, -20, -18, -16, -14, -12, -10, -8, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 } | type: enumeration  multiplicity: 6  isOrdered: True  isUnique: N/A  defaultValue: 0  isNullable: False |
| qQualMin | It indicates the minimum required quality level in the cell (dB). See qQualMin in TS 38.304 [44]. Unit is 1 dB.  Value 0 means that it is not sent and UE applies in such case the (default) value of negative infinity for Qqualmin. Sent in SIB3 or SIB5.  allowedValues: { -34..-3, 0 } | type: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| qRxLevMin | It indicates the required minimum received Reference Symbol Received Power (RSRP) level in the (E-UTRA) frequency for cell reselection. It corresponds to Qrxlevmin defined in 3GPP TS 38.304 [44]. It is broadcast in SIB3 or SIB5, depending on whether the related frequency is intra- or inter-frequency. Its unit is 1 dBm and resolution is 2.  allowedValues: { -140..-44 }. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| threshXHighP | This specifies the Srxlev threshold (in dB) used by the UE when reselecting towards a higher priority RAT/ frequency than the current serving frequency. Each frequency of NR and E-UTRAN might have a specific threshold. It corresponds to the ThreshX, HighPin 3GPP TS 38.304 [44]. Its unit is 1 dB and resolution is 2**.**  allowedValues: { 0..62 } | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| threshXHighQ | This specifies the Squal threshold (in dB) used by the UE when reselecting towards a higher priority RAT/ frequency than the current serving frequency. Each frequency of NR and E-UTRAN might have a specific threshold. It corresponds to the ThreshX, HighQ in TS 38.304 [44]. Its unit is 1 dB.  allowedValues: { 0..31 } | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| threshXLowP | This specifies the Srxlev threshold (in dB) used by the UE when reselecting towards a lower priority RAT/ frequency than the current serving frequency. Each frequency of NR might have a specific threshold. It corresponds to ThreshX,LowP in 3GPP TS 38.304 [44]. Its unit is 1 dB. Its resolution is 2.  allowedValues: { 0..62 } | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| threshXLowQ | This specifies the Squal threshold (in dB) used by the UE when reselecting towards a lower priority RAT/ frequency than the current serving frequency. Each frequency of NR might have a specific threshold. It corresponds to ThreshX,Low in TS 38.304 [44]. Its unit is 1 dB.  allowedValues: {0..31}. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| tReselectionNr | It is the cell reselection timer and corresponds to parameter TreselectionRAT for NR defined in 38.331 [50]. Its unit is in seconds.   allowedValues: {0..7}. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| tReselectionNRSfHigh | The attribute t-ReselectionNr (a parameter TreselectionNR in TS 38.304 [44]) is multiplied with this factor if the UE is in high mobility state. It corresponds to the parameter Speed dependent ScalingFactor for TreselectionNr for medium high state in 3GPP TS 38.304 [44]. The unit is one %.  Value mapping: 25 = 0.25 50 = 0.5 75 = 0.75 100 = 1.0  allowedValues: {25, 50, 75, 100}. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| tReselectionNRSfMedium | The attribute t-ReselectionNR (a parameter "TreselectionNR in TS 38.304 [44]”) is multiplied with this factor if the UE is in medium mobility state. It corresponds to the parameter Speed dependent ScalingFactor for TreselectionNr for medium mobility state in 3GPP TS 38.304 [44]. Its unit is one %.  Value mapping: 25 = 0.25 50 = 0.5 75 = 0.75 100 = 1.0   allowedValues: {25, 50, 75, 100}. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| absoluteFrequencySSB | The absolute frequency applicable for a downlink NR carrier frequency associated with the SSB.  allowedValues: {0.. 3279165}. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| sSBSubCarrierSpacing | This SSB is used for for synchronization. See subclause 5 in TS 38.104 [12]. Its units are in kHz.  allowedValues: {15, 30, 120, 240}.  Note that the allowed values of SSB used for representing data, by e.g. a BWP, are: 15, 30, 60 and 120 in units of kHz. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| multiFrequencyBandListNR | It is a list of additional frequency bands the frequency belongs to. The list is automatically set by the gNB.  allowedValues: {1..256 } | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| ssbFrequency | Indicates cell defining SSB frequency domain position  Frequency of the cell defining SSB transmission. The frequency provided in this attribute identifies the position of resource element RE=#0 (subcarrier #0) of resource block RB#10 of the SS block. The frequency shall be positioned on the NR global frequency raster, as defined in TS 38.101-1 [42] subclause 5.4.2. and within bSChannelBwDL.  allowedValues: 0..3279165 | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| ssbPeriodicity | Indicates cell defined SSB periodicity in number of subframes (ms).  The SSB periodicity in msec is used for the rate matching purpose.  allowedValues: 5, 10, 20, 40, 80, 160. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| ssbOffset   |  | | --- | |  | | Indicates cell defining SSB time domain position. Defined as the offset of the measurement window, in number of subframes (ms), in which to receive SS/PBCH blocks, where allowed values depend on the ssbPeriodicity.  allowedValues:  ssbPeriodicity5 ms 0..4,  ssbPeriodicity10 ms 0..9,  ssbPeriodicity20 ms 0..19,  ssbPeriodicity40 ms 0..39,  ssbPeriodicity80 ms 0..79,  ssbPeriodicity160 ms 0..159. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| ssbDuration   |  | | --- | |  | | Duration of the measurement window in which to receive SS/PBCH blocks. It is given in number of subframes (ms) (see 38.213 [41], subclause 4.1.  allowedValues: 1, 2, 3, 4, 5. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| NOTE 1: Void  NOTE **2**: The radio resource can be signaling resources (e.g. RRC connected users) or user plane resources (e.g. PDCP). The detail resource and how to map the ratio to exact number of resources is implementation dependant**.**  NOTE **3**: The averaging time interval is implementation dependent**.**  NOTE 4: How to cacluate the sum of the ratio is implementation dependent. | | |

***Next change***

## 4.5 Common notifications

This subclause presents a list of notifications, defined in TS 28.532 [35], that provisioning management service consumer can receive. The notification parameter objectClass/objectInstance, defined in TS 28.531 [26], would capture the DN of an instance of an IOC defined in the present document.

| Name | Qualifier | Notes |
| --- | --- | --- |
| notifyMOIAttributeValueChanges | O |  |
| notifyMOICreation | O |  |
| notifyMOIDeletion | O |  |

***Next change***

## 5.4 Attribute definitions

### 5.4.1 Attribute properties

The following table defines the attributes that are present in several Information Object Classes (IOCs) of the present document.

| Attribute Name | Documentation and Allowed Values | Properties |
| --- | --- | --- |
| aMFIdentifier | The AMFI is constructed from an AMF Region ID, an AMF Set ID and an AMF Pointer. The AMF Region ID identifies the region, the AMF Set ID uniquely identifies the AMF Set within the AMF Region, and the AMF Pointer uniquely identifies the AMF within the AMF Set. (Ref. 3GPP TS 23.003 [13]) | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| aMFSetId | It represents the AMF Set ID, which is uniquely identifies the AMF Set within the AMF Region.  allowedValues: defined in subclause 2.10.1 of 3GPP TS 23.003 [13]. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| aMFSetMemberList | It is the list of DNs of AMFFunction instances of the AMFSet.  allowedValues: N/A | type: DN  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| aMFRegionId | It represents the AMF Region ID, which identifies the region.  allowedValues: defined in subclause 2.10.1 of 3GPP TS 23.003 [13]. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| localAddress | This parameter specifies the localAddress including IP address and VLAN ID used for initialization of the underlying transport.  First string is IP address, IP address can be an IPv4 address (See RFC 791 [37]) or an IPv6 address (See RFC 2373 [38]).  Second string is VLAN Id (See IEEE 802.1Q [39]). | type: String  multiplicity: 2  isOrdered: True  isUnique: N/A  defaultValue: None  isNullable: False |
| remoteAddress | Remote address including IP address used for initialization of the underlying transport.  IP address can be an IPv4 address (See RFC 791 [37]) or an IPv6 address (See RFC 2373 [38]). | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| nfProfileList | It is a set of NFProfile(s) to be registered in the NRF instance. NFProfile is defined in 3GPP TS 29.510 [23]. | type: <<dataType>>  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| nSIIdList | It is a set of NSI Id. The NSI ID is defined in subclause 6.1.6.3.2 of 3GPP TS 29.531 [24]. | type: String  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| sNSSAIList | See subclause 4.4.1. |  |
| sBIFQDN | It is used to indicate the FQDN of the registered NF instance in service-based interface, for example, NF instance FQDN structure is:  nftype<nfnum>.slicetype<sliceid>.mnc<MNC>.mcc<MCC>.3gppnetwork.org | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| sBIServiceList | It is used to indicate the all supported NF services registered on service-based interface. | type: String  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| nRTACList | It is the list of Tracking Area Code (either legacy TAC or extended TAC) where the represented management function serving.  allowedValues:  Legacy TAC and Extended TAC are defined in clause 9.3.3.10 of TS 38.413 [5]. | type: Integer  multiplicity: 1..\*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| weightFactor | The weight factor is typically set according to the capacity of local node (AMF) relative to other nodes in the same type. And it is used to achieve load balancing among a set of same type of network functions. (Ref. 3GPP TS 23.501 [2]) | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |

***Next change***

## 5.5 Common notifications

This subclause presents a list of notifications, defined in TS 28.532 [35], that provisioning management service consumer can receive. The notification parameter objectClass/objectInstance, defined in TS 28.531 [26], would capture the DN of an instance of an IOC defined in the present document.

| Name | Qualifier | Notes |
| --- | --- | --- |
| notifyMOIAttributeValueChanges | O |  |
| notifyMOICreation | O |  |
| notifyMOIDeletion | O |  |

***Next change***

# E.5 Modules

This is the list of YANG modules for NR and NG-RAN NRM.

\_3gpp-nr-nrm-beam.yang

\_3gpp-nr-nrm-bwp.yang

\_3gpp-nr-nrm-commonbeamformingfunction.yang

\_3gpp-nr-nrm-ep.yang

\_3gpp-nr-nrm-eutrancellrelation.yang

\_3gpp-nr-nrm-eutranetwork.yang

\_3gpp-nr-nrm-eutranfreqrelation.yang

\_3gpp-nr-nrm-eutranfrequency.yang

\_3gpp-nr-nrm-externalamffunction.yang

\_3gpp-nr-nrm-externalenbfunction.yang

\_3gpp-nr-nrm-externaleutrancell.yang

\_3gpp-nr-nrm-externalgnbcucpfunction.yang

\_3gpp-nr-nrm-externalgnbcuupfunction.yang

\_3gpp-nr-nrm-externalgnbdufunction.yang

\_3gpp-nr-nrm-externalnrcellcu.yang

\_3gpp-nr-nrm-externalservinggwfunction.yang

\_3gpp-nr-nrm-externalupffunction.yang

\_3gpp-nr-nrm-gnbcucpfunction.yang

\_3gpp-nr-nrm-gnbcuupfunction.yang

\_3gpp-nr-nrm-gnbdufunction.yang

\_3gpp-nr-nrm-nrcellcu.yang

\_3gpp-nr-nrm-nrcelldu.yang

\_3gpp-nr-nrm-nrcellrelation.yang

\_3gpp-nr-nrm-nrfreqrelation.yang

\_3gpp-nr-nrm-nrfrequency.yang

\_3gpp-nr-nrm-nrnetwork.yang

\_3gpp-nr-nrm-nrsectorcarrier.yang

These are the YANG modules for NR and NG-RAN NRM.

module \_3gpp-nr-nrm-beam {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-nrnetwork-beam";

prefix "beam3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-nr-nrm-commonbeamformingfunction { prefix combeamformfunc3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the Beam Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-XX-XX {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

typedef BeamType {

type enumeration {

enum SSB-BEAM;

}

}

grouping BeamGrp {

description "Represents the Beam IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf beamIndex {

description "Index of the beam.”;

mandatory true;

type int32;

}

leaf beamType {

description "The type of the beam.”;

mandatory false;

type BeamType;

}

leaf beamAzimuth {

description "The azimuth of a beam transmission, which means the horizontal beamforming pointing angle (beam peak direction) in the (Phi) φ-axis in 1/10th degree resolution. The pointing angle is the direction equal to the geometric centre of the half-power contour of the beam relative to the reference plane. Zero degree implies explicit antenna bearing (boresight). Positive angle implies clockwise from the antenna bearing.";

reference "3GPP TS 38.104, TS 38.901, TS 28.662";

mandatory false;

type int32 { range "-1800..1800"; }

units 0.1 degree;

}

leaf beamTilt {

description "The tilt of a beam transmission, which means the vertical beamforming pointing angle (beam peak direction) in the (Theta) θ-axis in 1/10th degree resolution.

The pointing angle is the direction equal to the geometric centre of the half-power contour of the beam relative to the reference plane. Positive value implies downtilt.";

reference "3GPP TS 38.104, TS 38.901, TS 28.662";

mandatory false;

type int32 { range "-900..900"; }

units 0.1 degree;

}

leaf beamHorizWidth {

description " The Horizontal beamWidth of a beam transmission, which means the horizontal beamforming half-power (3dB down) beamwidth in the (Phi) φ-axis in 1/10th degree resolution.";

reference "3GPP TS 38.104, TS 38.901";

mandatory false;

type int32 { range "0..3599"; }

units 0.1 degree;

}

leaf beamVertWidth {

description " The Vertical beamWidth of a beam transmission, which means the vertical beamforming half-power (3dB down) beamwidth in the (Theta) θ-axis in 1/10th degree resolution.";

reference "3GPP TS 38.104, TS 38.901";

mandatory false;

type int32 { range "0..1800"; }

units 0.1 degree;

}

}

augment "/me3gpp:ManagedElement/combeamformfunc3gpp:CommonBeamformingFunction" {

list Beam {

description "Represents the per-Beam information required for, e.g. beam performance management utilizing measurements generated in the RAN. Can have spatial attributes of horizontal/azimuth (ie: Phi φ-axis) and vertical/tilt (ie: Theta θ-axis) beam pointing direction and beam width attributes.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses BeamGrp;

}

}

}

}

module \_3gpp-nr-nrm-bwp {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-bwp";

prefix "bwp3gpp";

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-nr-nrm-gnbdufunction { prefix gnbdu3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the BWP Information Object Class

(IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

typedef CyclicPrefix {

type enumeration {

enum NORMAL;

enum EXTENDED;

}

}

typedef BwpContext {

type enumeration {

enum DL;

enum UL;

enum SUL;

}

}

typedef IsInitialBwp {

type enumeration {

enum INITIAL;

enum OTHER;

}

}

grouping BWPGrp {

description "Represents the BWP IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf bwpContext {

description "Identifies whether the object is used for downlink, uplink

or supplementary uplink.";

mandatory true;

type BwpContext;

}

leaf isInitialBwp {

description "Identifies whether the object is used for initial or other

BWP.";

mandatory true;

type IsInitialBwp;

}

leaf subCarrierSpacing {

description "Subcarrier spacing configuration for a BWP.";

reference "3GPP TS 38.104";

mandatory true;

type uint32 { range "5 | 30 | 60 | 120"; }

units kHz;

}

leaf cyclicPrefix {

description "Cyclic prefix, which may be normal or extended.";

reference "3GPP TS 38.211";

mandatory true;

type CyclicPrefix;

}

leaf startRB {

description "Offset in common resource blocks to common resource block 0

for the applicable subcarrier spacing for a BWP.";

reference "N\_BWP\_start in 3GPP TS 38.211";

mandatory true;

type uint32;

}

leaf numberOfRBs {

description "Number of physical resource blocks for a BWP.";

reference "N\_BWP\_size in 3GPP TS 38.211";

mandatory true;

type uint32;

}

}

augment "/me3gpp:ManagedElement/gnbdu3gpp:GNBDUFunction" {

list BWP {

description "Represents a bandwidth part (BWP).";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses BWPGrp;

}

}

}

}

module \_3gpp-nr-nrm-commonbeamformingfunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-nrnetwork-commonbeamformingfunction";

prefix "combeamformfunc3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-nr-nrm-nrsectorcarrier { prefix nrsectcarr3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the CommonBeamformingFuntion Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-XX-XX {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping CommonBeamformingFunctionGrp {

description "Represents the CommonBeamformingFunction IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

}

augment "/me3gpp:ManagedElement/nrsectcarr3gpp:NRSectorCarrier" {

list CommonBeamformingFunction {

description "Represents common beamforming functionality (eg: SSB beams) for the NRSectorCarrier.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses CommonBeamformingFunctionGrp;

}

}

}

}

module \_3gpp-nr-nrm-ep {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-ep";

prefix "ep3gpp";

import \_3gpp-common-ep-rp { prefix eprp3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-nr-nrm-gnbcucpfunction { prefix gnbcucp3gpp; }

import \_3gpp-nr-nrm-gnbcuupfunction { prefix gnbcuup3gpp; }

import \_3gpp-nr-nrm-gnbdufunction { prefix gnbdu3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the NR related endpoint

Information Object Classes (IOCs) that are part of the NR Network

Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping EP\_E1Grp {

description "Represents the EP\_E1 IOC.";

reference "3GPP TS 28.541, 3GPP TS 38.401";

uses eprp3gpp:EP\_Common;

}

grouping EP\_F1CGrp {

description "Represents the EP\_F1C IOC.";

reference "3GPP TS 28.541, 3GPP TS 38.470";

uses eprp3gpp:EP\_Common;

}

grouping EP\_F1UGrp {

description "Represents the EP\_F1U IOC.";

reference "3GPP TS 28.541, 3GPP TS 38.470";

uses eprp3gpp:EP\_Common;

}

grouping EP\_XnCGrp {

description "Represents the EP\_XnC IOC.";

reference "3GPP TS 28.541, 3GPP TS 38.420";

uses eprp3gpp:EP\_Common;

}

grouping EP\_XnUGrp {

description "Represents the EP\_XnU IOC.";

reference "3GPP TS 28.541, 3GPP TS 38.420";

uses eprp3gpp:EP\_Common;

}

grouping EP\_NgCGrp {

description "Represents the EP\_NgC IOC.";

reference "3GPP TS 28.541, 3GPP TS 38.470";

uses eprp3gpp:EP\_Common;

}

grouping EP\_NgUGrp {

description "Represents the EP\_NgU IOC.";

reference "3GPP TS 28.541, 3GPP TS 38.470";

uses eprp3gpp:EP\_Common;

}

grouping EP\_X2CGrp {

description "Represents the EP\_X2C IOC.";

reference "3GPP TS 28.541, 3GPP TS 36.423";

uses eprp3gpp:EP\_Common;

}

grouping EP\_X2UGrp {

description "Represents the EP\_X2U IOC.";

reference "3GPP TS 28.541, 3GPP TS 36.425";

uses eprp3gpp:EP\_Common;

}

grouping EP\_S1UGrp {

description "Represents the EP\_S1U IOC.";

reference "3GPP TS 28.541, 3GPP TS 36.410";

uses eprp3gpp:EP\_Common;

}

augment "/me3gpp:ManagedElement/gnbcucp3gpp:GNBCUCPFunction" {

list EP\_E1 {

description "Represents the local end point of the logical link,

supporting E1 interface between gNB-CU-CP and gNB-CU-UP.";

reference "3GPP TS 28.541, 3GPP TS 38.401";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_E1Grp;

}

}

list EP\_F1C {

description "Represents the local end point of the control plane

interface (F1-C) between the DU and CU or CU-CP.";

reference "3GPP TS 28.541, 3GPP TS 38.470";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_F1CGrp;

}

}

list EP\_NgC {

description "Represents the local end point of the control plane

interface (NG-C) between the gNB and NG-Core entity.";

reference "3GPP TS 28.541, 3GPP TS 38.470";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_NgCGrp;

}

}

list EP\_XnC {

description "Represents the local gNB node end point of the logical

link, supporting Xn application protocols, to a neighbour gNB node.";

reference "3GPP TS 28.541, 3GPP TS 38.420";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_XnCGrp;

}

}

list EP\_X2C {

description "Represents the local end point of the logical link,

supporting X2-C application protocols used in EN-DC, to a neighbour

eNB or en-gNB node.";

reference "3GPP TS 28.541, 3GPP TS 36.423";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_X2CGrp;

}

}

}

augment "/me3gpp:ManagedElement/gnbcuup3gpp:GNBCUUPFunction" {

list EP\_E1 {

description "Represents the local end point of the logical link,

supporting E1 interface between gNB-CU-CP and gNB-CU-UP.";

reference "3GPP TS 28.541, 3GPP TS 38.401";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_E1Grp;

}

}

list EP\_F1U {

description "Represents the local end point of the user plane

interface (F1-U) between the DU and CU or CU-UP.";

reference "3GPP TS 28.541, 3GPP TS 38.470";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_F1UGrp;

}

}

list EP\_NgU {

description "Represents the local end point of the NG user plane

(NG-U) interface between the gNB and the UPGW.";

reference "3GPP TS 28.541, 3GPP TS 38.470";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_NgUGrp;

}

}

list EP\_XnU {

description "Represents the one end-point of a logical link supporting

the Xn user plane (Xn-U) interface. The Xn-U interface provides

non-guaranteed delivery of user plane PDUs between two NG-RAN nodes.";

reference "3GPP TS 28.541, 3GPP TS 38.420";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_XnUGrp;

}

}

list EP\_X2U {

description "Represents the local end-point of a logical link supporting

the X2 user plane (X2-U) interface used in EN-DC.";

reference "3GPP TS 28.541, 3GPP TS 36.425";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_X2UGrp;

}

}

list EP\_S1U {

description "Represents the local end point of the logical link,

supporting S1-U interface towards a S-GW node.";

reference "3GPP TS 28.541, 3GPP TS 36.410";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_S1UGrp;

}

}

}

augment "/me3gpp:ManagedElement/gnbdu3gpp:GNBDUFunction" {

list EP\_F1C {

description "Represents the local end point of the control plane

interface (F1-C) between the DU and CU or CU-CP.";

reference "3GPP TS 28.541, 3GPP TS 38.470";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_F1CGrp;

}

}

list EP\_F1U {

description "Represents the local end point of the user plane

interface (F1-U) between the DU and CU or CU-UP.";

reference "3GPP TS 28.541, 3GPP TS 38.470";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EP\_F1UGrp;

}

}

}

}

module \_3gpp-nr-nrm-eutrancellrelation {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-eutrancellrelation";

prefix "eutrancellrel3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-nr-nrm-gnbcucpfunction { prefix gnbcucp3gpp; }

import \_3gpp-nr-nrm-nrcellcu { prefix nrcellcu3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the EUtranCellRelation Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

typedef ActionAllowed {

type enumeration {

enum YES;

enum NO;

}

}

typedef EnergySavingCoverage {

type enumeration {

enum YES;

enum NO;

enum PARTIAL;

}

}

grouping EUtranCellRelationGrp {

description "Represents the EUtranCellRelation IOC.";

reference "3GPP TS 28.541, EUtranRelation in 3GPP TS 28.658";

uses mf3gpp:ManagedFunctionGrp;

leaf tCI {

description "Target Cell Identifier. Consists of E-UTRAN Cell Global

Identifier (ECGI) and Physical Cell Identifier (PCI) of the target

cell. Identifies the target cell from the perspective of the parent

cell instance.";

mandatory true;

type uint64;

}

leaf isRemoveAllowed {

description "Indicates if the subject EUtranCellRelation can be removed

(deleted) or not. If YES, the subject EUtranCellRelation instance can

be removed (deleted). If NO, the subject EUtranCellRelation instance

shall not be removed (deleted) by any entity but an IRPManager.";

mandatory true;

type ActionAllowed;

}

leaf isHOAllowed {

description "Indicates if handover is allowed or prohibited. If YES,

handover is allowed from source cell to target cell. Source cell is

represented by the parent cell instance. Target cell is the adjacent

cell referenced by this EUtranCellRelation instance. If NO, handover

shall not be allowed.";

mandatory true;

type ActionAllowed;

}

leaf isICICInformationSendAllowed {

description "Indicates if ICIC (Inter Cell Interference Coordination)

load information message sending is allowed or prohibited. If YES,

ICIC load information message sending is allowed from source cell to

target cell. Source cell is represented by the parent cell instance.

Target cell is the adjacent cell referenced by this EUtranCellRelation

instance. If NO, ICIC load information message sending shall not be

allowed.";

reference "3GPP TS 36.423";

mandatory true;

type ActionAllowed;

}

leaf isLBAllowed {

description "Indicates if load balancing is allowed or prohibited from

source cell to target cell. If YES, load balancing is allowed from

source cell to target cell. Source cell is represented by the parent

cell instance. Target cell is the adjacent cell referenced by this

EUtranCellRelation instance. If NO, load balancing shall be prohibited

from source cell to target cell.";

mandatory true;

type ActionAllowed;

}

leaf isESCoveredBy {

description "Indicates whether the adjacent cell according to this

planning provides no, partial or full coverage for the parent cell

instance. Adjacent cells with this attribute equal to YES are

recommended to be considered as candidate cells to take over the

coverage when the original cell is about to be transferred to energy

saving state. The entirety of adjacent cells with this property equal

to PARTIAL are recommended to be considered as entirety of candidate

cells to take over the coverage when the original cell is about to be

transferred to energy saving state.";

mandatory true;

type EnergySavingCoverage;

}

leaf qOffset {

description "Offset applicable to a specific neighbouring cell used for

evaluating the cell as a candidate for cell re-selection. Corresponds

to parameter q-OffsetCell broadcast in SIB4 for intra-frequency cells

and in SIB5 for inter-frequency cells. Used for Mobility Robustness

Optimization.";

reference "3GPP TS 36.331";

mandatory true;

type types3gpp:QOffsetRange;

}

leaf cellIndividualOffset {

description "Offset applicable to a neighbouring cell. It is used for

evaluating the neighbouring cell for handover in connected mode. Used

by the HandOver parameter Optimization (HOO) function or Load

Balancing Optimization (LBO) function.";

reference "3GPP TS 36.331";

config false;

type types3gpp:QOffsetRange;

}

leaf adjacentCell {

description "Reference to an EUtranCellFDD/TDD or

ExternalEUtranCellFDD/TDD instance.";

mandatory true;

type types3gpp:DistinguishedName;

}

}

augment /me3gpp:ManagedElement/gnbcucp3gpp:GNBCUCPFunction/nrcellcu3gpp:NRCellCU {

list EUtranCellRelation {

description "Represents a relation between an NR cell and an E-UTRAN cell.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EUtranCellRelationGrp;

}

}

}

}

module \_3gpp-nr-nrm-eutranetwork {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-eutranetwork";

prefix "eutranet3gpp";

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the EUtraNetwork Information Object

Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

feature ExternalsUnderEUtraNetwork {

description "Classes representing external entities like EUtranFrequency,

ExternalENBFunction are contained under a EUtraNetwork list/class.";

}

grouping EUtraNetworkGrp {

description "Represents the EUtraNetwork IOC.";

reference "3GPP TS 28.541";

uses subnet3gpp:SubNetworkGrp;

}

list EUtraNetwork {

description "A subnetwork containing gNB external E-UTRAN entities.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EUtraNetworkGrp;

leaf-list parents {

description "Reference to all containg EUtraNetwork instances

in strict order from the root EUtraNetwork down to the immediate

parent EUtraNetwork.

If EUtraNetworks form a containment hierarchy this is

modeled using references between the child EUtraNetwork and the parent

EUtraNetworks.

This reference MUST NOT be present for the top level EUtraNetwork and

MUST be present for other EUtraNetworks.";

type leafref {

path "../../../EUtraNetwork/id";

}

}

leaf-list containedChildren{

description "Reference to all directly contained EUtraNetwork instances.

If EUtraNetworks form a containment hierarchy this is

modeled using references between the child EUtraNetwork and the parent

EUtraNetwork.";

type leafref {

path "../../../EUtraNetwork/id";

}

}

}

}

}

module \_3gpp-nr-nrm-eutranfreqrelation {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-eutranfreqrelation";

prefix "eutranfreqrel3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-nr-nrm-gnbcucpfunction { prefix gnbcucp3gpp; }

import \_3gpp-nr-nrm-nrcellcu { prefix nrcellcu3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the EUtranFreqRelation Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping EUtranFreqRelationGrp {

description "Represents the EUtranFreqRelation IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf cellIndividualOffset {

description "Offset applicable to a neighbouring cell. Used for

evaluating the neighbouring cell for handover in connected mode.

Used by the HandOver parameter Optimization (HOO) function or

Load Balancing Optimization (LBO) function.";

reference "cellIndividualOffset in MeasObjectEUTRA in 3GPP TS 38.331";

default 0;

type types3gpp:QOffsetRange;

}

leaf-list blackListEntry {

description "A list of Physical Cell Identities (PCIs) that are

blacklisted in E-UTRAN measurements.";

reference "3GPP TS 38.331";

min-elements 0;

type uint16 { range "0..1007"; }

}

leaf-list blackListEntryIdleMode {

description "A list of Physical Cell Identities (PCIs) that are

blacklisted in SIB4 and SIB5.";

min-elements 0;

type uint16 { range "0..1007"; }

}

leaf cellReselectionPriority {

description "The absolute priority of the carrier frequency used by the

cell reselection procedure. Value 0 means lowest priority. The value

must not already used by other RAT, i.e. equal priorities between RATs

are not supported. The UE behaviour when no value is entered is

specified in subclause 5.2.4.1 of 3GPP TS 38.304.";

reference "CellReselectionPriority in 3GPP TS 38.331, priority in

3GPP TS 38.304";

mandatory true;

type int32 { range "0..7"; }

}

leaf cellReselectionSubPriority {

description "Indicates a fractional value to be added to the value of

cellReselectionPriority to obtain the absolute priority of the

concerned carrier frequency for E-UTRA and NR.";

reference "3GPP TS 38.331";

type uint8 { range "2 | 4 | 6 | 8"; }

units "0.1";

}

leaf pMax {

description "Used for calculation of the parameter Pcompensation

(defined in 3GPP TS 38.304), at cell reselection to a cell.";

reference "PEMAX in 3GPP TS 38.101-1";

mandatory true;

type int32 { range "-30..33"; }

units dBm;

}

leaf qOffsetFreq {

description "The frequency specific offset applied when evaluating

candidates for cell reselection.";

type int32;

default 0;

}

leaf qQualMin {

description "Indicates the minimum required quality level in the cell.

Value 0 means that it is not sent and UE applies in such case the

(default) value of negative infinity for Qqualmin. Sent in SIB3 or

SIB5.";

reference "qQualMin in TS 38.304";

mandatory true;

type int32 { range "-34..-3 | 0"; }

units dB;

}

leaf qRxLevMin {

description "Indicates the required minimum received Reference Symbol

Received Power (RSRP) level in the (E-UTRA) frequency for cell

reselection. Broadcast in SIB3 or SIB5, depending on whether the

related frequency is intra- or inter-frequency. Resolution is 2.";

reference "Qrxlevmin in 3GPP TS 38.304";

mandatory true;

type int32 { range "-140..-44"; }

units dBm;

}

leaf threshXHighP {

description "Specifies the Srxlev threshold used by the UE when

reselecting towards a higher priority RAT/frequency than the current

serving frequency. Each frequency of NR and E-UTRAN might have a

specific threshold. Resolution is 2.";

reference "ThreshX, HighP in 3GPP TS 38.304";

mandatory true;

type int32 { range "0..62"; }

units dB;

}

leaf threshXHighQ {

description "Specifies the Squal threshold used by the UE when

reselecting towards a higher priority RAT/frequency than the current

serving frequency. Each frequency of NR and E-UTRAN might have a

specific threshold.";

reference "ThreshX, HighQ in 3GPP TS 38.304";

mandatory true;

type int32 { range 0..31; }

units dB;

}

leaf threshXLowP {

description "Specifies the Srxlev threshold used by the UE when

reselecting towards a lower priority RAT/frequency than the current

serving frequency. Each frequency of NR and E-UTRAN might have a

specific threshold. Resolution is 2.";

reference "ThreshX, LowP in 3GPP TS 38.304";

mandatory true;

type int32 { range "0..62"; }

units dB;

}

leaf threshXLowQ {

description "Specifies the Squal threshold used by the UE when

reselecting towards a lower priority RAT/frequency than the current

serving frequency. Each frequency of NR and E-UTRAN might have a

specific threshold.";

reference "ThreshX, LowQ in 3GPP TS 38.304";

mandatory false;

type int32 { range "0..31"; }

units dB;

}

leaf tReselectionEutra {

description "Cell reselection timer for intra frequency E-UTRA cell

reselection. May be used for Mobility Robustness Optimization.";

reference "t-ReselectionEUTRA in 3GPP TS 36.331 and in 3GPP TS 23.207";

mandatory true;

type uint8 { range "0..7"; }

units s;

}

leaf tReselectionEutraSfHigh {

description "The attribute tReselectionEutra (parameter TreselectionEUTRA

in 3GPP TS 38.304) multiplied with this scaling factor if the UE is in

high mobility state.";

reference "Speed dependent ScalingFactor for TreselectionEUTRA for high

mobility state in 3GPP TS 38.304";

mandatory true;

type uint8 { range "25 | 50 | 75 | 100"; }

units %;

}

leaf tReselectionEutraSfMedium {

description "The attribute tReselectionEutra (parameter TreselectionEUTRA

in 3GPP TS 38.304) multiplied with this scaling factor if the UE is in

medium mobility state.";

reference "Speed dependent ScalingFactor for TreselectionEUTRA for medium

mobility state in 3GPP TS 38.304";

mandatory true;

type uint8 { range "25 | 50 | 75 | 100"; }

units %;

}

leaf eUtranFrequencyRef {

description "Reference to a corresponding EUtranFrequency instance.";

mandatory true;

type types3gpp:DistinguishedName;

}

}

augment /me3gpp:ManagedElement/gnbcucp3gpp:GNBCUCPFunction/nrcellcu3gpp:NRCellCU {

list EUtranFreqRelation {

description "Represents a frequency relation between an NR cell and an

E-UTRAN cell.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EUtranFreqRelationGrp;

}

}

}

}

module \_3gpp-nr-nrm-eutranfrequency {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-eutranfrequency";

prefix "eutraneteutranfreq3gpp";

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-nr-nrm-eutranetwork { prefix eutranet3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the EUtranFrequency Information

Object Class (IOC), that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM),

3GPP TS 28.658 (E-UTRAN) Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX

3GPP TS 28.658 V15.X.XX";

}

grouping EUtranFrequencyGrp {

description "Represents the EUtranFrequency IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf earfcnDL {

description "Specifies the channel number for the central DL frequency.";

reference "3GPP TS 36.101";

mandatory true;

type uint32 { range "0..262143"; }

}

leaf-list multiBandInfoListEutra {

description "List of additional frequency bands the frequency belongs to.";

config false;

min-elements 0;

type uint16 { range "1..256"; }

}

}

grouping EUtranFrequencyWrapper {

list EUtranFrequency {

description "Represents certain E-UTRAN frequency properties.";

reference "3GPP TS 28.658";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses EUtranFrequencyGrp;

}

}

}

augment "/subnet3gpp:SubNetwork" {

if-feature subnet3gpp:ExternalsUnderSubNetwork ;

uses EUtranFrequencyWrapper ;

}

augment "/eutranet3gpp:EUtraNetwork" {

if-feature eutranet3gpp:ExternalsUnderEUtraNetwork;

uses EUtranFrequencyWrapper ;

}

}

module \_3gpp-nr-nrm-externalamffunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-externalamffunction";

prefix "extamf3gpp";

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-nr-nrm-nrnetwork { prefix nrnet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-common-yang-types { prefix types3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the ExternalAMFFunction Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping ExternalAMFFunctionGrp {

description "Represents the ExternalAMFFunction IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

list pLMNIdList {

description "List of at most six entries of PLMN Identifiers, but at least

one (the primary PLMN Id).

The PLMN Identifier is composed of a Mobile Country Code (MCC) and a

Mobile Network Code (MNC).";

min-elements 1;

max-elements 6;

key "mcc mnc";

uses types3gpp:PLMNId;

}

container aMFIdentifier {

presence true;

description "An AMF identifier, comprising an AMF Region ID, an AMF Set ID and an AMF Pointer.";

uses types3gpp:AmfIdentifier;

}

}

grouping ExternalAMFFunctionWrapper {

list ExternalAMFFunction {

description "Represents the properties, known by the management

function, of a AMFFunction managed by another management

function.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ExternalAMFFunctionGrp;

}

}

}

augment "/subnet3gpp:SubNetwork" {

if-feature subnet3gpp:ExternalsUnderSubNetwork ;

uses ExternalAMFFunctionWrapper;

}

augment "/nrnet3gpp:NRNetwork" {

if-feature nrnet3gpp:ExternalsUnderNRNetwork;

uses ExternalAMFFunctionWrapper;

}

}

}module \_3gpp-nr-nrm-externalenbfunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-externalenbfunction";

prefix "extenb3gpp";

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-nr-nrm-eutranetwork { prefix eutranet3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the ExternalENBFunction

Information Object Class (IOC) that is part of the NR Network Resource

Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM),

3GPP TS 28.658 (E-UTRAN) Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX

3GPP TS 28.658 V15.X.XX";

}

grouping ExternalENBFunctionGrp {

description "Represets the ExternalENBFunction IOC.";

reference "3GPP TS 28.658";

uses mf3gpp:ManagedFunctionGrp;

leaf eNBId {

description "Unambiguously identifies an eNodeB within a PLMN.";

reference "3GPP TS 36.413, 3GPP TS 36.300";

mandatory true;

type int32 { range "0..268435455"; } // Representing 28 bit eNB ID.

// 18, 20 and 21 bit eNB IDs also

// allowed.

}

}

grouping ExternalENBFunctionWrapper {

list ExternalENBFunction {

description "Represents an external eNB functionality.";

reference "3GPP TS 28.658";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ExternalENBFunctionGrp;

}

}

}

augment "/subnet3gpp:SubNetwork" {

if-feature subnet3gpp:ExternalsUnderSubNetwork ;

uses ExternalENBFunctionWrapper;

}

augment "/eutranet3gpp:EUtraNetwork" {

if-feature eutranet3gpp:ExternalsUnderEUtraNetwork;

uses ExternalENBFunctionWrapper;

}

}

}module \_3gpp-nr-nrm-externaleutrancell {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-externaleutrancell";

prefix "exteutrancell3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-nr-nrm-eutranetwork { prefix eutranet3gpp; }

import \_3gpp-nr-nrm-externalenbfunction { prefix extenb3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the ExternalEUtranCellFDD and

ExternalEUtranCellTDD Information Object Classes (IOCs) that are part

of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM),

3GPP TS 28.658 (E-UTRAN) Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX

3GPP TS 28.658 V15.X.XX";

}

grouping ExternalEUtranGenericCellGrp {

description "Represents the ExternalEUtranGenericCell IOC.";

reference "3GPP TS 28.658";

uses mf3gpp:ManagedFunctionGrp;

leaf pci {

description "The Physical Cell Identity (PCI) of the cell (for

NM-Centralized, EM-Centralized and Distributed PCI assignment cases).

In the case of NM-Centralized PCI assignment, see 3GPP TS 36.300.";

reference "3GPP TS 36.211";

mandatory true;

type int32 { range "0..503"; }

}

list plmnIdList {

description "List of unique identities for PLMNs. A cell can broadcast

up to 6 PLMN IDs. This is to support the case that one cell can be

used by up to 6 operator's core networks. The PLMN(s) included in this

list will use the same single tracking area code (TAC) and the same

Cell Identity (cellLocalId) for sharing the radio access network

resources. One member of plmnIdList is the primary PLMN ID. A PLMN ID

included in this list cannot be included in the cellAccessInfoList.

The PLMN ID is composed of a Mobile Country Code (MCC) and a Mobile

Network Code (MNC).";

reference "3GPP TS 36.300, 3GPP TS 36.331, 3GPP TS 23.003";

key "mcc mnc";

min-elements 1;

max-elements 6;

uses types3gpp:PLMNId;

}

leaf cellLocalId {

description "Unambiguously identifies a cell within an eNodeB.";

reference "NCI defined in 3GPP TS 38.300";

type int32 {range "0..255"; }

}

leaf eNBId {

description "Unambiguously identifies an eNodeB within a PLMN.";

reference "3GPP TS 36.413, 3GPP TS 36.300";

mandatory true;

type int32 { range "0..268435455"; } // Representing 28 bit eNB ID.

// 18, 20 and 21 bit eNB IDs also

// allowed.

}

}

grouping ExternalEUtranCellFDDGrp {

description "Represents the ExternalEUtranCellFDD IOC.";

reference "3GPP TS 28.658";

uses ExternalEUtranGenericCellGrp;

leaf earfcnDL {

description "The channel number for the central DL frequency.";

reference "3GPP TS 36.101";

mandatory true;

type int32 { range "0..17999 | 46590..262143"; }

}

leaf earfcnUL {

description "The channel number for the central UL frequency. Value 0

means that the UL channel number is N/A for the DL-only bands.";

reference "3GPP TS 36.101";

mandatory true;

type int32 { range "0 | 18000..35999 | 46590..262143"; }

}

}

grouping ExternalEUtranCellTDDGrp {

description "Represents the ExternalEUtranCellTDD IOC.";

reference "3GPP TS 28.658";

uses ExternalEUtranGenericCellGrp;

leaf earfcn {

description "The frequency number for the central frequency.";

reference "3GPP TS 36.104";

mandatory true;

type int32 { range "36000..262143"; }

}

}

grouping ExternalEUtranCellFDDWrapper {

list ExternalEUtranCellFDD {

description "Represents the common properties of external E-UTRAN FDD

cell provided by eNB or NG-RAN FDD cell provided by ng-eNB.";

reference "3GPP TS 28.658";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ExternalEUtranCellFDDGrp;

}

}

}

grouping ExternalEUtranCellTDDWrapper {

list ExternalEUtranCellTDD {

description "Represents the common properties of external E-UTRAN cell

TDD provided by eNB or NG-RAN TDD cell provided by ng-eNB.";

reference "3GPP TS 28.658";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ExternalEUtranCellTDDGrp;

}

}

}

augment "/subnet3gpp:SubNetwork/extenb3gpp:ExternalENBFunction" {

if-feature subnet3gpp:ExternalsUnderSubNetwork;

uses ExternalEUtranCellFDDWrapper;

}

augment "/eutranet3gpp:EUtraNetwork/extenb3gpp:ExternalENBFunction" {

if-feature eutranet3gpp:ExternalsUnderEUtraNetwork;

uses ExternalEUtranCellFDDWrapper;

}

augment "/subnet3gpp:SubNetwork/extenb3gpp:ExternalENBFunction" {

if-feature subnet3gpp:ExternalsUnderSubNetwork;

uses ExternalEUtranCellTDDWrapper;

}

augment "/eutranet3gpp:EUtraNetwork/extenb3gpp:ExternalENBFunction" {

if-feature eutranet3gpp:ExternalsUnderEUtraNetwork;

uses ExternalEUtranCellTDDWrapper;

}

}

}module \_3gpp-nr-nrm-externalgnbcucpfunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-externalgnbcucpfunction";

prefix "extgnbcucp3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-nr-nrm-nrnetwork { prefix nrnet3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the ExternalGNBCUCPFunction

Information Object Class (IOC), that is part of the NR Network Resource

Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping ExternalGNBCUCPFunctionGrp {

description "Represets the ExternalGNBCUCPFunction IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf gNBId {

description "Identifies a gNB within a PLMN.";

reference "gNB Identifier (gNB ID) in 3GPP TS 38.300, Global gNB ID

in 3GPP TS 38.413";

mandatory true;

type int64 { range "0..4294967295"; }

}

leaf gNBIdLength {

description "Indicates the number of bits for encoding the gNB ID.";

reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

mandatory true;

type int32 { range "22..32"; }

}

list pLMNId {

description "Specifies the PLMN identifier to be used as part of the

global RAN node identity.";

key "mcc mnc";

min-elements 1;

max-elements 1;

uses types3gpp:PLMNId;

}

}

grouping ExternalGNBCUCPFunctionWrapper {

list ExternalGNBCUCPFunction {

description "Represents the properties, known by the management function,

of a GNBCUCPFunction managed by another management function.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ExternalGNBCUCPFunctionGrp;

}

}

}

augment "/subnet3gpp:SubNetwork" {

if-feature subnet3gpp:ExternalsUnderSubNetwork ;

uses ExternalGNBCUCPFunctionWrapper;

}

augment "/nrnet3gpp:NRNetwork" {

if-feature nrnet3gpp:ExternalsUnderNRNetwork;

uses ExternalGNBCUCPFunctionWrapper;

}

}

module \_3gpp-nr-nrm-externalgnbcuupfunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-externalgnbcuupfunction";

prefix "extgnbcuup3gpp";

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-nr-nrm-nrnetwork { prefix nrnet3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the ExternalGNBCUUPFunction

Information Object Class (IOC), that is part of the NR Network

Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping ExternalGNBCUUPFunctionGrp {

description "Represets the ExternalGNBCUUPFunction IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf gNBId {

description "Identifies a gNB within a PLMN.";

reference "gNB Identifier (gNB ID) in 3GPP TS 38.300, Global gNB ID

in 3GPP TS 38.413";

mandatory true;

type int64 { range "0..4294967295"; }

}

leaf gNBIdLength {

description "Indicates the number of bits for encoding the gNB ID.";

reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

mandatory true;

type int32 { range "22..32"; }

}

}

grouping ExternalGNBCUUPFunctionWrapper {

list ExternalGNBCUUPFunction {

description "Represents the properties, known by the management function,

of a GNBCUUPFunction managed by another management function.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ExternalGNBCUUPFunctionGrp;

}

}

}

augment "/subnet3gpp:SubNetwork" {

if-feature subnet3gpp:ExternalsUnderSubNetwork ;

uses ExternalGNBCUUPFunctionWrapper;

}

augment "/nrnet3gpp:NRNetwork" {

if-feature nrnet3gpp:ExternalsUnderNRNetwork;

uses ExternalGNBCUUPFunctionWrapper;

}

}

module \_3gpp-nr-nrm-externalgnbdufunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-externalgnbdufunction";

prefix "extgnbdu3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-nr-nrm-nrnetwork { prefix nrnet3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the ExternalGNBDUFunction

Information Object Class (IOC) that is part of the NR Network Resource

Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping ExternalGNBDUFunctionGrp {

description "Represets the ExternalGNBDUFunction IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf gNBId {

description "Identifies a gNB within a PLMN.";

reference "gNB Identifier (gNB ID) in 3GPP TS 38.300, Global gNB ID

in 3GPP TS 38.413";

mandatory true;

type int64 { range "0..4294967295"; }

}

leaf gNBIdLength {

description "Indicates the number of bits for encoding the gNB ID.";

reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

mandatory true;

type int32 { range "22..32"; }

}

list pLMNId {

description "Specifies the PLMN identifier to be used as part of the

global RAN node identity.";

key "mcc mnc";

min-elements 1;

max-elements 1;

uses types3gpp:PLMNId;

}

}

grouping ExternalGNBDUFunctionWrapper {

list ExternalGNBDUFunction {

description "Represents the properties, known by the management function,

of a GNBDUFunction managed by another management function.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ExternalGNBDUFunctionGrp;

}

}

}

augment "/subnet3gpp:SubNetwork" {

if-feature subnet3gpp:ExternalsUnderSubNetwork ;

uses ExternalGNBDUFunctionWrapper;

}

augment "/nrnet3gpp:NRNetwork" {

if-feature nrnet3gpp:ExternalsUnderNRNetwork;

uses ExternalGNBDUFunctionWrapper;

}

}

module \_3gpp-nr-nrm-externalnrcellcu {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-externalnrcellcu";

prefix "extnrcellcu3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-nr-nrm-nrnetwork { prefix nrnet3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-nr-nrm-externalgnbcucpfunction { prefix extgnbcucp3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the ExternalNRCellCU Information

Object Class (IOC), that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping ExternalNRCellCUGrp {

description "Represents the ExternalNRCellCU IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf cellLocalId {

description "Identifies an NR cell of a gNB. Together with corresponding

gNB ID it forms the NR Cell Identifier (NCI).";

reference "NCI in 3GPP TS 38.300";

mandatory true;

type int32 {range "0..16383"; }

}

leaf nRPCI {

description "The Physical Cell Identity (PCI) of the NR cell.";

reference "3GPP TS 36.211";

mandatory true;

type int32 { range "0..1007"; }

}

list pLMNIdList {

description "Defines which PLMNs that are assumed to be served by the

NR cell in another gNB CU-CP. This list is either updated by the

managed element itself (e.g. due to ANR, signalling over Xn, etc.) or

by consumer over the standard interface.";

key "mcc mnc";

min-elements 1;

max-elements 12;

uses types3gpp:PLMNId;

}

leaf nRFrequencyRef {

description "Reference to corresponding NRFrequency instance.";

mandatory true;

type types3gpp:DistinguishedName;

}

}

grouping ExternalNRCellCUWrapper {

list ExternalNRCellCU {

description "Represents the properties of an NRCellCU controlled by

another Management Service Provider.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ExternalNRCellCUGrp;

}

}

}

augment "/subnet3gpp:SubNetwork/extgnbcucp3gpp:ExternalGNBCUCPFunction" {

if-feature subnet3gpp:ExternalsUnderSubNetwork ;

uses ExternalNRCellCUWrapper;

}

augment "/nrnet3gpp:NRNetwork/extgnbcucp3gpp:ExternalGNBCUCPFunction" {

if-feature nrnet3gpp:ExternalsUnderNRNetwork;

uses ExternalNRCellCUWrapper;

}

}

module \_3gpp-nr-nrm-externalservinggwfunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-externalservinggwfunction";

prefix "extservgw3gpp";

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-nr-nrm-eutranetwork { prefix eutranet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the ExternalServingGWFunction

Information Object Class (IOC) that is part of the NR Network Resource

Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping ExternalServingGWFunctionGrp {

description "Represents the ExternalServingGWFunction IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

}

grouping ExternalServingGWFunctionWrapper {

list ExternalServingGWFunction {

description "Represents the properties, known by the management

function, of a ServingGWFunction managed by another management

function.";

reference "3GPP TS 28.658";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ExternalServingGWFunctionGrp;

}

}

}

augment "/subnet3gpp:SubNetwork" {

if-feature subnet3gpp:ExternalsUnderSubNetwork ;

uses ExternalServingGWFunctionWrapper;

}

augment "/eutranet3gpp:EUtraNetwork" {

if-feature eutranet3gpp:ExternalsUnderEUtraNetwork;

uses ExternalServingGWFunctionWrapper;

}

}

module \_3gpp-nr-nrm-externalupffunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-externalupffunction";

prefix "extupf3gpp";

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-nr-nrm-nrnetwork { prefix nrnet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the ExternalUPFFunction Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping ExternalUPFFunctionGrp {

description "Represents the ExternalUPFFunction IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

}

grouping ExternalUPFFunctionWrapper {

list ExternalUPFFunction {

description "Represents the properties, known by the management

function, of a UPFFunction managed by another management

function.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ExternalUPFFunctionGrp;

}

}

}

augment "/subnet3gpp:SubNetwork" {

if-feature subnet3gpp:ExternalsUnderSubNetwork ;

uses ExternalUPFFunctionWrapper;

}

augment "/nrnet3gpp:NRNetwork" {

if-feature nrnet3gpp:ExternalsUnderNRNetwork;

uses ExternalUPFFunctionWrapper;

}

}

module \_3gpp-nr-nrm-gnbcucpfunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-gnbcucpfunction";

prefix "gnbcucp3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the GNBCUCPFunction Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping GNBCUCPFunctionGrp {

description "Represents the GNBCUCPFunction IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf gNBId {

description "Identifies a gNB within a PLMN. The gNB Identifier (gNB ID)

is part of the NR Cell Identifier (NCI) of the gNB cells.";

reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

mandatory true;

type int64 { range "0..4294967295"; }

}

leaf gNBIdLength {

description "Indicates the number of bits for encoding the gNB ID.";

reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

mandatory true;

type int32 { range "22..32"; }

}

leaf gNBCUName {

description "Identifies the Central Unit of an gNB.";

reference "3GPP TS 38.473";

mandatory true;

type string { length "1..150"; }

}

list pLMNId {

description "The PLMN identifier to be used as part of the global RAN

node identity.";

key "mcc mnc";

min-elements 1;

max-elements 1;

uses types3gpp:PLMNId;

}

}

augment "/me3gpp:ManagedElement" {

list GNBCUCPFunction {

description "Represents the logical function CU-CP of gNB and en-gNB.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses GNBCUCPFunctionGrp;

}

}

}

}

module \_3gpp-nr-nrm-gnbcuupfunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-gnbcuupfunction";

prefix "gnbcuup3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the GNBCUUPFunction Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-08-21 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping GNBCUUPFunctionGrp {

description "Represents the GNBCUUPFunction IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf gNBCUUPId {

type uint64 {

range "0..68719476735" ;

}

config false;

mandatory true;

description "Identifies the gNB-CU-UP at least within a gNB-CU-CP";

reference "'gNB-CU-UP ID' in subclause 9.3.1.15 of 3GPP TS 38.463";

}

leaf gNBId {

type int64 { range "0..4294967295"; }

mandatory true;

description "Identifies a gNB within a PLMN. The gNB Identifier (gNB ID)

is part of the NR Cell Identifier (NCI) of the gNB cells.";

reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

}

leaf gNBIdLength {

type int32 { range "22..32"; }

mandatory true;

description "Indicates the number of bits for encoding the gNB ID.";

reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

}

list pLMNIdList {

key "mcc mnc";

min-elements 1;

max-elements 12;

description "A list of PLMN identifiers. Defines from which set of PLMNs

an UE must have as its serving PLMN to be allowed to use the

gNB CU-UP.";

uses types3gpp:PLMNId;

}

}

augment "/me3gpp:ManagedElement" {

list GNBCUUPFunction {

key id;

description "Represents the logical function CU-UP of gNB or en-gNB.";

reference "3GPP TS 28.541";

uses top3gpp:Top\_Grp;

container attributes {

uses GNBCUUPFunctionGrp;

}

}

}

}

module \_3gpp-nr-nrm-gnbdufunction {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-gnbdufunction";

prefix "gnbdu3gpp";

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the GNBDUFunction Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-08-21 {

description "Initial revision.";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping GNBDUFunctionGrp {

description "Represents the GNBDUFunction IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf gNBId {

type int64 { range "0..4294967295"; }

mandatory true;

description "Identifies a gNB within a PLMN. The gNB Identifier (gNB ID)

is part of the NR Cell Identifier (NCI) of the gNB cells.";

reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

}

leaf gNBIdLength {

type int32 { range "22..32"; }

mandatory true;

description "Indicates the number of bits for encoding the gNB ID.";

reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

}

leaf gNBDUId {

type int64 { range "0..68719476735"; }

mandatory true;

description "Uniquely identifies the DU at least within a gNB.";

reference "3GPP TS 38.473";

}

leaf gNBDUName {

type string { length "1..150"; }

mandatory true;

description "Identifies the Distributed Unit of an NR node";

reference "3GPP TS 38.473";

}

}

augment "/me3gpp:ManagedElement" {

list GNBDUFunction {

key id;

description "Represents the logical function DU of gNB or en-gNB.";

reference "3GPP TS 28.541";

uses top3gpp:Top\_Grp;

container attributes {

uses GNBDUFunctionGrp;

}

}

}

}

module \_3gpp-nr-nrm-nrcellcu {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-nrcellcu";

prefix "nrcellcu3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-nr-nrm-gnbcucpfunction { prefix gnbcucp3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the NRCellCU Information Object

Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

typedef quotaType {

type enumeration {

enum STRICT;

enum FLOAT;

}

}

grouping RRMPolicyRatio1 {

description "Represents properties of RRMPolicyRatio1.";

leaf groupId {

description "Uniquely identifies one sNSSAIList group inside an

NRCellCU instance.";

type uint32;

}

leaf-list sNSSAIList {

description "List of S-NSSAIs the managed object is supporting. NSSAI is

a set of supported S-NSSAIs. An S-NSSAI is comprised of an

SST (Slice/Service type) and an optional SD (Slice Differentiator)

field.";

reference "3GPP TS 23.003";

type types3gpp:SNssai;

}

leaf rRRMPolicyRatio {

description "Percentage of PRBs to be allocated to the corresponding

S-NSSAIs, in average over time. The sum of the values for

rRMPolicyRatio described in rRMPolicyRatio1List shall be less or

equal to 100.";

type uint8 { range "0..100"; }

units %;

}

}

grouping RRMPolicyRatio2 {

description "Represents properties of RRMPolicyRatio2. The RRM policy

setting the ratios for the split of the radio resources between the

supported S-NSSAI lists, in average over time.";

leaf groupId {

description "Uniquely identifies one sNSSAIList group inside an

NRCellCU instance.";

type uint32;

}

leaf-list sNSSAIList {

description "List of S-NSSAIs the managed object is supporting. NSSAI

is a set of supported S-NSSAI(s). An S-NSSAI is comprised of an

SST (Slice/Service type) and an optional SD (Slice Differentiator)

field.";

reference "3GPP TS 23.003";

type types3gpp:SNssai;

}

leaf quotaType {

description "The type of the quota which allows to allocate resources as

strictly usable for defined slice(s) (strict quota) or allows that

resources to be used by other slice(s) when defined slice(s) do not

need them (float quota).";

type quotaType;

}

leaf rRMPolicyMaxRatio {

description "The RRM policy setting the maximum percentage of radio

resources to be allocated to the corresponding S-NSSAI list. This

quota can be strict or float quota. Strict quota means resources are

not allowed for other sNSSAIs even when they are not used by the

defined sNSSAIList. Float quota resources can be used by other sNSSAIs

when the defined sNSSAIList do not need them. Value 0 indicates that

there is no maximum limit.";

type uint8 { range "0..100"; }

units %;

}

leaf rRMPolicyMarginMaxRatio {

description "Maximum quota margin ratio is applicable when maximum quota

policy ratio is of type “float quota”. It defines the resource quota

within maximum quota to reserve buffers for new resource requirements

for the specified S-NSSAI list. With the margin ratio, unused resources

of the maximum resource quota can be allocated to other S-NSSAIs when

the free resources are more than resource amount indicated by the

margin. The margin resource quota can only be used for the specific

S-NSSAI list. Value 0 indicates that no margin is used.";

type uint8 { range "0..100"; }

units %;

}

leaf rRMPolicyMinRatio {

description "The RRM policy setting the minimum percentage of radio

resources to be allocated to the corresponding S-NSSAI list. This

quota can be strict or float quota. Strict quota means resources are

not allowed for other sNSSAIs even when they are not used by the

defined sNSSAIList. Float quota resources can be used by other sNSSAIs

when the defined sNSSAIList do not need them. Value 0 indicates that

there is no minimum limit.";

type uint8 { range "0..100"; }

units %;

}

leaf rRMPolicyMarginMinRatio {

description "Minimum quota margin ratio is applicable when minimum quota

policy ratio is of type “float quota”. It defines the resource quota

within minimum quota to reserve buffers for new resource requirements

for the specified S-NSSAI list. With the margin ratio, unused resources

of the minimum resource quota can be allocated to other S-NSSAIs when

the free resources are more than resource amount indicated by the

margin. The margin resource quota can only be used for the specific

S-NSSAI list. Value 0 indicates that no margin is used. Value 0

indicates that there is no minimum limit.";

type uint8 { range "0..100"; }

units %;

}

}

grouping NRCellCUGrp {

description "Represents the NRCellCU IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf cellLocalId {

description "Identifies an NR cell of a gNB. Together with corresponding

gNB ID it forms the NR Cell Identifier (NCI).";

mandatory true;

type int32 { range "0..16383"; }

}

list pLMNIdList {

description "Defines which PLMNs that can be served by the NR cell.";

// Note: Whether this attribute can be writable depends on the implementation.

key "mcc mnc";

min-elements 1;

max-elements 12;

uses types3gpp:PLMNId;

}

leaf-list sNSSAIList {

description "List of S-NSSAIs the cell is capable of supporting. An

S-NSSAI is comprised of an SST (Slice/Service Type) and an optional

SD (Slice Differentiator) field.";

reference "3GPP TS 23.003";

min-elements 0;

type types3gpp:SNssai;

}

leaf rRMPolicyType {

description "Type of RRM policy. The value 0 denotes use of the

rRMPolicy. The value 1 denotes use of the rRMPolicyRatio1List.

The value 2 denotes use of the rRMPolicyRatio2.";

mandatory true;

type uint16 { range "0..65535"; }

}

leaf rRMPolicy {

description "RRM policy which includes guidance for split of radio

resources between multiple slices the cell supports.";

mandatory true;

type string;

}

list rRMPolicyRatio1List {

description "List of RRMPolicyRatio1. Used for setting the ratio for the

split of the radio resources (i.e. PRBs) between the supported S-NSSAI

lists.";

key groupId;

min-elements 1;

uses RRMPolicyRatio1;

}

list rRMPolicyRatio2 {

description "List of RRMPolicyRatio2. Used for setting the ratio for the

split of the radio resources between the S-NSSAI lists for radio

resources (e.g. RRC connected users, PDCP resource, etc.), in average

time.";

key groupId;

min-elements 1;

uses RRMPolicyRatio2;

}

leaf nRFrequencyRef {

description "Reference to corresponding NRFrequency instance.";

config false;

type types3gpp:DistinguishedName;

}

}

augment "/me3gpp:ManagedElement/gnbcucp3gpp:GNBCUCPFunction" {

list NRCellCU {

description "Represents the information required by CU that is

responsible for the management of inter-cell mobility and neighbour

relations via ANR.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses NRCellCUGrp;

}

}

}

}

module \_3gpp-nr-nrm-nrcelldu {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-nrcelldu";

prefix "nrcelldu3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-nr-nrm-gnbdufunction { prefix gnbdu3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the NRCellDU Information Object

Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping NRCellDUGrp {

description "Represents the NRCellDU IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf cellLocalId {

description "Identifies an NR cell of a gNB. Together with the

corresponding gNB identifier in forms the NR Cell Identity (NCI).";

reference "NCI in 3GPP TS 38.300";

mandatory true;

type int32 { range "0..16383"; }

}

leaf operationalState {

description "Operational state of the NRCellDU instance. Indicates

whether the resource is installed and partially or fully operable

(ENABLED) or the resource is not installed or not operable

(DISABLED).";

config false;

type types3gpp:OperationalState;

}

leaf administrativeState {

description "Administrative state of the NRCellDU. Indicates the

permission to use or prohibition against using the cell, imposed

through the OAM services.";

mandatory true;

type types3gpp:AdministrativeState;

}

leaf cellState {

description "Cell state of the NRCellDU instance. Indicates whether the

cell is not currently in use (IDLE), or currently in use but not

configured to carry traffic (INACTIVE), or currently in use and is

configured to carry traffic (ACTIVE).";

config false;

type types3gpp:CellState;

}

list pLMNIdList {

description "Defines which PLMNs that can be served by the NR cell. The

first entry of the list is the PLMN used to construct the nCGI for the

NR cell.";

key "mcc mnc";

min-elements 1;

max-elements 12;

uses types3gpp:PLMNId;

}

leaf-list sNSSAIList {

description "List of S-NSSAIs the NR cell is supporting. NSSAI is a set

of supported S-NSSAI(s), and an S-NSSAI is comprised of a SST

(Slice/Service type) and an optional SD (Slice Differentiator) field.";

reference "3GPP TS 23.003";

min-elements 0;

type types3gpp:SNssai;

}

leaf nRPCI {

description "The Physical Cell Identity (PCI) of the NR cell.";

reference "3GPP TS 36.211";

mandatory true;

type int32 { range "0..1007"; }

}

leaf nRTAC {

description "The common 5GS Tracking Area Code for the PLMNs.";

reference "3GPP TS 23.003, 3GPP TS 38.473";

mandatory true;

type types3gpp:Tac;

}

leaf arfcnDL {

description "NR Absolute Radio Frequency Channel Number (NR-ARFCN) for

downlink.";

reference "3GPP TS 38.104";

mandatory true;

type int32;

}

leaf arfcnUL {

description "NR Absolute Radio Frequency Channel Number (NR-ARFCN) for

uplink.";

reference "3GPP TS 38.104";

mandatory true;

type int32;

}

leaf arfcnSUL {

description "NR Absolute Radio Frequency Channel Number (NR-ARFCN) for

supplementary uplink.";

reference "3GPP TS 38.104";

mandatory true;

type int32;

}

leaf bSChannelBwDL {

description "Base station channel bandwidth for downlink.";

reference "3GPP TS 38.104";

mandatory true;

type int32;

units MHz;

}

leaf bSChannelBwUL {

description "Base station channel bandwidth for uplink.";

reference "3GPP TS 38.104";

mandatory false;

type int32;

units MHz;

}

leaf bSChannelBwSUL {

description "Base station channel bandwidth for supplementary uplink.";

reference "3GPP TS 38.104";

mandatory false;

type int32;

units MHz;

}

leaf ssbFrequency {

description "Indicates cell defining SSB frequency domain position.

Frequency (in terms of NR-ARFCN) of the cell defining SSB transmission.

The frequency identifies the position of resource element RE=#0

(subcarrier #0) of resource block RB#10 of the SS block. The frequency

must be positioned on the NR global frequency raster, as defined in

3GPP TS 38.101-1, and within bSChannelBwDL.";

mandatory true;

type int32 { range "0..3279165"; }

}

leaf ssbPeriodicity {

description "Indicates cell defined SSB periodicity. The SSB periodicity

is used for the rate matching purpose.";

mandatory true;

type int32 { range "5 | 10 | 20 | 40 | 80 | 160"; }

units "subframes (ms)";

}

leaf ssbSubCarrierSpacing {

description "Subcarrier spacing of SSB. Only the values 15 kHz or 30 kHz

(< 6 GHz), 120 kHz or 240 kHz (> 6 GHz) are applicable.";

reference "3GPP TS 38.211";

mandatory true;

type int32 { range "15 | 30 | 120 | 240"; }

units kHz;

}

leaf ssbOffset {

description "Indicates cell defining SSB time domain position. Defined

as the offset of the measurement window, in which to receive SS/PBCH

blocks, where allowed values depend on the ssbPeriodicity

(ssbOffset < ssbPeriodicity).";

mandatory true;

type int32 { range "0..159"; }

units "subframes (ms)";

}

leaf ssbDuration {

description "Duration of the measurement window in which to receive

SS/PBCH blocks.";

reference "3GPP TS 38.213";

mandatory true;

type int32 { range "1..5"; }

units "subframes (ms)";

}

leaf-list nRSectorCarrierRef {

description "Reference to corresponding NRSectorCarrier instance.";

min-elements 1;

type types3gpp:DistinguishedName;

}

leaf-list bWPRef {

description "Reference to corresponding BWP instance.";

min-elements 0;

type types3gpp:DistinguishedName;

}

leaf-list nRFrequencyRef {

description "Reference to corresponding NRFrequency instance.";

min-elements 0;

type types3gpp:DistinguishedName;

}

}

augment "/me3gpp:ManagedElement/gnbdu3gpp:GNBDUFunction" {

list NRCellDU {

description "Represents the information of a cell known by DU.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses NRCellDUGrp;

}

}

}

}

module \_3gpp-nr-nrm-nrcellrelation {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-nrcellrelation";

prefix "nrcellrel3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-nr-nrm-gnbcucpfunction { prefix gnbcucp3gpp; }

import \_3gpp-nr-nrm-nrcellcu { prefix nrcellcu3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the NRCellRelation Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping NRCellRelationGrp {

description "Represents the NRCellRelation IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf nRTCI {

description "Target NR Cell Identifier. It consists of NR Cell

Identifier (NCI) and Physical Cell Identifier of the target NR cell

(nRPCI).";

type uint64;

}

container cellIndividualOffset {

description "A set of offset values for the neighbour cell. Used when

UE is in connected mode. Defined for rsrpOffsetSSB, rsrqOffsetSSB,

sinrOffsetSSB, rsrpOffsetCSI-RS, rsrqOffsetCSI-RS and

sinrOffsetCSI-RS.";

reference "cellIndividualOffset in MeasObjectNR in 3GPP TS 38.331";

leaf rsrpOffsetSsb {

description "Offset value of rsrpOffsetSSB.";

default 0;

type types3gpp:QOffsetRange;

}

leaf rsrqOffsetSsb{

description "Offset value of rsrqOffsetSSB.";

default 0;

type types3gpp:QOffsetRange;

}

leaf sinrOffsetSsb {

description "Offset value of sinrOffsetSSB.";

default 0;

type types3gpp:QOffsetRange;

}

leaf rsrpOffsetCsiRs{

description "Offset value of rsrpOffsetCSI-RS.";

default 0;

type types3gpp:QOffsetRange;

}

leaf rsrqOffsetCsiRs {

description "Offset value of rsrqOffsetCSI-RS.";

default 0;

type types3gpp:QOffsetRange;

}

leaf sinrOffsetCsiRs {

description "Offset value of sinrOffsetCSI-RS.";

default 0;

type types3gpp:QOffsetRange;

}

}

leaf nRFreqRelationRef {

description "Reference to a corresponding NRFrequency instance.";

mandatory true;

type types3gpp:DistinguishedName;

}

leaf adjacentNRCellRef {

description "Reference to an adjacent NR cell (NRCellCU or

ExternalNRCellCU).";

mandatory true;

type types3gpp:DistinguishedName;

}

}

augment /me3gpp:ManagedElement/gnbcucp3gpp:GNBCUCPFunction/nrcellcu3gpp:NRCellCU {

list NRCellRelation {

description "Represents a neighbour cell relation from a source cell

to a target cell, where the target cell is an NRCellCU or

ExternalNRCellCU instance.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses NRCellRelationGrp;

}

}

}

}

module \_3gpp-nr-nrm-nrfreqrelation {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-nrfreqrelation";

prefix "nrfreqrel3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-nr-nrm-gnbcucpfunction { prefix gnbcucp3gpp; }

import \_3gpp-nr-nrm-nrcellcu { prefix nrcellcu3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the NRFreqRelation Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping NRFreqRelationGrp {

description "Represents the NRFreqRelation IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

container offsetMO {

description "A set of offset values applicable to all measured cells

with reference signal(s) indicated in corresponding MeasObjectNR. It

is used to indicate a cell, beam or measurement object specific offset

to be applied when evaluating candidates for cell re-selection or when

evaluating triggering conditions for measurement reporting. It is

defined for rsrpOffsetSSB, rsrqOffsetSSB, sinrOffsetSSB,

rsrpOffsetCSI-RS, rsrqOffsetCSI-RS and sinrOffsetCSI-RS.";

reference "offsetMO in MeasObjectNR in 3GPP TS 38.331";

leaf rsrpOffsetSsb {

description "Offset value of rsrpOffsetSSB.";

default 0;

type types3gpp:QOffsetRange;

}

leaf rsrqOffsetSsb {

description "Offset value of rsrqOffsetSSB.";

default 0;

type types3gpp:QOffsetRange;

}

leaf sinrOffsetSsb {

description "Offset value of sinrOffsetSSB.";

default 0;

type types3gpp:QOffsetRange;

}

leaf rsrpOffsetCsiRs {

description "Offset value of rsrpOffsetCSI-RS.";

default 0;

type types3gpp:QOffsetRange;

}

leaf rsrqOffsetCsiRs {

description "Offset value of rsrqOffsetCSI-RS.";

default 0;

type types3gpp:QOffsetRange;

}

leaf sinrOffsetCsiRs {

description "Offset value of sinrOffsetCSI-RS.";

default 0;

type types3gpp:QOffsetRange;

}

}

leaf-list blackListEntry {

description "A list of Physical Cell Identities (PCIs) that are

blacklisted in NR measurements.";

reference "3GPP TS 38.331";

min-elements 0;

type uint16 { range "0..1007"; }

}

leaf-list blackListEntryIdleMode {

description "A list of Physical Cell Identities (PCIs) that are

blacklisted in SIB4 and SIB5.";

min-elements 0;

type uint16 { range "0..1007"; }

}

leaf cellReselectionPriority {

description "The absolute priority of the carrier frequency used by the

cell reselection procedure. Value 0 means lowest priority. The value

must not already used by other RAT, i.e. equal priorities between RATs

are not supported. The UE behaviour when no value is entered is

specified in subclause 5.2.4.1 of 3GPP TS 38.304.";

reference "CellReselectionPriority in 3GPP TS 38.331, priority in

3GPP TS 38.304";

type uint32;

default 0;

}

leaf cellReselectionSubPriority {

description "Indicates a fractional value to be added to the value of

cellReselectionPriority to obtain the absolute priority of the

concerned carrier frequency for E-UTRA and NR.";

reference "3GPP TS 38.331";

type uint8 { range "2 | 4 | 6 | 8"; }

units "0.1";

}

leaf pMax {

description "Used for calculation of the parameter Pcompensation

(defined in 3GPP TS 38.304), at cell reselection to a cell.";

reference "PEMAX in 3GPP TS 38.101-1";

mandatory false;

type int32 { range "-30..33"; }

units dBm;

}

leaf qOffsetFreq {

description "The frequency specific offset applied when evaluating

candidates for cell reselection.";

mandatory false;

type types3gpp:QOffsetRange;

default 0;

}

leaf qQualMin {

description "Indicates the minimum required quality level in the cell.

Value 0 means that it is not sent and UE applies in such case the

(default) value of negative infinity for Qqualmin. Sent in SIB3 or

SIB5.";

reference "3GPP TS 38.304";

type int32 { range "-34..-3 | 0"; }

units dB;

default 0;

}

leaf qRxLevMin {

description "Indicates the required minimum received Reference Symbol

Received Power (RSRP) level in the NR frequency for cell reselection.

Broadcast in SIB3 or SIB5, depending on whether the related frequency

is intra- or inter-frequency. Resolution is 2.";

reference "3GPP TS 38.304";

mandatory true;

type int32 { range "-140..-44"; }

units dBm;

}

leaf threshXHighP {

description "Specifies the Srxlev threshold used by the UE when

reselecting towards a higher priority RAT/frequency than the current

serving frequency. Each frequency of NR and E-UTRAN might have a

specific threshold. Resolution is 2.";

reference "ThreshX, HighP in 3GPP TS 38.304";

mandatory true;

type int32 { range "0..62"; }

units dB;

}

leaf threshXHighQ {

description "Specifies the Squal threshold used by the UE when

reselecting towards a higher priority RAT/frequency than the current

serving frequency. Each frequency of NR and E-UTRAN might have a

specific threshold.";

reference "ThreshX, HighQ in 3GPP TS 38.304";

mandatory true;

type int32 { range "0..31"; }

units dB;

}

leaf threshXLowP {

description "Specifies the Srxlev threshold used by the UE when

reselecting towards a lower priority RAT/frequency than the current

serving frequency. Each frequency of NR and E-UTRAN might have a

specific threshold. Resolution is 2.";

reference "ThreshX, LowP in 3GPP TS 38.304";

mandatory true;

type int32 { range "0..62"; }

units dB;

}

leaf threshXLowQ {

description "Specifies the Squal threshold used by the UE when

reselecting towards a lower priority RAT/frequency than the current

serving frequency. Each frequency of NR and E-UTRAN might have a

specific threshold.";

reference "ThreshX, LowQ in 3GPP TS 38.304";

mandatory true;

type int32 { range "0..31"; }

units dB;

}

leaf tReselectionNR {

description "Cell reselection timer for NR.";

reference "TreselectionRAT for NR in 3GPP TS 38.331";

mandatory true;

type int32 { range "0..7"; }

units s;

}

leaf tReselectionNRSfHigh {

description "The attribute tReselectionNr (parameter TreselectionNR in

3GPP TS 38.304) is multiplied with this scaling factor if the UE is

in high mobility state.";

reference "Speed dependent ScalingFactor for TreselectionNR for high

mobility state in 3GPP TS 38.304";

mandatory true;

type uint8 { range "25 | 50 | 75 | 100"; }

units %;

}

leaf tReselectionNRSfMedium {

description "The attribute tReselectionNr (parameter TreselectionNR in

3GPP TS 38.304) multiplied with this scaling factor if the UE is in

medium mobility state.";

reference "Speed dependent ScalingFactor for TreselectionNR for medium

mobility state in 3GPP TS 38.304";

mandatory true;

type uint8 { range "25 | 50 | 75 | 100"; }

units %;

}

leaf nRFrequencyRef {

description "Reference to a corresponding NRFrequency instance.";

mandatory true;

type types3gpp:DistinguishedName;

}

}

augment /me3gpp:ManagedElement/gnbcucp3gpp:GNBCUCPFunction/nrcellcu3gpp:NRCellCU {

list NRFreqRelation {

description "Together with the target NRFrequency, it represents the

frequency properties applicable to the referencing NRFreqRelation.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses NRFreqRelationGrp;

}

}

}

}

module \_3gpp-nr-nrm-nrfrequency {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-nrnetwork-nrfrequency";

prefix "nrfreq3gpp";

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-nr-nrm-nrnetwork { prefix nrnet3gpp; }

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the NRFrequency Information Object

Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping NRFrequencyGrp {

description "Represents the NRFrequency IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf absoluteFrequencySSB {

description "The absolute frequency applicable for a downlink NR carrier

frequency associated with the SSB, in terms of NR-ARFCN.";

mandatory true;

type uint32 { range "0.. 3279165"; }

}

leaf sSBSubCarrierSpacing {

description "Sub-carrier spacing of the SSB.";

mandatory true;

type uint8 { range "15 | 30 | 60 | 120"; }

units "kHz";

}

leaf-list multiFrequencyBandListNR {

description "List of additional frequency bands the frequency belongs to.

The list is automatically set by the gNB.";

config false;

min-elements 0;

type uint16 { range "1..256"; }

}

}

grouping NRFrequencyWrapper {

list NRFrequency {

description "Represents certain NR frequency properties.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses NRFrequencyGrp;

}

}

}

augment "/subnet3gpp:SubNetwork" {

if-feature subnet3gpp:ExternalsUnderSubNetwork ;

uses NRFrequencyWrapper;

}

augment "/nrnet3gpp:NRNetwork" {

if-feature nrnet3gpp:ExternalsUnderNRNetwork;

uses NRFrequencyWrapper;

}

}

module \_3gpp-nr-nrm-nrnetwork {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-nrnetwork";

prefix "nrnet3gpp";

import \_3gpp-common-subnetwork { prefix subnet3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the NRNetwork Information Object

Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

feature ExternalsUnderNRNetwork {

description "Classes representing external entities like NRFrequency,

ExternalGNBCUCPFunction, ExternalGNBDUFunction

are contained under a NRNetwork list/class.";

}

grouping NRNetworkGrp {

description "Represents the NRNetwork IOC.";

reference "3GPP TS 28.541";

uses subnet3gpp:SubNetworkGrp;

}

list NRNetwork {

description "A subnetwork containing gNB external NR entities.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses NRNetworkGrp;

}

}

}

module \_3gpp-nr-nrm-nrsectorcarrier {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-nrnetwork-nrsectorcarrier";

prefix "nrsectcarr3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-managed-function { prefix mf3gpp; }

import \_3gpp-common-managed-element { prefix me3gpp; }

import \_3gpp-nr-nrm-gnbdufunction { prefix gnbdu3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

organization "3GPP SA5";

description "Defines the YANG mapping of the NRSectorCarrier Information

Object Class (IOC) that is part of the NR Network Resource Model (NRM).";

reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

revision 2019-06-17 {

description "Initial revision";

reference "Based on

3GPP TS 28.541 V15.X.XX";

}

grouping NRSectorCarrierGrp {

description "Represents the NRSectorCarrier IOC.";

reference "3GPP TS 28.541";

uses mf3gpp:ManagedFunctionGrp;

leaf txDirection {

description "Indicates if the transmission direction is downlink,

uplink, or both downlink and uplink.";

mandatory true;

type types3gpp:TxDirection;

}

leaf configuredMaxTxPower {

description "Maximum possible transmisssion power for all downlink

channels, used simultaneously in a sector-carrier, added together.";

mandatory true;

type int32;

units mW;

}

leaf arfcnDL {

description "NR Absolute Radio Frequency Channel Number (NR-ARFCN)

for downlink.";

reference "3GPP TS 38.104";

mandatory true;

type int32 { range "0..3279165"; }

}

leaf arfcnUL {

description "NR Absolute Radio Frequency Channel Number (NR-ARFCN)

for uplink.";

reference "3GPP TS 38.104";

mandatory true;

type int32 { range "0..3279165"; }

}

leaf bSChannelBwDL {

description "Base station channel bandwitdth for downlink.";

reference "3GPP TS 38.104";

mandatory true;

type int32 { range "5 | 10 | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

90 | 100"; }

units MHz;

}

leaf bSChannelBwUL {

description "Base station channel bandwitdth for uplink.";

reference "3GPP TS 38.104";

mandatory true;

type int32 { range "5 | 10 | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

90 | 100"; }

units MHz;

}

leaf sectorEquipmentFunctionRef {

description "Reference to corresponding SectorEquipmentFunction

instance.";

reference "3GPP TS 23.622";

mandatory true;

type types3gpp:DistinguishedName;

}

}

augment "/me3gpp:ManagedElement/gnbdu3gpp:GNBDUFunction" {

list NRSectorCarrier {

description "Represents the resources of each transmission point

included in the cell.";

reference "3GPP TS 28.541";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses NRSectorCarrierGrp;

}

}

}

}

***End of changes***