**3GPP TSG-RAN2 Meeting #109 electronic R2-200xxxx**

**24 Feb – 6 Mar 2020**

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| *CR-Form-v11.2* |
| **CHANGE REQUEST** |
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|  | **38.331** | **CR** | **1152** | **rev** | **3** | **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:***  | CR on capability of maxUplinkDutyCycle for inter-band EN-DC PC2 UE |
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| ***Source to WG:*** | CMCC |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | ENDC\_UE\_PC2\_TDD\_TDD |  | ***Date:*** | 2019-08-09 |
|  |  |  |  |  |
| ***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 RAN4#91 meeting, RAN4 agreed the LS on UE capability of maxUplinkDutyCycle for PC2 inter-band EN-DC (LTE TDD PC3+NR TDD PC3) (R4-1907479) and sent the LS to inform RAN2 to design the capability signalling. The content of LS is provided as below:

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| RAN4 has discussed the SAR issues for PC2 inter-band EN-DC (LTE TDD PC3 + NR TDD PC3). It is agreed to introduce a UE capability of *maxUplinkDutyCycle-EN-DC* which indicates that the maxUplinkDutyCycle capability of NR band corresponds to LTE UL/DL configuration.The *maxUplinkDutyCycle-EN-DC* capability for PC2 inter-band EN-DC (TDD+TDD) is optional, when the percentage of NR uplink symbols transmitted in a certain evaluation period is larger than its capability (The exact evaluation period is no less than one radio frame), i.e., maxUplinkDutyCycle-EN-DC, the requirements for PC2 inter-band EN-DC (TDD+TDD) are not applicable, and the corresponding requirements for a PC3 inter-band EN-DC (TDD+TDD) UE shall apply. The capability of *maxUplinkDutyCycle-EN-DC* is reported by UE as a per band combination capability. The granularity is 10%. The value range of *maxUplinkDutyCycle-EN-DC* for PC2 inter-band EN-DC(TDD+TDD) is from 20% to 100% and the default value is 30%. |

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| ***Summary of change:*** | **Explian the changes**Rev 0:A UE capability of maxUplinkDutyCycle-interBandENDC-TDD-PC2 with values {20%,40%,50%,60%,70%,80%,90%,100%} is introduced to indicate the maximum percentage of symbols during a evaluation period that can be scheduled for NR uplink transmission under different EUTRA TDD uplink-downlink configurations so as to ensure compliance with applicable electromagnetic energy absorption requirements provided by regulatory bodies. This field is only applicable for inter-band TDD+TDD EN-DC power class 2 UE as specified in TS 38.101-3 [34]. If the field is absent, 30% shall be applied. Value n20 corresponds to 20%, value n40 corresponds to 4Rev 1:Suffix is added for the extension of the original field.Rev 2:This CR was agreed in principle in RAN2#107 meeting, and is updated to the latest version of the TS and resubmitted to RAN2#109e for formal agree.Rev 3:Change *maxUplinkDutyCycle-interBandENDC-TDD-r16* to *maxUplinkDutyCycle-interBandENDC-TDD-PC2-r16*, in order to be align with 38.306 CR**Impact analysis**Impacted functionality: The changes only impact power class 2 UEs. (EN-DC only)Inter-operability: 1. If the network is implemented according to the CR and the UE is not, network cannot know when UE will do power back off in order to ensure compliance with applicable electromagnetic energy absorption requirements provided by regulatory bodies.
2. If the UE is implenented according to the CR and the network is not, network scheduler will not consider the *maxUplinkDutyCycle-interBandENDC-TDD-PC2* in order to ensure compliance with applicable electromagnetic energy absorption requirements provided by regulatory bodies, and UE could do power back off when the percentage of uplink transmission within a certain evaluation period is larger than its capability.
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| ***Consequences if not approved:*** | No capability of *maxUplinkDutyCycle* for EN-DC power class 2 UEis supported. |
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| ***Clauses affected:*** | 6.3.3 UE capability information elements, RF parameters |
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|  | **Y** | **N** |  |  |
| ***Other specs*** | **x** |  |  Other core specifications  | TS 38.306 CR 0145 |
| ***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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– *MRDC-Parameters*

The IE *MRDC-Parameters* contains the band combination parameters specific to MR-DC for a given MR-DC band combination.

***MRDC-Parameters* information element**

-- ASN1START

-- TAG-MRDC-PARAMETERS-START

MRDC-Parameters ::= SEQUENCE {

 singleUL-Transmission ENUMERATED {supported} OPTIONAL,

 dynamicPowerSharing ENUMERATED {supported} OPTIONAL,

 tdm-Pattern ENUMERATED {supported} OPTIONAL,

 ul-SharingEUTRA-NR ENUMERATED {tdm, fdm, both} OPTIONAL,

 ul-SwitchingTimeEUTRA-NR ENUMERATED {type1, type2} OPTIONAL,

 simultaneousRxTxInterBandENDC ENUMERATED {supported} OPTIONAL,

 asyncIntraBandENDC ENUMERATED {supported} OPTIONAL,

 ...,

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 dualPA-Architecture ENUMERATED {supported} OPTIONAL,

 intraBandENDC-Support-v1540 ENUMERATED {non-contiguous, both} OPTIONAL,

 ul-TimingAlignmentEUTRA-NR ENUMERATED {required} OPTIONAL

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 maxUplinkDutyCycle-interBandENDC-TDD-PC2-r16 SEQUENCE{

 eutra-TDD-Config0-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config1-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config2-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL, eutra-TDD-Config3-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config4-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config5-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config6-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL

 } OPTIONAL

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}

-- TAG-MRDC-PARAMETERS-STOP

-- ASN1STOP

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