**3GPP TSG-RAN2 Meeting #109-e *R2-2002350***

**Online, , 24th Feb 2020 - 6th Mar 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **38.306** | **CR** | **0259** | **rev** | **1** | **Current version:** | **15.8.0** |  |
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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:***  | UE capability of intra-band requirements for inter-band EN-DC/NE-DC |
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| ***Source to WG:*** | NTT DOCOMO, INC., Qualcomm Incorporated |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2020-02-19 |
|  |  |  |  |  |
| ***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 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:*** | For an inter-band EN-DC combination where the frequency range of the E-UTRA band is a subset of the frequency range of the NR band, RAN4 agreed to apply intra-band EN-DC requirements. In this case, RAN4 also agreed that non-contigous CC allocation is mandatory, whereas contiguous CC allocation is optional. RAN2 is asked by their LS to update RAN2 specifications for the UE to report these requirements, by reusing the existing UE capability signalling of *intraBandENDC-Support* or introducing a new capability bit, as in [R2-2000034](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e/LSin/R2-2000034.zip). This CR is aimed at addressing the RAN4 request. |
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| ***Summary of change:*** | A new UE capability is introduced in MRDC-Parameters to address the decision made by RAN4, as mentioned in the reason for change. Rather than reusing the existing *intraBandENDC-Support*, an explicit indication via a new UE capability is introduced to avoid the implicit functional support. One single codepoint is used for the new UE capability to indicate support of contiguous CC allocation for a given inter-band EN-DC combination. The absence of the new capability implies that the UE supports non-contiguous CC allocation for a given inter-band EN-DC band combination.**Impact analysis:**Impacted 5G architecture options:EN-DC, NGEN-DC and NE-DCImpacted functionality:UE capability of EN-DC/NE-DC band combinationsInter-operability:If the UE implements this CR but the gNB does not, the gNB merely comprehends the component frequency bands in a band combination signalling and so consider it as an inter-band EN-DC band combination (i.e. non-contigous CC allocation). For the gNB to configure EN-DC/NE-DC, it does not matter whether intra-band or inter-band EN-DC requirement is applied, since it is purely from the UE RF viewpoints.If the gNB implements this CR but the UE does not, the gNB considers that only non-contigous allocation with an intra-band requirementhas been supported for a given inter-EN-DC band combination. |
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| ***Consequences if not approved:*** | For the inter-band EN-DC combination compliant with intra-band requirements, the system still considers it as inter-band EN-DC. |
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| ***Clauses affected:*** | 4.2.7.9 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.331 CR 1501 |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
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| ***This CR's revision history:*** | Rev.1:- The proposed new UE capability is updated just to indicate whether contigous CC allocation is supported by a single codepoint. Absence of the new capability bit implies that non-contigous CC allocation is supported for the inter-band EN-DC combination to which intra-band requirements are applied. - Inter-operability analysis is updated, in accordance with the upcate of new UE capabilities. |

#### 4.2.7.9 *MRDC-Parameters*

| Definitions for parameters | Per | M | FDD-TDDDIFF | FR1-FR2DIFF |
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| ***asyncIntraBandENDC***Indicates whether the UE supports asynchronous FDD-FDD intra-band EN-DC with MRTD and MTTD as specified in clause 7.5 and 7.6 of TS 38.133 [5]. If it is not supported for FDD-FDD intra-band EN-DC, the UE supports only synchronous FDD-FDD intra-band EN-DC. | BC | No | FDD only | FR1 only |
| ***dualPA-Architecture***For an intra-band band combination, this field indicates the support of dual PAs. If absent in an intra-band band combination, the UE supports single PA for all the ULs in the intra-band band combination. For other band combinations, this field is not applicable. | BC | No | No | No |
| ***dynamicPowerSharingENDC***Indicates whether the UE supports dynamic (NG)EN-DC power sharing between NR FR1 carriers and the LTE carriers. If the UE supports this capability the UE supports the dynamic power sharing behaviour as specified in clause 7 of TS 38.213 [11]. | BC | Yes | No | FR1 only |
| ***dynamicPowerSharingNEDC***Indicates whether the UE supports dynamic NE-DC power sharing between NR FR1 carriers and the LTE carriers. If the UE supports this capability, the UE supports the dynamic power sharing behavior as specified in clause 7 of TS 38.213 [11]. | BC | Yes | No | FR1 only |
| ***intraBandENDC-Support***Indicates whether the UE supports intra-band EN-DC with only non-contiguous spectrum, or with both contiguous and non-contiguous spectrum for the EN-DC combination as specified in TS 38.101-3 [4].If the UE does not include this field for an intra-band EN-DC combination the UE only supports the contiguous spectrum for the intra-band EN-DC combination. | BC | No | No | No |
| ***interBandContiguousMRDC***Indicates for an inter-band (NG)EN-DC/NE-DC combination, where the frequency range of the E-UTRA band is a subset of the frequency range of the NR band (as specified in Table 5.5B.4.1-1 of TS 38.101-3 [4]), that the UE supports intra-band contiguous (NG)EN-DC/NE-DC requirements (see TS 38.101-3 [4]). If the field is absent for such an inter-band (NG)EN-DC/NE-DC combination, the UE supports intra-band non-contiguous (NG)EN-DC/NE-DC requirements. | BC | CY | No | No |
| ***simultaneousRxTxInterBandENDC***Indicates whether the UE supports simultaneous transmission and reception in TDD-TDD and TDD-FDD inter-band EN-DC. It is mandatory for certain TDD-FDD and TDD-TDD band combinations defined in TS 38.101-3 [4]. | BC | CY | No | No |
| ***singleUL-Transmission***Indicates that the UE does not support simultaneous UL transmissions as defined in TS 38.101-3 [4]. The UE may only include this field for certain band combinations defined in TS 38.101-3 [4]. If included for a particular band combination, the field applies to all fallback band combinations of this band combination that are defined in TS 38.101-3 [4] as being allowed to include this field and does not apply to any other fallback band combinations defined in TS 38.101-3 [4]. | BC | No | No | No |
| ***tdm-Pattern***Indicates whether the UE supports the *tdm-PatternConfig* for *single UL-transmission* associated functionality, as specified in TS 36.331 [17]. Support is conditionally mandatory in (NG)EN-DC for UEs that do not support dynamicPowerSharingENDC and for UEs that indicate single UL transmission for any (NG)EN-DC BC. Support is conditionally mandatory in NE-DC for UEs that do not support dynamicPowerSharingNEDC and for UEs that indicate single UL transmission for any NE-DC BC. The feature is optional otherwise. | BC | CY | Yes | Yes |
| ***ul-SharingEUTRA-NR***Indicates whether the UE supports EN-DC with EUTRA-NR coexistence in UL sharing via TDM only, FDM only, or both TDM and FDM from UE perspective as specified in TS 38.101-3 [4]. | BC | No | No | FR1 only |
| ***ul-SwitchingTimeEUTRA-NR***Indicates support of switching type between LTE UL and NR UL for EN-DC with LTE-NR coexistence in UL sharing from UE perspective as defined in clause 6.3B of TS 38.101-3 [4]. It is mandatory to report switching time type 1 or type 2 if UE reports *ul-SharingEUTRA-NR* is *tdm* or *both*. | BC | CY | No | FR1 only |
| ***ul-TimingAlignmentEUTRA-NR***Indicates whether to apply the same UL timing between NR and LTE for dynamic power sharing capable UE operating in a synchronous intra-band contiguous (NG)EN-DC. If this field is absent, UE shall be capable of handling a timing difference up to applicable MTTD requirements when operating in a synchronous intra-band contiguous (NG)EN-DC network, as specified in TS 38.133 [5]. If this capability is included in an inter-band (NG)EN-DC BC with an intra-band (NG)EN-DC BC part, this capability is used to indicate the restriction to the intra-band (NG)EN-DC BC part. | BC | No | No | No |