**3GPP TSG-RAN WG4 Meeting #98bis-e *R4-2107222***

Online, 12 Apr – 20 Apr, 2021

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **draftCR** | **rev** | **-** | **Current version:** | **16.7.0** |  |
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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 |  | Core Network |  |

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| ***Title:***  | Correction on RRC-based BWP switch on single CC and multiple CCs requirements |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_RRM\_Enh-Core |  | ***Date:*** | 2021-04-02 |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | Correction on RRC-based BWP switch on single CC and multiple CCs in R16 is needed according to RAN2 response LS R2-2102476 |
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| ***Summary of change:*** | * Clarify that RRC-based BWP switch on single CC or multiple CCs applied for SpCell and for the paramter change for all Cells except the modification of parameters *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* for SCell(s).
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| ***Consequences if not approved:*** | The requirements for RRC-based BWP switch on multiple CCs are not correct. |
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| ***Clauses affected:*** | 8.6.3, 8.6.3A.1, 8.6.3A.2 |
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|  | **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:*** |  |

**< Start of change>**

8.6.3 RRC based BWP switch delay on a single CC

The requirements in this clause only apply to the case that the BWP switch is performed on a single CC with one or more than one BWP configuration(s) configured.'

The requirements in this clause shall apply:

* Active BWP switching or parameter change of its active BWPs for SpCell
* Parameter change of its active BWPs except parameter *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* for SCells

For RRC-based BWP switch, after the UE receives RRC reconfiguration involving active BWP switching or parameter change of its active BWP, UE shall be able to receive PDSCH/PDCCH (for DL active BWP switch) or transmit PUSCH (for UL active BWP switch) on the new BWP on the serving cell on which BWP switch occurs on the first DL or UL slot right after a time duration of $\frac{T\_{RRCprocessingDelay}+T\_{BWPswitchDelayRRC}}{NR Slot length}$ slots which begins from the beginning of DL slot n, where

 DL slot n is the last slot containing the RRC command, and

 $NR Slot length$ is determined by the smaller SCS between the SCS before BWP switch and the SCS after BWP switch if the BWP switch involves changing of SCS.

 $T\_{RRCprocessingDelay}$is the length of the RRC procedure delay in ms as defined in clause 12 in TS 38.331 [2], and

 $T\_{BWPswitchDelayRRC}=6ms$ is the time used by the UE to perform BWP switch.

The UE is not required to transmit UL signals or receive DL signals during the time defined by $T\_{RRCprocessingDelay}+T\_{BWPswitchDelayRRC}$ on the cell where RRC-based BWP switch occurs. When $T\_{HARQ}> T\_{RRCprocessingDelay}$ a longer switching delay is allowed. Where $T\_{HARQ}$ is the time between DL data transmission and acknowledgement as specified in TS 38.213 [3].

8.6.3A RRC based BWP switch delay on multiple CCs

The requirements in this clause only apply to the case when the same type of BWP switch (RRC based BWP switch) is performed on multiple CCs simultaneously or over partially overlapping time period.

The requirements in this clause shall apply:

* Active BWP switching or parameter change of its active BWPs for SpCell
* Parameter change of its active BWPs except parameter *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* for SCells

8.6.3A.1 Simultaneous RRC based BWP switch delay on multiple CCs

Requirements in this clause apply only if RRC based BWP switching on multiple CCs for NR-CA is triggered by a single RRC command.

For RRC-based BWP switch, after the UE receives RRC reconfiguration involving active BWP switching or parameter change of its active BWPs, UE shall be able to receive PDSCH/PDCCH (for DL active BWP switch) or transmit PUSCH (for UL active BWP switch) on the new BWPs on the serving cells on which BWP switch occurs on the first DL or UL slot right after a time duration of $\frac{T\_{RRCprocessingDelay}+T\_{BWPswitchDelayRRC}+D\_{RRC}\*(N-1)}{NR slot length}$slots which begins from the beginning of DL slot n, where

 DL slot n is the last slot containing the RRC command, and

 $T\_{RRCprocessingDelay} and T\_{BWPswitchDelayRRC} $are defined in clause 8.6.3, and

 $D\_{RRC}=0$ for UE which is capable of type 1 BWP switching delay depending on UE capability *bwp-SwitchingDelay* [2]. $D\_{RRC}=D$ for UE which is capable of type 2 BWP switching delay depending on UE capability *bwp-SwitchingDelay* [2], where D is the incremental delay for each additional CC involved in simultaneous BWP switch and depends on UE capability [13].

 N is the number of CCs within the NR-CA configured for performing simultaneous BWP switch.

The UE is not required to transmit UL signals or receive DL signals during the time defined by $T\_{RRCprocessingDelay}+T\_{BWPswitchDelayRRC}+D\_{RRC}\*(N-1)$ on the cells where RRC-based BWP switch occurs.

8.6.3A.2 Non-simultaneous RRC based BWP switch delay on multiple CCs

In non-simultaneous case, the RRC-based BWP switch on multiple CCs is triggered over partially overlapping time period in different Cell groups. The delay requirements in this clause apply only if:

 BWP switching on multiple CCs in different cell groups are triggered by separate RRC commands, and

 UE is operating in NR-DC (FR1+FR2), and

 UE is capable of per-FR gap, and

 BWP switch does not involve SCS change.

For non-simultaneous RRC-based BWP switch, after the UE receives RRC reconfiguration involving active BWP switching or parameter change of its active BWPs, UE shall be able to receive PDSCH/PDCCH (for DL active BWP switch) or transmit PUSCH (for UL active BWP switch) on the new BWPs on the serving cells on which BWP switch occurs on the first DL or UL slot right after a time duration of $\frac{T\_{Waiting}+T\_{RRCprocessingDelay}+T\_{BWPswitchDelayRRC}+D\_{RRC}\*(M-1)}{NR slot length}$ slots which begins from the beginning of DL slot n, where

 DL slot n is the last slot containing the RRC command,

 $T\_{Waiting}$ is the waiting time for RRC based BWP switch which is upper bounded by the ongoing BWP switch time in the first CG defined in clause 8.6.3A.1,

 *M* is the number of CCs within the NR-CA configured for performing simultaneous BWP switch in the second CG; M=1 if the BWP switch is performed on single CC,

 $T\_{RRCprocessingDelay}$ and $T\_{BWPswitchDelayRRC}$ are defined in clause 8.6.3, and

 $D\_{RRC}$ is defined in clause 8.6.3A.1.

The UE is not required to transmit UL signals or receive DL signals during the time defined by $T\_{RRCprocessingDelay}+T\_{BWPswitchDelayRRC }+D\_{RRC}\*(M-1)$ on the cells in the second CG where RRC-based BWP switch occurs.

**< End of change>**