**3GPP TSG-SA5 Meeting #129e *S5-201919***

**e-meeting, 24 February – 4 March 2020**

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| *CR-Form-v11.4* |
| **CHANGE REQUEST** |
|  |
|  | **28.541** | **CR** | **0239** | **rev** | **-** | **Current version:** | **16.3.0** |  |
|  |
| *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 |  |

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|  |
| ***Title:***  | Update the NR NRM to align with NG-RAN overview architecture |
|  |  |
| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | eNRM |  | ***Date:*** | 2020-02-14 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *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 canbe 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)* |
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| ***Reason for change:*** | In TS 38.300 NG-RAN overview architecture in clause 4.1, the gNB can connect to the ng-eNB via Xn interface, however, this interface can not be support by our NR NRM. |
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| ***Summary of change:*** | 1. Update Figure 4.2.1.1-2: NRM for EPs for all deployment scenarios and EP\_XnC definition to support Xn interface between gNB and en-gNB.The main change in the figure is:
* Replace the GNBCUCPFunction<<ProxyClass>> with GNBCUCPNeighbor<<ProxyClass>>;
* Replace the GNBCUUPFunction<<ProxyClass>> with GNBCUUPNeighbor<<ProxyClass>>;
* Combine two EP\_X2U and replace it’s associated GNBCUUPFunction<<ProxyClass>> with GNBCUUPNeighbor<<ProxyClass>>;
1. Update the EP\_XnC YANG module description
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| ***Consequences if not approved:*** | The NR NRM is not align with NG-RAN defined in TS 38.300 |
|  |  |
| ***Clauses affected:*** | 4.2.1.1, 4.3.17.1, 4.3.17.2, 4.3.X(new), 4.3.Y(new),E.5.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |

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| --- | --- |
| ***This CR's revision history:*** |  |

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| **1st Change** |

#### 4.2.1.1 Relationships

This clause depicts the set of classes (e.g. IOCs) that encapsulates the information relevant for this gNB and en-gNB. For the UML semantics, see 3GPP TS 32.156 [43]. Subsequent clauses provide more detailed specification of various aspects of these classes.

The model fragments are for management representation of gNB and en-gNB for all NG-RAN deployment scenario as listed below.

- Non-split NG-RAN deployment scenario, represents the gNB defined in TS 38.401[4].

- 2-split NG-RAN deployment scenario, represents the gNB consist of gNB-CU and gNB-DU defined in TS 38.401[4] clause 6.1.1.

- 3-split NG-RAN deployment scenario, represents the gNB consist of gNB-CU-CP, gNB-CU-UP and gNB-DU defined in TS 38.401[4] clause 6.1.2.



Figure 4.2.1.1-1: NRM for all deployment scenarios



Figure 4.2.1.1-2: NRM for EPs for all deployment scenarios



Figure 4.2.1.1-3: NRM for <<IOC>>NRSectorCarrier and <<IOC>>BWP for all deployment scenarios



Figure 4.2.1.1-4: Cell Relation view for all deployment scenarios

NOTE 1: The above NRM fragment uses SubNetwork to hold both NR and LTE external entities and frequencies.



Figure 4.2.1.1-5: Cell Relation view for all deployment scenarios

NOTE 2: The above NRM fragment uses NRNetwork to hold NR external entities and frequency and using EUtraNetwork to hold LTE external entities and frequency. The NRNetwork and EUtraNetwork are subclasses of SubNetwork (defined in TS 28.622 [30]) with no additional attributes. The reason using NRNetwork and EUtraNetwork is for a clean separation of NR external entities and frequency and LTE external entities and frequency.

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| **2nd Change** |

### 4.3.17 EP\_XnC

#### 4.3.17.1 Definition

This IOC represents the local gNB node end point of the logical link, supporting Xn Application protocols, to a neighbour NG-RAN node (including gNB and ng-eNB). The Xn Application PDUs are carried over SCTP/IP/Data link layer/Physical layer stack. See subclause 7 of 3GPP TS 38.420 [6].

#### 4.3.17.2 Attributes

The EP\_XnC IOC includes attributes inherited from EP\_RP IOC (defined in TS 28.622[30]) and the following attributes:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| localAddress | O | T | T | F | T |
| remoteAddress | O | T | T | F | T |

#### 4.3.17.3 Attribute constraints

None

#### 4.3.17.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

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| **3rd Change** |

### 4.3.X GNBCUCPNeighbour <<ProxyClass>>

#### 4.3.X.1 Definition

This IOC represents an <<IOC>>GNBCUCPFunction, <<IOC>>ExternalGNBCUCPFunction, <<IOC>>ENBFunction and <<IOC>>ExternalENBFunction.

#### 4.3.X.2 Attributes

See that defined in <<IOC>>GNBCUCPFunction, <<IOC>>ExternalGNBCUCPFunction, <<IOC>>ENBFunction and <<IOC>>ExternalENBFunction.

#### 4.3.X.3 Attribute constraints

See that defined in <<IOC>>GNBCUCPFunction, <<IOC>>ExternalGNBCUCPFunction, <<IOC>>ENBFunction and <<IOC>>ExternalENBFunction.

#### 4.3.X.4 Notifications

See respective IOCs.

### 4.3.Y GNBCUUPNeighbour <<ProxyClass>>

#### 4.3.Y.1 Definition

This IOC represents an <<IOC>>GNBCUUPFunction, <<IOC>>ExternalGNBCUUPFunction, <<IOC>>ENBFunction and <<IOC>>ExternalENBFunction.

#### 4.3.Y.2 Attributes

See that defined in <<IOC>>GNBCUUPFunction, <<IOC>>ExternalGNBCUUPFunction, <<IOC>>ENBFunction and <<IOC>>ExternalENBFunction.

#### 4.3.Y.3 Attribute constraints

See that defined in <<IOC>>GNBCUUPFunction, <<IOC>>ExternalGNBCUUPFunction, <<IOC>>ENBFunction and <<IOC>>ExternalENBFunction.

#### 4.3.Y.4 Notifications

See respective IOCs.

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| **4th Change** |

## E.5.2 module\_3gpp-nr-nrm-ep.yang

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 2020-03-02 { reference S5-201191"; }

 revision 2019-06-17 {

 description "Initial revision";

 }

 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 NG-RAN node

 (including gNB and ng-eNB). The Xn Application PDUs are carried over

 SCTP/IP/Data link layer/Physical layer stack.";

 reference "3GPP TS 28.541, 3GPP TS 38.420 subclause 7";

 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;

 }

 }

 }

}

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| **End of Change** |