**3GPP TSG-RAN WG2 Meeting #109bis Electronic R2-2003419**

**20th – 30th Apr, 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **36.331** | **CR** | **4266** | **rev** | **-** | **Current version:** | **16.0.0** |  |
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| *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 | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | Introduction in new SIB of bandlist for ENDC for 5G indicator | | | | | | | | | |
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| ***Source to WG:*** | Huawei, HiSilicon, BT, Samsung | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core | | | | |  | ***Date:*** | | | 2020-04-9 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **A** |  | | | | | ***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 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:*** | | In RAN #86, a LS was received from GSMA in RP-193053 requesting further work from 3GPP to enhance the existing 5G indicator handling. RAN plenary requested RAN2 to work on this in RP-193265 and RAN concluded that the following changes to the E-UTRA RRC specification are required:   1. Introduce signalling to enable a UE camped on an E-UTRA cell to be informed, with frequency band granularity, of the NR frequency bands available for configuration of EN-DC operation within the area of this cell. In the case of RAN sharing, it must be possible to provide the NR frequency bands independently per PLMN. RAN2 can involve other groups as necessary to introduce the appropriate signalling. 2. For a UE in RRC Idle (or Inactive), specify that the presence of the upperLayerIndication is only provided to upper layers if the UE supports EN-DC operation for one or more of the indicated frequency bands. 3. For a UE in RRC Connected, specify that the presence or absence of the upperLayerIndication is provided to upper layers depending on whether or not the UE is configured by RRC for EN-DC operation. | | | | | | | | |
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| ***Summary of change:*** | | The following changes are made:   * Add SIBxy to broadcast NR band information for EN-DC operation * Modify UE’s action on forwarding *upperLayerIndication* to upper layers after receiving SIB2 * Add action description of RRC\_CONNECTED UE to forward *upperLayerIndication* to upper layers   **Impact Analysis**  Impacted 5G architecture options: EN-DC  Impacted functionality:  Handling of *upperLayerIndication* (used for 5G icon display)  Inter-operability:   1. If the network is implemented according to the CR and the UE is not, there is no inter-operability problem, the UE will pass the *upperLayerIndication* to upper layers (in order to display 5G icon) as per legacy*.* 2. If the UE is implemented according to the CR and the network is not, the network would not broadcast the new SIBxy, the UE will pass the *upperLayerIndication* to upper layers (in order to display 5G icon) as per legacy. | | | | | | | | |
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| ***Consequences if not approved:*** | | A UE that doesn’t support any NR band for EN-DC in one area will pass the *upperLayerIndication* to upper layers (in order to display 5G icon) as per legacy. This will make the user confused. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.9, 5.2.2.xy, 5.3.5.2, 6.2.2, 6.3.1, 6.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

5.2.2.9 Actions upon reception of *SystemInformationBlockType2*

Upon receiving *SystemInformationBlockType2*, the UE shall:

*<Partially omitted>*

1> else:

2> indicate to upper layers that *up-CIoT-EPS-Optimisation* is not present;

1. if *SystemInformationBlockTypexy is not present,* to upper layers either forward *upperLayerIndication*, if present for the selected PLMN , or otherwise indicate absence of this field;

NOTE: *upperLayerIndication* is an indication to upper layers that the UE has entered a coverage area that offers 5G capabilities.

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| *<Next modification>* |

#### 5.2.2.34 Actions upon reception of *SystemInformationBlockPos*

No UE requirements related to the contents of the *SystemInformationBlockPos* apply other than those specified elsewhere e.g. within TS 36.355 [54], and/or within the corresponding field descriptions.

#### 5.2.2.35 Actions upon reception of *SystemInformationBlockType27*

No UE requirements related to the contents of this *SystemInformationBlock (SystemInformationBlockType27* or *SystemInformationBlockType27-NB)* apply other than those specified elsewhere e.g. within procedures using the concerned system information, and/ or within the corresponding field descriptions.

#### 5.2.2.36 Actions upon reception of *SystemInformationBlockType28*

Upon receiving *SystemInformationBlockType28*, the UE shall perform actions as specified in 5.2.2.4.x in TS 38.331 [82].

#### 5.2.2.xy Actions upon reception of *SystemInformationBlockTypexy*

Upon receiving *SystemInformationBlockTypexy* the UE shall:

1> if *nrBandList* is included for the selected PLMN and the UE supports to operate in (NG-)EN-DC using the serving cell and at least one of NR bands in *nrBandList:*

2> forward *upperLayerIndication* to upper layers;

1> else:

2> indicate upper layers absence of *upperLayerIndication*;

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| *<Next modification>* |

#### 5.3.5.2 Initiation

E-UTRAN may initiate the RRC connection reconfiguration procedure to a UE in RRC\_CONNECTED. E-UTRAN applies the procedure as follows:

- the *mobilityControlInfo* is included only when AS-security has been activated, and SRB2 with at least one DRB are setup and not suspended;

- the establishment of RBs (other than SRB1, that is established during RRC connection establishment) is included only when AS security has been activated;

- the addition of SCells is performed only when AS security has been activated;

- the addition, release or modification of conditional configurations (conditional handover) is performed only when AS security has been activated, and SRB2 with at least one DRB are setup and not suspended;

- if the UE is configured to operate in (NG)-EN-DC, forward *upperLayerIndication* to upper layers, otherwise indicates upper layers absence of this field.

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| *<Next modification>* |

### 6.2.2 Message definitions

*<Partially omitted>*

#### – *SystemInformation*

The *SystemInformation* message is used to convey one or more System Information Blocks or Positioning System Information Blocks. All the SIBs or posSIBs included are transmitted with the same periodicity. *SystemInformation-BR* and *SystemInformation-MBMS* use the same structure as *SystemInformation.*

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channels: BCCH and BR-BCCH

Direction: E‑UTRAN to UE

*SystemInformation message*

-- ASN1START

SystemInformation-BR-r13 ::= SystemInformation

SystemInformation-MBMS-r14 ::= SystemInformation

SystemInformation ::= SEQUENCE {

criticalExtensions CHOICE {

systemInformation-r8 SystemInformation-r8-IEs,

criticalExtensionsFuture-r15 CHOICE {

posSystemInformation-r15 PosSystemInformation-r15-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

}

SystemInformation-r8-IEs ::= SEQUENCE {

sib-TypeAndInfo SEQUENCE (SIZE (1..maxSIB)) OF CHOICE {

sib2 SystemInformationBlockType2,

sib3 SystemInformationBlockType3,

sib4 SystemInformationBlockType4,

sib5 SystemInformationBlockType5,

sib6 SystemInformationBlockType6,

sib7 SystemInformationBlockType7,

sib8 SystemInformationBlockType8,

sib9 SystemInformationBlockType9,

sib10 SystemInformationBlockType10,

sib11 SystemInformationBlockType11,

...,

sib12-v920 SystemInformationBlockType12-r9,

sib13-v920 SystemInformationBlockType13-r9,

sib14-v1130 SystemInformationBlockType14-r11,

sib15-v1130 SystemInformationBlockType15-r11,

sib16-v1130 SystemInformationBlockType16-r11,

sib17-v1250 SystemInformationBlockType17-r12,

sib18-v1250 SystemInformationBlockType18-r12,

sib19-v1250 SystemInformationBlockType19-r12,

sib20-v1310 SystemInformationBlockType20-r13,

sib21-v1430 SystemInformationBlockType21-r14,

sib24-v1530 SystemInformationBlockType24-r15,

sib25-v1530 SystemInformationBlockType25-r15,

sib26-v1530 SystemInformationBlockType26-r15,

sibxy-v15xy SystemInformationBlockTypexy-r15,

sib27-v16xy SystemInformationBlockType27-r16,

sib28-v16xy SystemInformationBlockType28-r16 },

nonCriticalExtension SystemInformation-v8a0-IEs OPTIONAL

}

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| *<Next modification>* |

### 6.3.1 System information blocks

*<Partially omitted>*

#### – *SystemInformationBlockType28*

The IE *SystemInformationBlockType28* contains NR sidelink communication configuration.

*SystemInformationBlockType28* information element

-- ASN1START

SystemInformationBlockType28-r16 ::= SEQUENCE {

sl-ConfigCommonNR-r16 OCTET STRING OPTIONAL, -- Need OR

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

-- ASN1STOP

| *SystemInformationBlockType28* field descriptions |
| --- |
| ***sl-ConfigCommonNR***  Container for the configuration for NR sidelink communication, this fieild includes the *SL-ConfigCommonNR* IE as specified in TS 38.331 [82]. |

#### – *SystemInformationBlockTypexy*

The IE *SystemInformationBlockTypexy* contains bands list which can be used for ENDC operation with the serving cell.

*SystemInformationBlockTypexy* information element

-- ASN1START

SystemInformationBlockTypexy-r15 ::= SEQUENCE {

plmn-InfoList-v15xy PLMN-InfoList-v15xy,

bandListENDC-r15 BandListENDC-r15

...

}

BandListENDC-r15 ::= SEQUENCE (SIZE (1.. maxBandsENDC-r15)) OF SupportedBandNR-r15

PLMN-InfoList-r15 ::= SEQUENCE (SIZE (1..maxPLMN-r11)) OF PLMN-Info-r15

PLMN-Info-r15 ::= SEQUENCE {

nrBandList BIT STRING (SIZE(maxBandsENDC-r15)) OPTIONAL -- Need OR

}

-- ASN1STOP

| *SystemInformationBlockTypexy* field descriptions |
| --- |
| ***bandListENDC***  A list of bands which can be configured as SCG in (NG-)EN-DC operation with serving cell for the indication of *upperLayerIndication*. |
| ***plmn-InfoList***  This field includes the same number of entries, and listed in the same order as PLMNs across the *plmn-IdentityList* fields included in SIB1. I.e. the first entry corresponds to the first entry of the combined list that results from concatenating the entries included in the second to the original *plmn-IdentityList* field. |
| ***nrBandList***  This field is encoded as a bitmap, where the bit N is set to “1” if the current serving cell supports (NG-)EN-DC operation with the *N*-th NR band in *bandListENDC*. The bits which have no corresponding bands in *bandListENDC* shall be set to 0. |

*<Partially omitted>*

## 6.4 RRC multiplicity and type constraint values

### – Multiplicity and type constraint definitions

-- ASN1START

ffsValue INTEGER ::= 65536 -- Placeholder for all FFS value

hiFFS INTEGER ::= 64 -- Highest value of a range that still is FFS. To be removed.

maxAccessCat-1-r15 INTEGER ::= 63 -- Maximum number of Access Categories - 1

maxACDC-Cat-r13 INTEGER ::= 16 -- Maximum number of ACDC categories (per PLMN)

maxAvailNarrowBands-r13 INTEGER ::= 16 -- Maximum number of narrowbands

maxBandComb-r10 INTEGER ::= 128 -- Maximum number of band combinations.

maxBandComb-r11 INTEGER ::= 256 -- Maximum number of additional band combinations.

maxBandComb-r13 INTEGER ::= 384 -- Maximum number of band combinations in Rel-13

maxBands INTEGER ::= 64 -- Maximum number of bands listed in EUTRA UE caps

maxBandsNR-r15 INTEGER ::= 1024 -- Maximum number of NR bands listed in EUTRA UE caps

maxBandsENDC-r15 INTEGER ::= 10 -- Maximum number of NR bands for (NG)-ENDC for the indication of upperLayerIndication.

maxBandwidthClass-r10 INTEGER ::= 16 -- Maximum number of supported CA BW classes per band

maxBandwidthCombSet-r10 INTEGER ::= 32 -- Maximum number of bandwidth combination sets per

-- supported band combination

<Partially omitted>

-- ASN1STOP