3GPP TSG-RAN WG2 Meeting #111 Electronic DRAFT R2-2008138

Elbonia, 17 – 28 August 2020

**Agenda item: 6.8.1**

**Source: Nokia, Nokia Shanghai Bell**

**Title: [AT111-e][208][DCCA] Corrections SCell dormancy (Nokia)**

**WID/SID: LTE\_NR\_DC\_CA\_enh-Core - Release 16**

**Document for: Discussion and Decision**

# 1 Introduction

This is the following email discussion (Please note that scope says 38.331 CRs but when checked with chairman also 38.321 CRs were intended to be covered):

* **[AT111-e][208][DCCA] Corrections SCell dormancy (Nokia)**

Scope:

* Collect companies’ feedback for the 38.331 CRs under 6.8.1, 6.8.2 and 6.8.3.1 marked for this email discussion
* Proponents may provide updated versions (if needed) under this email discussion (Tdoc numbers can be requested for this purpose from the session chair or the RAN2 secretary)

        Intended outcome:

* Discussion summary in [R2-2008138](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2008138.zip) (by email rapporteur).
* Session chair proposes agreements after the summary report is available

        Deadline for providing comments, for rapporteur inputs, conclusions and CR finalization:

* Deadline for companies' feedback:  Thursday 2020-08-20 09:00 UTC
* Deadline for rapporteur's summary (in [R2-2008138](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2008138.zip)):  Friday 2020-08-21 09:00 UTC
* Deadline for CR finalization (for agreed CRs): Thursday 2020-08-27 07:00 UTC

For simple CRs only a table has been added where people can reflect their opinion on CR. Reason for the CR can be found in the cover sheet. but if there are some unclarities regarding reasoning then additional questions may be added for companies to comment.

# 2 Configuration of sCellState

These papers are related to configuration of sCellState:

[R2-2007006](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2007006.zip) Correction on the Configuration of sCellState for 38.331 CATT CR Rel-16 38.331 16.1.0 1768 - F LTE\_NR\_DC\_CA\_enh-Core

*(moved from 6.8.3.3)*

[R2-2007007](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2007007.zip) Correction on the Configuration of sCellState for 36.331 CATT CR Rel-16 36.331 16.1.1 4366 - F LTE\_NR\_DC\_CA\_enh-Core

*(moved from 6.8.3.3)*

*(moved from 6.8.3.3)*

So reason for change for above papers is written as (from 36.331 CR – 38.331 is analogous removing corresponding part from 38.331):

However, in NR the SCell state can be configured upon PSCell change. Therefore, for NE-DC, the SCell state should also be configured upon PSCell change, which algins with NR-DC and (NG)EN-DC.

Furthermore, the E-UTRA *sCellToAddModList* can’t be configured in NR *RRCResume* message directly. It should be the *sCellToAddModListSCG* included in an E-UTRA *RRCConnectionReconfiguration* message which embedded in *NR RRCResume* message

|  |  |  |
| --- | --- | --- |
| Company | Agree / Not Agree | Comments |
| Nokia | Agree (partly) | If a CR is agreed both should be agreed and coversheet should indicate dependency. Anyway purpose seems to be correct and we are OK to agree this with corrections to cover sheet. |
| Samsung | Agree | Agree to the intention and we are fine with Nokia’s suggestion. |
| Qualcomm | Agree | Agree with Nokia’s suggestion |
| Huawei | Agree |  |
| OPPO | Agree |  |
| ZTE | See comments | In R2-2006007, it is proposed to remove “or in an E-URA *RRCConnectionResume* messge” with the reason that it is already covered by the first sentence.  If we follow the same principle, then in R2-2006007, shouldn’t the last sentence be removed as well? Because *sCellToAddModListSCG* can not be included in RRCReconfiguration message directly, and it is covered by the front sentence.  2> if the *sCellToAddModList* was received within an *RRCConnectionResume* or *sCellToAddModListSCG* was received within *RRCConnectionReconfiguration* with *mobilityControlInfoSCG* embedded in an NR *RRCResume* or embedded in an NR *RRCReconfiguration* message:  We agree that clarification is needed, but better to align the description in both TS 36.331 and TS 38.331. For instance, in R2-2006006, instead of removing the last sentence, we suggest to modify the sentence as below (same as in R2-2006007):  2> if the *sCellToAddModList* was received in an *RRCReconfiguration* message including *reconfigurationWithSync*~~,~~embedded in an *RRCResume* message or embedded in an E-UTRA *RRCConnectionResume* message: |
| Sharp | Agree |  |
| vivo | Agree |  |
| Ericsson | Agree |  |
| Apple | Agree | Similar view as Nokia/ZTE (in that the intention is ok, but needs some clean-up) |
| Futurewei | Agree |  |
| CATT | Agree | We can go with the aligning the wording in both 36.331 and 38.331 as proposed by ZTE |
| MediaTek | Agree but | We also prefer to align LTE and NR. The suggestion from ZTE looks better. |

**Summary:** Agree to CR after aligning wording in LTE and NR Crs as proposed by ZTE and clean up coversheet.

**Proposal 1: CATT prepares update of the CR based on the input**

# 3 Stage 2 changes regarding Dormant BWP

By Email [208]

[R2-2007691](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2007691.zip) Correction on UL behaviours in the dormant BWP Huawei, HiSilicon CR Rel-16 38.300 16.2.0 0286 - F LTE\_NR\_DC\_CA\_enh-Core

|  |  |  |
| --- | --- | --- |
| Company | Agree / Not Agree | Comments |
| Nokia | Agree | This seems to be adding valid points to stage-2 currently missing |
| Samsung | Agree (partly) | No strong opinion since it is specified in other part but OK to add it. |
| Qualcomm | Agree | We think we indeed missed to capture it in 38.300 |
| Huawei | Agree (proponent) |  |
| OPPO | Agree |  |
| ZTE | Agree |  |
| Sharp | Agree |  |
| vivo | Agree |  |
| LG | Agree | Suggestion for better readability:  If the active BWP of the activated SCell is a dormant BWP, the UE stops monitoring PDCCH and transmitting SRS/PUSCH/PUCCH on the SCell but continues performing CSI measurements, AGC and beam management, if configured. |
| Ericsson | Agree |  |
| Apple | Agree |  |
| Futurewei | Agree |  |
| CATT | Agree |  |
| MediaTek | Agree (No strong view) | The intention is correct but seems not essential. But fine to have this. |

**Summary: Agree the CR (consider also LG rewording proposal)**

**Proposal 2: Huawei consider the wording proposal from LG and update CR if needed**

# 3 MAC changes regarding Dormant BWP

By Email [208]

*SCell reactivation:*

[R2-2006679](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2006679.zip) Discussion on Scell reactivation in a dormant and non-dormant BWP SHARP Corporation discussion Rel-16 LTE\_NR\_DC\_CA\_enh-Core

*(moved from 6.8.1)*

In this paper it was identified that in case of reactivation of dormant SCell following observations were raised with nice coloring for the corresponding part in the MAC specification:

**Observation 1**: when dormant BWP is introduced, a reactivated Scell could be either in a dormant BWP or in a non-dormant BWP before a Scell A/D MAC CE is received.

In 5.9 Activation/Deactivation of SCells[1], it is described as below

|  |
| --- |
| [...]  The MAC entity shall for each configured SCell:  1> if an SCell is configured with *sCellState* set to *activated* upon SCell configuration, or an SCell Activation/Deactivation MAC CE is received activating the SCell:  2> if *firstActiveDownlinkBWP-Id* is not set to dormant BWP:  3> activate the SCell according to the timing defined in TS 38.213 [6]; i.e. apply normal SCell operation including:  4> SRS transmissions on the SCell;  4> CSI reporting for the SCell;  4> PDCCH monitoring on the SCell;  4> PDCCH monitoring for the SCell;  4> PUCCH transmissions on the SCell, if configured.  3> if the SCell was deactivated prior to receiving this SCell Activation/Deactivation MAC CE, or an SCell is configured with *sCellState* set to *activated* upon SCell configuration:  4> activate the DL BWP and UL BWP indicated by *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* respectively;  3> start or restart the sCellDeactivationTimer associated with the SCell according to the timing defined in TS 38.213 [6];  3> (re-)initialize any suspended configured uplink grants of configured grant Type 1 associated with this SCell according to the stored configuration, if any, and to start in the symbol according to rules in clause 5.8.2;  3> trigger PHR according to clause 5.4.6.  2> else if *firstActiveDownlinkBWP-Id* is set to dormant BWP:  3> stop the *bwp-InactivityTimer* of this Serving Cell, if running.  3> if the SCell was deactivated prior to receiving this SCell Activation/Deactivation MAC CE, or if an SCell is configured with *sCellState* set to *activated* upon SCell configuration:  4> activate the DL BWP and UL BWP indicated by *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* respectively;  3> start or restart the *sCellDeactivationTimer* associated with the SCell according to the timing defined in TS 38.213 [6].  [...] |

Since the C-fields in a Scell A/D MAC CE indicate the activation/deactivation status of the SCell, when a Scell A/D MAC CE is received, if the corresponding C field is set as 1, it could be considered as activating the Scell, no matter the Scell is in activated or deactivated state. So the grey part also applies to an activated Scell. Considering current spec, for an activated Scell working in a dormant BWP, when it is reactivated, the *firstActiveDownlinkBWP-ID* has to be checked (highlighted in red). If *firstActiveDownlinkBWP-Id* is not set to dormant BWP, normal SCell operation in a non-dormant BWP will be applied, such as PDCCH monitoring, CSI reporting and etc.

However, the reactivated Scell is activated and working in a dormant BWP before the Scell A/D MAC CE is received. The green part referring to BWP switching is not applied. So it is not clear which non-dormant BWP the UE has to switch to for the Scell to apply the required normal operation in non-dormant BWP.

**Observation 2**: When a Scell A/D MAC CE is received, a reactivated Scell in a dormant BWP has to perform required PDCCH monitoring, CSI reporting and etc. It is not clear how it is done in current spec.

And for an activated Scell working in a non-dormant BWP, the *bwp-InactivityTimer* could be running if the Active BWP is not the *initialDownlinkBWP/ defaultDownlinkBWP-Id.* However, when it is reactivated*,* if *firstActiveDownlinkBWP-Id* is set to dormant BWP, UE has to stop the *bwp-InactivityTimer* of this SCell (in blue part). And since the reactivated Scell is activated prior to receiving of Scell A/D MAC CE, the yellow part referring to BWP switching is not applicable.

The *bwp-InactivityTimer* could be stopped when active DL BWP is a dormant BWP or within a RA procedure. Conversely, it is not clear if the timer is stopped, any BWP switching is implicitly required. Furthermore, if BWP switch is implicitly required by stopping the timer, it should be clarified which BWP will be switched to.

**Observation 3**: When a Scell A/D MAC CE is received, a reactivated Scell in a non-dormant BWP has to stop the *bwp-InactivityTimer* if running. However, it is not clear if a consequent BWP switching is implicitly required or not, and if yes, which BWP should be switched to.

Please provide you company view on observations and need to correct them:

|  |  |  |
| --- | --- | --- |
| Company | Agree / Not Agree | Comments |
| Nokia | Agree (at least mostly) | In fact there seems to be small problem on reactivating SCells after we introduced dormancy. It seems that if the Dormant SCell is reactivated ,   1. In case dormant BWP was active for the SCell upon re-activation, SCell should not apply normal operation including SRS transmission, CSI reporting, PDCCH monitoring, etc. but should still follow what is specified for the dormant BWP in clause 5.15.1. Furthermore, configured uplink grants should not be (re-)initialized in this case and neither PHR to be triggered. 2. firstActiveDownlinkBWP-Id and firstActiveUplinkBWP-Id are activated when SCell was previously active no matter if the firstActiveDownlinkBWP-Id is dormant BWP or not. 3. *sCellDeactivationTimer* is restarted no matter if the *firstActiveDownlinkBWP-Id* is set to dormant BWP or not   This kind of behaviour was not intention of RAN2 but just unfortunate result of the CR. We think this shall be corrected. |
| Samsung | Agree | Agree to the observations, which was not the intended behaviour.  To resolve these issues, we provide one of the possible changes as follows:  The MAC entity shall for each configured SCell:  1> if an SCell is configured with *sCellState* set to *activated* upon SCell configuration, or an SCell Activation/Deactivation MAC CE is received activating the SCell:  2> if the SCell was deactivated prior to receiving this SCell Activation/Deactivation MAC CE, or an SCell is configured with *sCellState* set to activated upon SCell configuration:  23> if *firstActiveDownlinkBWP-Id* is not set to dormant BWP:  34> activate the SCell according to the timing defined in TS 38.213 [6]; i.e. apply normal SCell operation including:  45> SRS transmissions on the SCell;  45> CSI reporting for the SCell;  45> PDCCH monitoring on the SCell;  45> PDCCH monitoring for the SCell;  45> PUCCH transmissions on the SCell, if configured.  23> else if *firstActiveDownlinkBWP-Id* is set to dormant BWP:  34> stop the *bwp-InactivityTimer* of this Serving Cell, if running.  3> activate the DL BWP and UL BWP indicated by *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* respectively.  2> start or restart the *sCellDeactivationTimer* associated with the SCell according to the timing defined in TS 38.213 [6];  2> if the active DL BWP is not the dormant BWP:  3> (re-)initialize any suspended configured uplink grants of configured grant Type 1 associated with this SCell according to the stored configuration, if any, and to start in the symbol according to rules in clause 5.8.2.2> trigger PHR according to clause 5.4.6.  3> trigger PHR according to clause 5.4.6;  1> else if an SCell Activation/Deactivation MAC CE is received deactivating the SCell; or  1> if the *sCellDeactivationTimer* associated with the activated SCell expires:  2> deactivate the SCell according to the timing defined in TS 38.213 [6];  2> stop the *sCellDeactivationTimer* associated with the SCell;  2> stop the *bwp-InactivityTimer* associated with the SCell;  2> deactivate any active BWP associated with the SCell;  2> clear any configured downlink assignment and any configured uplink grant Type 2 associated with the SCell respectively;  2> clear any PUSCH resource for semi-persistent CSI reporting associated with the SCell;  2> suspend any configured uplink grant Type 1 associated with the SCell;  2> flush all HARQ buffers associated with the SCell;  2> cancel, if any, triggered consistent LBT failure for the SCell.  1> if PDCCH on the activated SCell indicates an uplink grant or downlink assignment; or  1> if PDCCH on the Serving Cell scheduling the activated SCell indicates an uplink grant or a downlink assignment for the activated SCell; or  1> if a MAC PDU is transmitted in a configured uplink grant and LBT failure indication is not received from lower layers; or  1> if a MAC PDU is received in a configured downlink assignment:  2> restart the *sCellDeactivationTimer* associated with the SCell.  1> if the SCell is deactivated:  2> not transmit SRS on the SCell;  2> not report CSI for the SCell;  2> not transmit on UL-SCH on the SCell;  2> not transmit on RACH on the SCell;  2> not monitor the PDCCH on the SCell;  2> not monitor the PDCCH for the SCell;  2> not transmit PUCCH on the SCell. |
| Qualcomm | Not agree | We agree with the observations, which was not the intended behaviour. However, we don’t think MAC spec change is needed:   * In legacy, if an activated SCell receives activation MAC CE, it does not take any action (i.e. we think that it is considered an error case by the UE). We think it is a general principle in RAN2 that we usually do not specify UE behaviours in error scenario. * In Rel-16, it is possible that a SCell may not be configured with dormant BWP. Then if we make spec change for this small issue, that would mean we need to define different behaviors for SCell de-/activation MAC CE depend on whether a SCell is configured with dormant BWP or not.  But we fail to see any benefits in doing that. In fact, since it would be a slower option for switching an SCell out of dormant BWP, we doubt it would be used at all even if it is allowed. If it is not going to be used in reality, then why should we specify it?   Based on above analysis, we suggest to just capture below agreement in RAN2 Chair notes:  “*If an activated SCell is configured with dormant BWP, the UE is not expected to receive MAC-CE to re-activate the SCell*” |
| Huawei | Agree with Samsung's proposed changes | Also, we are confused by "if an SCell is configured with *sCellState* set to *activated* upon SCell configuration": it seems 38.321 is saying to take some action based on RRC parameter and condition specified in TS 38.321 while the real conditions are I TSTherefore, we suggest replacing this with "if configured by upper layers to consider the SCell to be in activated state, as specified in TS 38.331 clause 5.3.5.5.9". |
| OPPO | Not agree | Agree with QC.   1. if an activated SCell receives activation MAC CE, it does not take any action. 2. The PHR trigger due to SCell activation only based on the SCell activation from deactivation. So, we propose the CR[[R2-2006810](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2006810.zip)/[R2-2006811](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2006811.zip)] to clarify the PHR trigger due to scell activation.   This issue is discussed in the email discussion in last RAN2 meeting, based on the above two bullets, no change is needed. |
| ZTE | Agree with Samsung’s proposed changes. | We have some sympathy on Qualcomm’s comments, but we are not sure whether all UE will behave as expected (i.e. ignore the activation MAC CE if SCell is already activated). In addition, it seems not so nice to put extra restriction (i.e. disallow MAC-CE in this case) to network implementation. So we would prefer to make the spec clear to avoid further clarification in the future. |
| Sharp | Agree with Samsung’s proposal | We have the same understanding that current spec description is not the intend behaviour. We think it should be updated. And Samsung’s proposal is fine for us. |
| vivo | Not agree | Agree with the reasons given by QC, and we suggest to have minimum modification to the spec, for example: 6.1.3.10 SCell Activation/Deactivation MAC CEs <Omit>  - Ci: If there is an SCell configured for the MAC entity with *SCellIndex* i as specified in TS 38.331 [5], this field indicates the activation/deactivation status of the SCell with *SCellIndex* i, else the MAC entity shall ignore the Ci field. The Ci field is set to 1 to indicate that the SCell with *SCellIndex* i shall be activated if it was deactivated, otherwise the Ci field set to 1 shall be ignored. The Ci field is set to 0 to indicate that the SCell with *SCellIndex* i shall be deactivated;  - R: Reserved bit, set to 0. |
| Nokia | TP added at the end of document | Added TP based on Samsung input for dormant BWP – easier to comment on details based on that. Please note that I modified a bit structure of Samsung proposal but intention should be same. Please have a careful check! |
| LG | Support Nokia’s TP | Samsung’s proposal changes the principle of legacy UE behaviour on reactivation of an SCell as well. |
| Ericsson | Not agree | So far we do not have such “re-activation” behaviour in place, simply nothing happens if an activation command is received for an already activated SCell. If we start to consider now this as a new case there may be as well other places where we would have to correct the MAC behaviour for the “re-activation” case, which we think was not anyway the intention in the MAC to handle such behaviour.  So we agree in general with QC comments and way forward. |
| Apple | Not agree | We have the same views as Qualcomm and others. UEs already ignore re-activation and same logic holds here as well. |
| Futurewei | Not agree | We share the similar view as QC. In order to minimize any delay due to dormancy/non-dormancy switch, only phy DCI signalling triggers such a switch. We never specify any L2 signalling which could change the dormancy status. The scenario of reactivation appears not real. The same as in legacy system, any behaviour in activated state is not changed by “re-activation” including the dormancy behaviour. |
| CATT | Not agree | We agree that the current specification does not reflect the intended behaviour. But we are wondering whether this can be avoided by network implementation, i.e. the network shall not send MAC-CE to re-active the SCell, if an activated SCell is configured with dormant BWP for the UE. |

**Summary: Discussion needed regarding reactivation support. Status: not supported(6) – Reactivation supported(6). Comments from Rapporteur - reactivation of activated SCell is supported (and deemed necessary) in LTE, Rel-15 NR. It should be noted that activation of other SCells may require also activation of already activated SCell.**

**LG pointed in the email :**

Previous RAN2 discussion is provided below, copied from RAN2#72bis:

*sCellDeactivationTimer* is not started at reactivation?

- Samsung and InterDigital would like not restart

- Ericsson and Renesas would like to keep the specification as it is.

Þ keep the specification as it is i.e. restart timer always at n+8.

PHR is not triggered at reactivation?

- 8 companies favour

- 12 companies not in favour

Þ keep the specification as it is for now i.e. trigger PHR always at n+8.

**Rapporteur:** Currently how release 16 spec is written (after adding dormant BWP support) in case of reactivation of activated SCell not being dormant but *firstActiveDownlinkBWP-Id* is dormant does not trigger PHR although in release 15 reactivation always triggers PHR. Additionally regarding dormant BWP we erroneously (at least to our understanding) activate thse actions for dormant BWP:

3>  activate the SCell according to the timing defined in TS 38.213 [6]; i.e. apply normal SCell operation including:

4>  SRS transmissions on the SCell;

4>  CSI reporting for the SCell;

4>  PDCCH monitoring on the SCell;

4>  PDCCH monitoring for the SCell;

4>  PUCCH transmissions on the SCell, if configured.

**Proposal 3: Provide comments regarding above rapporteur view – is this correct understanding of current release 16 specification and comment whether this should be changed:**

|  |  |  |
| --- | --- | --- |
| Nokia | Agree and this should be corrected (see comment for details) | Release 16 UE operating on non-dormant BWPs should have similar behaviour as release 15 UE.  And triggering rapporteur mentioned actions for dormant BWP seem to be quite wrong  There is TP added at the end of document trying to achieve this with as little changes as possible. We do not really care how these aspects are corrected but just showing this as an example. Which ever way to correct is fine by us but these should be corrected. |
|  |  |  |

# 3.1 MAC – Dormant state corrections

*Dormant UE behaviour:*

[R2-2007217](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2007217.zip) correction on the UE behaviour on dormant state vivo CR Rel-15 36.321 15.9.0 1491 - F LTE\_NR\_DC\_CA\_enh-Core, LTE\_euCA-Core

[R2-2007218](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2007218.zip) correction on the UE behaviour on dormant state vivo CR Rel-16 36.321 16.1.0 1492 - A LTE\_NR\_DC\_CA\_enh-Core, LTE\_euCA-Core

|  |  |  |
| --- | --- | --- |
| Company | Agree / Not Agree | Comments |
| Nokia | Agree | Intention is correct but as the PUCCH cannot be configured for dormant SCell. Current specification is bit confusing about talking PUCCH for dormant SCell. |
| Samsung | Agree | No problem with the current text but we are fine with the proposed change to avoid confusion. |
| Qualcomm | Not agree | "PUCCH-SCell can't enter dormant state" is already captured in 36.300. Thus, we don't think this statement in 36.321 will make confusion. However, if we remove it, it may make people misunderstand that PUCCH can be sent in dormant state.  Thus, we prefer to keep the current spec. If company really want to clarify it in 36.321, we think it can be captured in 1st paragraph of Section 5.22 |
| Huawei | Not agree | ̂We should not agree editorial CRs to Rel-15 now, this is a waste of time. |
| OPPO | Not agree | Agree with QC. |
| ZTE | No strong view | Intention is correct, but seems no harm to keep that sentence, we are fine with majority. |
| Sharp | Agree | Share the same view with Nokia. |
| vivo | Agree | As " Dormant State is not applicable for PUCCH SCell." is already mentioned in the TS 36.321, it will not cause any confusion if we remove the statement for dormant state. If we don’t, it will. |
| LG | Not Agree | No problem with the current text. |
| Ericsson | Not Agree | Same view as Qualcomm |
| Apple | Not agree | Who also think that PUCCH SCell cant be in dormant state and share same thoughts as Qualcomm. |
| Futurewei | Not agree | Same view as QC. Current text is clear. |
| CATT | Agree | Since PUCCH SCell will not enter dormant State, we agree to delete this part to align with 36.300. |
| MediaTek | Not agree | Similar view as QC. We think that current text is fine. Also we should NOT agree R15 in R16 AI. |

**Summary: Not agree (release 15 change and no sufficient support)**

**Proposal 4: Release 15 CR – not to be treated in this email discussion**

[R2-2007219](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2007219.zip) correction on the UE behaviour on dormant BWP vivo CR Rel-16 38.321 16.1.0 0810 - F LTE\_NR\_DC\_CA\_enh-Core

|  |  |  |
| --- | --- | --- |
| Company | Agree / Not Agree | Comments |
| Nokia | Agree (partly and even more changes needed) | Correct – PUCCH is not supported and thus having this written as action for SCell activated with dormant BWP is misleading.  But also additionally when one reads 5.15.1 one can notice that there are other issues as well:   1. Transmission on RACH is not prevented for SCell with dormant BWP active. This is not aligned with RAN2 agreement. 2. “Perform periodic or semi-persistent CSI measurement for the BWP, if configured;” does not prevent any reporting. Furthermore, MAC does not perform measurements but defines how the reporting is done.   All of the listed issues should be corrected (and possibly we can also do some clean up) assuming these are agreeable by RAN2. |
| Samsung | Agree | The same view as Nokia. |
| Qualcomm | Not agree | "The dormant BWP is one of the UE’s dedicated BWPs configured by network via dedicated RRC signalling. The SpCell and PUCCH SCell cannot be configured with a dormant BWP. " is already captured in section 10.6 of 38.300. Thus, we don't think this statement in 38.321 will make confusion. However, if we remove it, it may make people misunderstand that PUCCH can be sent when SCell is in dormant.  Thus, we prefer to keep the current spec. If company really want to clarify it in 38.321, we think it can be captured in 4th paragraph of Section 5.15.1 of 38.321 |
| Huawei | Agree | but this should be in a general cleanup CR. |
| OPPO | Not agree | It is same as the previous changes in LTE. Agree with QC. |
| ZTE | No strong view | Same comment as above one. |
| Sharp | Agree |  |
| Nokia | TP added | We added TP at the end of document. In addition to mentioned RACH, CSI aspects also it seems that most of actions for dormant and deactivated cells are same so we tried to avoid duplication. Also it seems unnecessary to say “perform beam failure detection.” for the dormant BWP as it is not prevented anywhere which means it should be performed.  Please have a careful check! |
| vivo | Agree | As " The dormant BWP configuration for PUCCH SCell (an SCell configured with PUCCH) is not supported." is already mentioned in the TS 38.321, it will not cause any confusion if we remove the statement for dormant BWP. If we don’t, it will. |
| LG | Not Agree | No problem with the current text. |
| Ericsson | Not Agree | Same view as Qualcomm |
| Apple | Not agree | Similar views as Qualcomm |
| Futurewei | Not agree | Same position as for LTE. |
| CATT | Agree | We agree with Nokia. |
| MediaTek | Not agree | Same view as QC. We think that current text is fine. |

**Summary: Not agree regarding PUCCH change. Discuss is it OK to allow RACH on dormant as well as CSI reporting which seems to be against RAN2 agreements on dormant BWP, or should this be corrected – If these points are agreeble then consider** [**TP at the end of document (regarding R2-2007219).**](#_TP_for_discussion)

**Proposal 5:** Based on agreements in RAN2 we do not support RACH/CSI reporting on dormant SCell

|  |  |  |
| --- | --- | --- |
| Nokia | Agree | We provide very simple TP at the end for this. Hopefully this would be acceptable. |

## 3.2 MAC – Clarifications on PHR triggering:

[R2-2006810](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2006810.zip) Clarifications on PHR triggers-R15 OPPO CR Rel-15 38.321 15.9.0 0786 - F NR\_newRAT-Core

[R2-2006811](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2006811.zip) Clarifications on PHR triggers-R16 OPPO CR Rel-16 38.321 16.1.0 0787 - F LTE\_NR\_DC\_CA\_enh-Core

|  |  |  |
| --- | --- | --- |
| Company | Agree / Not Agree | Comments |
| Nokia | Not Agree | In our understanding intention was to trigger PHR for reactivation case as well. |
| Samsung | Not Agree | Our understanding is that RAN2 had the same discussion in LTE and concluded to trigger PHR for SCell reactivation case long times ago, i.e. the current NR text inherited from this.  Considering dormant BWP, we can trigger PHR for Scell reactivation with non-dormant BWP but we don’t need to trigger PHR for Scell reactivation with dormant BWP as RAN2 agreed in the last meeting. |
| Qualcomm | Not agree | Same understanding as Samsung |
| Huawei | Not agree | This is a Rel-15 CR proposal, it is too late. |
| OPPO | Agree (proponent) | It is just a clarification that only scell activation from deactivation, then the PHR report is triggered. If the scell is reactivation, the PHR will not be triggered.  **Please reconsider the change in the CR. @nokia, @Samsung, @QC, @Huawei.** |
| ZTE | Not Agree | We are wondering whether this is NBC to Rel-15 UEs? |
| Sharp | Not agree | Same understanding as Samsung |
| LG | Not Agree |  |
| Ericsson | Not Agree |  |
| Apple | Not needed |  |
| Futurewei | Not agree |  |
| CATT | Not agree |  |
| MediaTek | Not agree |  |

**Summary: Not agree. But confirm in chairman minutes that PHR triggering should occur at reactivation of SCell (already happens in release 15) with non-dormant BWP as active BWP.**

**Proposal 6:** Not agree (anyway this is release 15 CR and should not even be treated)

[R2-2007947](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2007947.zip) Correction on PHR triggering upon BWP switching from dormant BWP to non-dormant BWP Huawei, HiSilicon CR Rel-16 38.321 16.1.0 0871 - F LTE\_NR\_DC\_CA\_enh-Core

|  |  |  |
| --- | --- | --- |
| Company | Agree / Not Agree | Comments |
| Nokia | Not Agree | no need. "Upon change of activated BWP from dormant BWP to non-dormant DL BWP of an SCell of any MAC entity with configured uplink" in PHR section (5.4.6) covers BWP switching.. |
| Samsung | Not Agree | It seems redundant. If the majority want to have this, we can replace “the leaving dormant BWP” to “the switching to non-dormant DL BWP”, which is more aligned with clause 5.4.6. |
| Qualcomm | Not agree | We have added this condition in section 5.9 and section 5.4.6. Thus, we see no need to have duplicated statement |
| Huawei | Proponent |  |
| OPPO | No agree |  |
| ZTE | Not Agree |  |
| Sharp | Not Agree |  |
| LG | Not Agree | It’s already covered. |
| Ericsson | Not Agree | Not needed |
| Apple | Not agree | Already covered. |
| CATT | Not agree |  |

**Summary: Not agree**

**Proposal 7:** Not agree

[R2-2008014](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2008014.zip) CR on the terminology of PHR trigger Samsung CR Rel-16 38.321 16.1.0 0874 - F LTE\_NR\_DC\_CA\_enh-Core

|  |  |  |
| --- | --- | --- |
| Company | Agree / Not Agree | Comments |
| Nokia | Agree | We are fine to update terminology. If this is agreeable we could consider combining this with CRs agreed to MAC dormant BWP handling (if any). |
| Samsung | Agree | Just for text alignment with other part of MAC specification. |
| Qualcomm | Agree | Wonder whether it can included in rapporteur CR |
| Huawei | Agree | But this should be in a general cleanup CR. |
| OPPO | Agree |  |
| ZTE | Agree | We also think it can be included in rapporteur CR (if any). |
| Sharp | Agree |  |
| vivo | Agree |  |
| LG | Agree |  |
| Ericsson | Agree | We also think this could be part of rapporteur CR. |
| Apple | Agree |  |
| CATT | agree |  |
| MediaTek | agree |  |

**Summary: Agree (but should be included as part of cleanup MAC CR).** [**Captured also at the end of document**](#_TP_(from_CR)

**Proposal 8:** Agree to incorporate to generic MAC CR

# 4 RRC changes regarding dormant BWP

By Email [208]

[R2-2007003](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2007003.zip) Correction on the Dormant BWP CATT discussion Rel-16 LTE\_NR\_DC\_CA\_enh-Core

**Do you see need to change need codes of the *dormancyGroupWithinActiveTime* and *dormancyGroupOutsideActiveTime* to need “R”?**

|  |  |  |
| --- | --- | --- |
| Company | Agree / Not Agree | Comments |
| Nokia | Not Agree | How would you release the configuration with need code M? |
| Samsung | Not Agree | We have some sympathy with the intention. However, we have the same question as Nokia, which would require more change. |
| Qualcomm | Not agree | Same question as Nokia |
| Huawei | Agree |  |
| OPPO | Not agree |  |
| ZTE | Not Agree | Same question as Nokia. |
| Sharp | Not agree | Same question as Nokia |
| LG | Not Agree |  |
| Ericsson | Not Agree | Same question as Nokia. |
| Apple | Not agree |  |
| Futurewei | Not Agree |  |
| CATT | Agree | 1. For dormancy state indication outside DRX Active time-DCI format 2\_6:  Each bit in SCell dormancy indication of DCI format 2\_6 corresponds to the one of the SCell group(s) configured by *dormancyGroupOutsideActiveTime*. That means if *dormancyGroupOutsideActiveTime* is not configured/released, the IE *OutsideActiveTimeConfig* with only *firstOutsideActiveTimeBWP-Id* can’t work. So it is meaningless to release *dormancyGroupOutsideActiveTime* alone. If we want release the configuration, we can release *OutsideActiveTimeConfig*.  2. For dormancy state indication within DRX Active Time- DCI format 0\_1.  It is similar with DCI format 2\_6. Each bit in format 0\_1 corresponds to one of the SCell group(s) configured by higher layers parameter *dormancyGroupWithinActiveTime*.  3. For dormancy state indication within DRX Active Time-DCI format 1\_1  The UE can distinguish the difference via the following condition  “If one-shot HARQ-ACK request is not present or set to '0', and all bits of frequency domain resource assignment are set to 0 for resource allocation type 0 or set to 1 for resource allocation type 1 or set to 0 or 1 for dynamic switch resource allocation type”[38.212-g20].  If the condition is satisfied, the SCell dormancy indication will be present and each bit corresponds to one SCell; Otherwise, the SCell dormancy indication can only be present when the *dormancyGroupWithinActiveTime* is configured by RRC.  That means if *dormancyGroupWithinActiveTime* is not released, the UE can still work.  So if we want to release the configuration of *dormancyGroupWithinActiveTime*, we can release *WithinActiveTimeConfig*. |
| MediaTek | No strong view | We have some sympathy on CATT proposal so would be fine to change it. But also think that nothing is broken even if no change. So fine to follow majority. |

**Summary: Not agree.**

**Proposal 9:** Not agree

[R2-2007684](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2007684.zip) Correction on dormant BWP Huawei, HiSilicon CR Rel-16 38.331 16.1.0 1881 - F LTE\_NR\_DC\_CA\_enh-Core

|  |  |  |
| --- | --- | --- |
| Company | Agree / Not Agree | Comments |
| Nokia | Agree (but see the comment for need for corrections) | Intention seems to be correct as there should not be case that NW configures dormant BWP unless there is more than one DL BWP for the serving cell. In the CR there is something wrong with the fonts as the conditions listed at the end seems to be some “garbage”. Please correct these. And as the CR is quite minor we can consider combining CR with some other CR (if we have any other CR for RRC regarding dormancy) |
| Samsung | Agree | Agree to the intention and its correction with Nokia’s suggestions. |
| Qualcomm | See comments | The intention is correct. However, we think the wording of change can be updated to:  “The network can only configure dormant BWP when the UE is configured with at least two **dedicated** DL BWPs for an SCell.”  It is our understanding that dormant BWP is UE dedicated RRC configured BWP. For example, it can’t work in basic BWP operation option 1 (in FG 6-1) although it has two BWPs. |
| Huawei | Proponent | Sorry, can fix the fonts. |
| OPPO | Agree |  |
| ZTE | Agree | This has been discussed during ASN.1 review phase, and the sentence was removed from condition explanation. But we are fine to add it in spec.  Regarding the comment from Qualcomm, not sure if “dedicated BWP” covers BWP#0 when BWP#0 is configured with dedicated configuration.  We slightly prefer the original wording, if there is concern, suggest to use the term “two RRC-Configured DL BWPs” as in section B.2 in TS38.331. |
| Sharp | Agree |  |
| vivo | Agree | It aligns with the RAN2 agreement.  o **For dormant BWP configuration:**  ** Dormant BWP configuration should be based on condition that UE is configured with at least two BWPs for an SCell.** |
| LG | Not Agree |  |
| Ericsson | Not Agree | We think the CR is not needed. It should be clear already that the dormant BWP cannot be the only BWP configured for an SCell.  E.g. the definition:  **Dormant BWP:** The dormant BWP is one of downlink BWPs configured by the network via dedicated RRC signalling. In the dormant BWP, the UE stops monitoring PDCCH on/for the SCell, but continues performing CSI measurements, Automatic Gain Control (AGC) and beam management, if configured. For each serving cell other than the SpCell or PUCCH SCell, the network may configure one BWP as a dormant BWP.  It should also be clear from the field description of dormantBWP-Id, as it cannot be set to same value as defaultDownlinkBWP-Id, so there must be also another BWP-Id:  ***dormantBWP-Id***  This field contains the ID of the downlink bandwidth part to be used as dormant BWP. If this field is configured, its value is different from *defaultDownlinkBWP-Id*, and at least one of the *withinActiveTimeConfig* and *outsideActiveTimeConfig* should be configured. |
| Apple | No strong view | We agree with comments from Ericsson, but RAN2 decides to add more description, we like ZTE’s comments ( dedicated BWPs for both might not be accurate all the time). |
| Futurewei | Agree | This RAN2 agreement should be captured. Agree with ZTE. |
| CATT | Agree | We agree with ZTE. |
| MediaTek | Agree |  |

**Summary: No clear consensus. Issue may be clear already at least by careful reading (see Ericsson comment) but majority would like to clarify this.**

**Proposal 10:** Provide comments is it already clear that network can only configure dormant BWP when the UE is configured with at least two dedicated DL BWPs for an SCell

|  |  |  |
| --- | --- | --- |
| Nokia | Agree partly | Ericsson has point in our view. One can derive this information from dormant BWP definition and dormantBWP-Id field description. |

# 5 Conclusion

To make it easier to find the correct contact delegate in each company for potential follow-up questions, the rapporteur encourages the delegates who provide input to provide their contact information in this table:

|  |  |
| --- | --- |
| Company | Delegate contact |
| COMPANY\_NAME | NAME ([email@address.com](mailto:email@address.com)) |
| Nokia | Jarkko Koskela (jarkko.t.koskela@nokia.com) |
| Qualcomm | Peng Cheng(chengp@QTI.QUALCOMM.COM) |
| Samsung | Donggun Kim(s\_dg.kim@samsung.com) |
| OPPO | Shukun Wang(wangshukun@oppo.com) |
| Sharp | (Zhang Chongming ( chongming.zhang@CN.SHARP-WORLD.COM) |
| LG | SunYoung LEE (ssunyoung.lee@lge.com) |
| Ericsson | Stefan Wager (stefan.wager@ericsson.com) |
| Apple | Naveen Palle (naveen.palle@apple.com) |
| MediaTek | Felix Tsai (Chun-Fan.Tsai@mediatek.com) |
| Futurewei | Jialin Zou (Jialinzou88@yahoo.com) |

# TP (from CR R2-2008014)

*<Start of modification>*

### 5.4.6 Power Headroom Reporting

The Power Headroom reporting procedure is used to provide the serving gNB with the following information:

- Type 1 power headroom: the difference between the nominal UE maximum transmit power and the estimated power for UL-SCH transmission per activated Serving Cell;

- Type 2 power headroom: the difference between the nominal UE maximum transmit power and the estimated power for UL-SCH and PUCCH transmission on SpCell of the other MAC entity (i.e. E-UTRA MAC entity in EN-DC, NE-DC, and NGEN-DC cases);

- Type 3 power headroom: the difference between the nominal UE maximum transmit power and the estimated power for SRS transmission per activated Serving Cell.

RRC controls Power Headroom reporting by configuring the following parameters:

- *phr-PeriodicTimer*;

- *phr-ProhibitTimer*;

- *phr-Tx-PowerFactorChange*;

- *phr-Type2OtherCell*;

- *phr-ModeOtherCG*;

- *multiplePHR*.

A Power Headroom Report (PHR) shall be triggered if any of the following events occur:

- *phr-ProhibitTimer* expires or has expired and the path loss has changed more than *phr-Tx-PowerFactorChange* dB for at least one activated Serving Cell of any MAC entity of which the active DL BWP is not dormant BWP which is used as a pathloss reference since the last transmission of a PHR in this MAC entity when the MAC entity has UL resources for new transmission;

NOTE 1: The path loss variation for one cell assessed above is between the pathloss measured at present time on the current pathloss reference and the pathloss measured at the transmission time of the last transmission of PHR on the pathloss reference in use at that time, irrespective of whether the pathloss reference has changed in between. The current pathloss reference for this purpose does not include any pathloss reference configured using pathlossReferenceRS-Pos in TS 38.331 [5].

- *phr-PeriodicTimer* expires;

- upon configuration or reconfiguration of the power headroom reporting functionality by upper layers, which is not used to disable the function;

- activation of an SCell of any MAC entity with configured uplink of which *firstActiveDownlinkBWP-Id* is not set to dormant BWP;

- addition of the PSCell (i.e. PSCell is newly added or changed);

- *phr-ProhibitTimer* expires or has expired, when the MAC entity has UL resources for new transmission, and the following is true for any of the activated Serving Cells of any MAC entity with configured uplink:

- there are UL resources allocated for transmission or there is a PUCCH transmission on this cell, and the required power backoff due to power management (as allowed by P-MPRc as specified in TS 38.101-1 [14], TS 38.101-2 [15], and TS 38.101-3 [16]) for this cell has changed more than *phr-Tx-PowerFactorChange* dB since the last transmission of a PHR when the MAC entity had UL resources allocated for transmission or PUCCH transmission on this cell.

- Upon switching of activated BWP from dormant BWP to non-dormant DL BWP of an SCell of any MAC entity with configured uplink.

NOTE 2: The MAC entity should avoid triggering a PHR when the required power backoff due to power management decreases only temporarily (e.g. for up to a few tens of milliseconds) and it should avoid reflecting such temporary decrease in the values of PCMAX,f,c/PH when a PHR is triggered by other triggering conditions.

NOTE 3: If a HARQ process is configured with *cg-RetransmissionTimer* and if the PHR is already included in a MAC PDU for transmission by this HARQ process, but not yet transmitted by lower layers, it is up to UE implementation how to handle the PHR content.

If the MAC entity has UL resources allocated for a new transmission the MAC entity shall:

1> if it is the first UL resource allocated for a new transmission since the last MAC reset:

2> start *phr-PeriodicTimer*;

1> if the Power Headroom reporting procedure determines that at least one PHR has been triggered and not cancelled; and

1> if the allocated UL resources can accommodate the MAC CE for PHR which the MAC entity is configured to transmit, plus its subheader, as a result of LCP as defined in clause 5.4.3.1:

2> if *multiplePHR* with value *true* is configured:

3> for each activated Serving Cell with configured uplink associated with any MAC entity of which the active DL BWP is not dormant BWP:

4> obtain the value of the Type 1 or Type 3 power headroom for the corresponding uplink carrier as specified in clause 7.7 of TS 38.213 [6] for NR Serving Cell and clause 5.1.1.2 of TS 36.213 [17] for E-UTRA Serving Cell;

4> if this MAC entity has UL resources allocated for transmission on this Serving Cell; or

4> if the other MAC entity, if configured, has UL resources allocated for transmission on this Serving Cell and *phr-ModeOtherCG* is set to *real* by upper layers:

5> obtain the value for the corresponding PCMAX,f,c field from the physical layer.

3> if *phr-Type2OtherCell* with value *true* is configured:

4> if the other MAC entity is E-UTRA MAC entity:

5> obtain the value of the Type 2 power headroom for the SpCell of the other MAC entity (i.e. E-UTRA MAC entity);

5> if *phr-ModeOtherCG* is set to *real* by upper layers:

6> obtain the value for the corresponding PCMAX,f,c field for the SpCell of the other MAC entity (i.e. E-UTRA MAC entity) from the physical layer.

3> instruct the Multiplexing and Assembly procedure to generate and transmit the Multiple Entry PHR MAC CE as defined in clause 6.1.3.9 based on the values reported by the physical layer.

2> else (i.e. Single Entry PHR format is used):

3> obtain the value of the Type 1 power headroom from the physical layer for the corresponding uplink carrier of the PCell;

3> obtain the value for the corresponding PCMAX,f,c field from the physical layer;

3> instruct the Multiplexing and Assembly procedure to generate and transmit the Single Entry PHR MAC CE as defined in clause 6.1.3.8 based on the values reported by the physical layer.

2> start or restart *phr-PeriodicTimer*;

2> start or restart *phr-ProhibitTimer*;

2> cancel all triggered PHR(s).

*<End of modification>*

# TP regarding MAC changes for dormant BWP

5.9 Activation/Deactivation of SCells

If the MAC entity is configured with one or more SCells, the network may activate and deactivate the configured SCells. Upon configuration of an SCell, the SCell is deactivated unless the parameter *sCellState* is set to *activated* for the SCell by upper layers.

The configured SCell(s) is activated and deactivated by:

- receiving the SCell Activation/Deactivation MAC CE described in clause 6.1.3.10;

- configuring *sCellDeactivationTimer* timer per configured SCell (except the SCell configured with PUCCH, if any): the associated SCell is deactivated upon its expiry.

The MAC entity shall for each configured SCell:

1> if an SCell is configured with *sCellState* set to *activated* upon SCell configuration, or an SCell Activation/Deactivation MAC CE is received activating the SCell:

2> if the SCell was activated prior to receiving this SCell Activation/Deactivation MAC CE and the active DL BWP for the SCell is not the dormant BWP; or

2> if the SCell was deactivated prior to receiving this SCell Activation/Deactivation MAC CE and the *firstActiveDownlinkBWP-Id* is not set to dormant BWP; or

2> if an SCell is configured with *sCellState* set to *activated* upon SCell configuration and the *firstActiveDownlinkBWP-Id* is not set to dormant BWP:

3> activate the SCell according to the timing defined in TS 38.213 [6]; i.e. apply normal SCell operation including:

4> SRS transmissions on the SCell;

4> CSI reporting for the SCell;

4> PDCCH monitoring on the SCell;

4> PDCCH monitoring for the SCell;

4> PUCCH transmissions on the SCell, if configured.

2> if the SCell was deactivated prior to receiving this SCell Activation/Deactivation MAC CE, or an SCell is configured with *sCellState* set to *activated* upon SCell configuration:

3> activate the DL BWP and UL BWP indicated by *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* respectively;

2> if the active DL BWP for the SCell is not the dormant BWP:

3> (re-)initialize any suspended configured uplink grants of configured grant Type 1 associated with this SCell according to the stored configuration, if any, and to start in the symbol according to rules in clause 5.8.2;

3> trigger PHR according to clause 5.4.6.

2> start or restart the *sCellDeactivationTimer* associated with the SCell according to the timing defined in TS 38.213 [6].

1> else if an SCell Activation/Deactivation MAC CE is received deactivating the SCell; or

1> if the *sCellDeactivationTimer* associated with the activated SCell expires:

2> deactivate the SCell according to the timing defined in TS 38.213 [6];

2> stop the *sCellDeactivationTimer* associated with the SCell;

2> stop the *bwp-InactivityTimer* associated with the SCell;

2> deactivate any active BWP associated with the SCell;

2> clear any configured downlink assignment and any configured uplink grant Type 2 associated with the SCell respectively;

2> clear any PUSCH resource for semi-persistent CSI reporting associated with the SCell;

2> suspend any configured uplink grant Type 1 associated with the SCell;

2> flush all HARQ buffers associated with the SCell;

2> cancel, if any, triggered consistent LBT failure for the SCell.

1> if PDCCH on the activated SCell indicates an uplink grant or downlink assignment; or

1> if PDCCH on the Serving Cell scheduling the activated SCell indicates an uplink grant or a downlink assignment for the activated SCell; or

1> if a MAC PDU is transmitted in a configured uplink grant and LBT failure indication is not received from lower layers; or

1> if a MAC PDU is received in a configured downlink assignment:

2> restart the *sCellDeactivationTimer* associated with the SCell.

1> if the SCell is deactivated:

2> not transmit SRS on the SCell;

2> not report CSI for the SCell;

2> not transmit on UL-SCH on the SCell;

2> not transmit on RACH on the SCell;

2> not monitor the PDCCH on the SCell;

2> not monitor the PDCCH for the SCell;

2> not transmit PUCCH on the SCell.

HARQ feedback for the MAC PDU containing SCell Activation/Deactivation MAC CE shall not be impacted by PCell, PSCell and PUCCH SCell interruptions due to SCell activation/deactivation in TS 38.133 [11].

When SCell is deactivated, the ongoing Random Access procedure on the SCell, if any, is aborted.

# TP for discussion in R2-2007219

5.15.1 Downlink and Uplink

In addition to clause 12 of TS 38.213 [6], this clause specifies requirements on BWP operation.

A Serving Cell may be configured with one or multiple BWPs, and the maximum number of BWP per Serving Cell is specified in TS 38.213 [6].

The BWP switching for a Serving Cell is used to activate an inactive BWP and deactivate an active BWP at a time. The BWP switching is controlled by the PDCCH indicating a downlink assignment or an uplink grant, by the *bwp-InactivityTimer*, by RRC signalling, or by the MAC entity itself upon initiation of Random Access procedure or upon detection of consistent LBT failure on SpCell. Upon RRC (re-)configuration of *firstActiveDownlinkBWP-Id* and/or *firstActiveUplinkBWP-Id* for SpCell or activation of an SCell, the DL BWP and/or UL BWP indicated by *firstActiveDownlinkBWP-Id* and/or *firstActiveUplinkBWP-Id* respectively (as specified in TS 38.331 [5]) is active without receiving PDCCH indicating a downlink assignment or an uplink grant. The active BWP for a Serving Cell is indicated by either RRC or PDCCH (as specified in TS 38.213 [6]). For unpaired spectrum, a DL BWP is paired with a UL BWP, and BWP switching is common for both UL and DL.

For each SCell a dormant BWP may be configured with *dormantDownlinkBWP-Id* by RRC signalling as described in TS 38.331 [5]. Entering or leaving dormant BWP for SCells is done by BWP switching per SCell or per dormancy SCell group based on instruction from PDCCH (as specified in TS 38.213 [6]). The dormancy SCell group configurations are configured by RRC signalling as described in TS 38.331 [5]. Upon reception of the PDCCH indicating leaving dormant BWP, the DL BWP indicated by *firstOutsideActiveTimeBWP-Id* or by *firstWithinActiveTimeBWP-Id* (as specified in TS 38.331 [5] and TS 38.213 [6]) is activated. Upon reception of the PDCCH indicating entering dormant BWP, the DL BWP indicated by *dormantDownlinkBWP-Id* (as specified in TS 38.331 [5]) is activated. The dormant BWP configuration for SpCell or PUCCH SCell is not supported.

For each activated Serving Cell configured with a BWP, the MAC entity shall:

1> if a BWP is activated and the active DL BWP for the Serving Cell is not the dormant BWP:

2> transmit on UL-SCH on the BWP;

2> transmit on RACH on the BWP, if PRACH occasions are configured;

2> monitor the PDCCH on the BWP;

2> transmit PUCCH on the BWP, if configured;

2> report CSI for the BWP;

2> transmit SRS on the BWP, if configured;

2> receive DL-SCH on the BWP;

2> (re-)initialize any suspended configured uplink grants of configured grant Type 1 on the active BWP according to the stored configuration, if any, and to start in the symbol according to rules in clause 5.8.2;

2> if consistent LBT failure recovery is configured:

3> stop the *lbt-FailureDetectionTimer*, if running;

3> set *LBT\_COUNTER* to 0;

3> monitor LBT failure indications from lower layers as specified in clause 5.21.2.

1> if a BWP is activated and the active DL BWP for the Serving Cell is dormant BWP:

2> stop the *bwp-InactivityTimer* of this Serving Cell, if running.

2> not monitor the PDCCH on the BWP;

2> not monitor the PDCCH for the BWP;

2> not receive DL-SCH on the BWP;

2> report CSI except aperiodic CSI for the BWP;

2> not transmit SRS on the BWP;

2> not transmit on UL-SCH on the BWP;

2> not transmit on RACH on the BWP;

2> not transmit PUCCH on the BWP.

2> clear any configured downlink assignment and any configured uplink grant Type 2 associated with the SCell respectively;

2> suspend any configured uplink grant Type 1 associated with the SCell;

2> if configured, perform beam failure detection and beam failure recovery for the SCell if beam failure is detected.

1> if a BWP is deactivated:

2> not transmit on UL-SCH on the BWP;

2> not transmit on RACH on the BWP;

2> not monitor the PDCCH on the BWP;

2> not transmit PUCCH on the BWP;

2> not report CSI for the BWP;

2> not transmit SRS on the BWP;

2> not receive DL-SCH on the BWP;

2> clear any configured downlink assignment and configured uplink grant of configured grant Type 2 on the BWP;

2> suspend any configured uplink grant of configured grant Type 1 on the inactive BWP.

Upon initiation of the Random Access procedure on a Serving Cell, after the selection of carrier for performing Random Access procedure as specified in clause 5.1.1, the MAC entity shall for the selected carrier of this Serving Cell:

1> if PRACH occasions are not configured for the active UL BWP:

2> switch the active UL BWP to BWP indicated by *initialUplinkBWP*;

2> if the Serving Cell is an SpCell:

3> switch the active DL BWP to BWP indicated by *initialDownlinkBWP*.

1> else:

2> if the Serving Cell is an SpCell:

3> if the active DL BWP does not have the same *bwp-Id* as the active UL BWP:

4> switch the active DL BWP to the DL BWP with the same *bwp-Id* as the active UL BWP.

1> stop the *bwp-InactivityTimer* associated with the active DL BWP of this Serving Cell, if running.

1> if the Serving Cell is SCell:

2> stop the *bwp-InactivityTimer* associated with the active DL BWP of SpCell, if running.

1> perform the Random Access procedure on the active DL BWP of SpCell and active UL BWP of this Serving Cell.

If the MAC entity receives a PDCCH for BWP switching of a Serving Cell, the MAC entity shall:

1> if there is no ongoing Random Access procedure associated with this Serving Cell; or

1> if the ongoing Random Access procedure associated with this Serving Cell is successfully completed upon reception of this PDCCH addressed to C-RNTI (as specified in clauses 5.1.4, 5.1.4a, and 5.1.5):

2> cancel, if any, triggered consistent LBT failure for this Serving Cell;

2> perform BWP switching to a BWP indicated by the PDCCH.

If the MAC entity receives a PDCCH for BWP switching for a Serving Cell(s) or a dormancy SCell group(s) while a Random Access procedure associated with that Serving Cell is ongoing in the MAC entity, it is up to UE implementation whether to switch BWP or ignore the PDCCH for BWP switching, except for the PDCCH reception for BWP switching addressed to the C-RNTI for successful Random Access procedure completion (as specified in clauses 5.1.4, 5.1.4a, and 5.1.5) in which case the UE shall perform BWP switching to a BWP indicated by the PDCCH. Upon reception of the PDCCH for BWP switching other than successful contention resolution, if the MAC entity decides to perform BWP switching, the MAC entity shall stop the ongoing Random Access procedure and initiate a Random Access procedure after performing the BWP switching; if the MAC decides to ignore the PDCCH for BWP switching, the MAC entity shall continue with the ongoing Random Access procedure on the Serving Cell.

Upon reception of RRC (re-)configuration for BWP switching for a Serving Cell while a Random Access procedure associated with that Serving Cell is ongoing in the MAC entity, the MAC entity shall stop the ongoing Random Access procedure and initiate a Random Access procedure after performing the BWP switching.

Upon reception of RRC (re-)configuration for BWP switching for a Serving Cell, cancel any triggered LBT failure in this Serving Cell.

The MAC entity shall for each activated Serving Cell configured with *bwp-InactivityTimer*:

1> if the *defaultDownlinkBWP-Id* is configured, and the active DL BWP is not the BWP indicated by the *defaultDownlinkBWP-Id*, and the active DL BWP is not the BWP indicated by the *dormantDownlinkBWP-Id* if configured; or

1> if the *defaultDownlinkBWP-Id* is not configured, and the active DL BWP is not the *initialDownlinkBWP*, and the active DL BWP is not the BWP indicated by the *dormantDownlinkBWP-Id* if configured:

2> if a PDCCH addressed to C-RNTI or CS-RNTI indicating downlink assignment or uplink grant is received on the active BWP; or

2> if a PDCCH addressed to C-RNTI or CS-RNTI indicating downlink assignment or uplink grant is received for the active BWP; or

2> if a MAC PDU is transmitted in a configured uplink grant and LBT failure indication is not received from lower layers; or

2> if a MAC PDU is received in a configured downlink assignment:

3> if there is no ongoing Random Access procedure associated with this Serving Cell; or

3> if the ongoing Random Access procedure associated with this Serving Cell is successfully completed upon reception of this PDCCH addressed to C-RNTI (as specified in clauses 5.1.4, 5.1.4a and 5.1.5):

4> start or restart the *bwp-InactivityTimer* associated with the active DL BWP.

2> if the *bwp-InactivityTimer* associated with the active DL BWP expires:

3> if the *defaultDownlinkBWP-Id* is configured:

4> perform BWP switching to a BWP indicated by the *defaultDownlinkBWP-Id*.

3> else:

4> perform BWP switching to the *initialDownlinkBWP*.

NOTE: If a Random Access procedure is initiated on an SCell, both this SCell and the SpCell are associated with this Random Access procedure.

1> if a PDCCH for BWP switching is received, and the MAC entity switches the active DL BWP:

2> if the *defaultDownlinkBWP-Id* is configured, and the MAC entity switches to the DL BWP which is not indicated by the *defaultDownlinkBWP-Id* and is not indicated by the *dormantDownlinkBWP-Id* if configured; or

2> if the *defaultDownlinkBWP-Id* is not configured, and the MAC entity switches to the DL BWP which is not the *initialDownlinkBWP* and is not indicated by the *dormantDownlinkBWP-Id* if configured:

3> start or restart the *bwp-InactivityTimer* associated with the active DL BWP.