3GPP TSG-RAN WG2 Meeting #112 Electronic R2-200XXXX

Elbonia, 02 – 13 November 2020

**Agenda item: 6.8.2**

**Source: Rapporetuer (Nokia)**

**Title: [AT111-e][221][DCCA] Fast Scell activation and early measurements (Nokia)**

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

**Release: Release 16**

**Document for: Discussion and Decision**

# 1 Introduction

This is discussion document for the email:

* [AT111-e][221][DCCA] Fast Scell activation and early measurements (Nokia)

Scope:

* + - Discuss corrections under 6.8.2/6.8.3 marked for this discussion to see which CRs could be agreeable

Intended outcome:

* + - Discussion summary in R2-2010731 (by email rapporteur).

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

* + - Initial deadline (for companies' feedback): 1st week Fri, UTC 0900
    - Initial deadline (for rapporteur's summary in R2-2010731): 2nd week Mon, UTC 13:00

where following documents are to be treated:

### 6.8.2 Fast Scell activation

By Email [221] (5)

*SCell dormancy, MAC corrections:*

[R2-2009549](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2009549.zip) Dormancy correction Nokia, Nokia Shanghai Bell CR Rel-16 38.321 16.2.0 0934 - F LTE\_NR\_DC\_CA\_enh-Core

[R2-2009573](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2009573.zip) Corrections on bwp-InactivityTimer Samsung CR Rel-16 38.321 16.2.1 0935 - F LTE\_NR\_DC\_CA\_enh-Core

[R2-2008927](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2008927.zip) Correction on RA upon BWP switching to dormant BWP Asia Pacific Telecom co. Ltd CR Rel-16 38.321 16.2.1 0901 - F LTE\_NR\_DC\_CA\_enh-Core

[R2-2010022](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2010022.zip) Timing of direct SCell activation upon RRC configuration Ericsson CR Rel-16 38.321 16.2.1 0956 - F LTE\_NR\_DC\_CA\_enh-Core

* Email 221

*SCell dormancy, UE capabilities:*

[R2-2009550](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2009550.zip) BWP support for dormancy Nokia, Nokia Shanghai Bell discussion Rel-16 LTE\_NR\_DC\_CA\_enh-Core

* Email 221

### 6.8.3 Early measurement reporting

By Email [221] (2)

*Applicability to serving carrier measurements:*

[R2-2009551](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2009551.zip) Measurement applicability and validity Nokia, Nokia Shanghai Bell CR Rel-15 36.331 15.11.0 4468 - F LTE\_euCA-Core

[R2-2009552](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2009552.zip) Measurement applicability and validity Nokia, Nokia Shanghai Bell CR Rel-16 36.331 16.2.1 4469 - F LTE\_euCA-Core, LTE\_NR\_DC\_CA\_enh-Core

[R2-2009553](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2009553.zip) Measurement applicability and validity Nokia, Nokia Shanghai Bell CR Rel-16 38.331 16.2.0 2090 - F LTE\_NR\_DC\_CA\_enh-Core

* Email 221

*Clarification to IDLE mode measurement storing procedural text:*

[R2-2010023](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2010023.zip) Serving cell results for early measurements Ericsson CR Rel-16 38.331 16.2.0 2162 - F LTE\_NR\_DC\_CA\_enh-Core

* Email 221

By Email [221] (1)

*Indication of T331 expiration in measurements:*

[R2-2010024](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2010024.zip) Early measurement requirements Ericsson discussion LTE\_NR\_DC\_CA\_enh-Core

* Email 221

By Email [221] (1)

*Usage of SIB indication for early measurements:*

[R2-2010653](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2010653.zip) Reporting of dle/inactive measurement not obtained in the current cell Huawei, HiSilicon CR Rel-16 36.331 16.2.1 4528 - F LTE\_NR\_DC\_CA\_enh-Core

[R2-2010654](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2010654.zip) Reporting of dle/inactive measurement not obtained in the current cell Huawei, HiSilicon CR Rel-16 38.331 16.2.0 2268 - F LTE\_NR\_DC\_CA\_enh-Core

* Email 221

# 2 Discussion

## 2.1 Fast SCell activation

[R2-2009549](file:///C:\\Users\\terhentt\\Documents\\Tdocs\\RAN2\\RAN2_112-e\\R2-2009549.zip) Dormancy correction Nokia, Nokia Shanghai Bell CR Rel-16 38.321 16.2.0 0934 - F LTE\_NR\_DC\_CA\_enh-Core

[R2-2009573](file:///C:\\Users\\terhentt\\Documents\\Tdocs\\RAN2\\RAN2_112-e\\R2-2009573.zip) Corrections on bwp-InactivityTimer Samsung CR Rel-16 38.321 16.2.1 0935 - F LTE\_NR\_DC\_CA\_enh-Core

Two above papers affect same part of the specification – One removing a else branch from 5.9 claiming it to be obsolete and other one aligning with wording in legacy. Please provide your view below on the proposed CRs:

|  |  |  |
| --- | --- | --- |
| Company | Need for CR | Comments |
| Nokia | Yes (removing the else branch) | As explained in the CR coversheet There is redundant UE actions in case of activated BWP is dormant BWP in 5.9 (activation/deactivation of SCells). bwp-InactivityTimer is attemted to be stopped before even activating a BWP for a SCell which either was deactivated before the action or just newly configured by RRC. This seems logically incorrect. Furthermore, upon activation the BWP, same action is already performed in 5.15.1. (BWP), ie., the bwp-InactivityTimer is stopped if the activated DL BWP is dormant BWP. |
| Qualcomm | Yes with comments | First, we agree the CR to remove the else branch.  Then, we need to point out that we raised this issue in email discussion#037 of RAN2#119bis-e. However, two companies disagreed with the argurement: “*Current 38.321 already have similar duplication for activation of SCell and deactivation SCell in both 5.9 and 5.15. And* *bwp-InactivityTimer is for each SCell, i.e. cell specific behavior*.“  Thus, we are wondering: whether we need to align the same style of 38.321? |
| Asia Pacific Telecom (APT) | Yes (for Nokia’s CR)  No strong view (for Samsung’s CR) | For Nokia’s CR, it’s good to remove the duplicated sentence with the same behavior which is already captured in another agenda item.  For Samsung’s CR, we have no strong view on if it’s needed to highlight that the timer is only applied for SCell in this case, since the current sentence seems not cause error. |
| Samsung | No (for 9549) and  Proponent (for 9573) | Even if a SCell was activated and its bwpInactivityTimer was running, the network can indicate BWP switching to dormant BWP by RRCReconfiguration. We think it’s the reason why we captured the yellow part below. So, It would be better to cover this case by keeping the current specification as follows:  2> if the SCell is configured with *sCellState* set to *activated* upon SCell configuration:  3> if *firstActiveDownlinkBWP-Id* is not set to dormant BWP:  4> activate the SCell according to the timing defined in TS 38.213 [6]; i.e. apply normal SCell operation including:  5> SRS transmissions on the SCell;  5> CSI reporting for the SCell;  5> PDCCH monitoring on the SCell;  5> PDCCH monitoring for the SCell;  5> PUCCH transmissions on the SCell, if configured.  3> else (i.e. *firstActiveDownlinkBWP-Id* is set to dormant BWP):  4> stop the *bwp-InactivityTimer* of this Serving Cell, if running. |

[R2-2008927](file:///C:\\Users\\terhentt\\Documents\\Tdocs\\RAN2\\RAN2_112-e\\R2-2008927.zip) Correction on RA upon BWP switching to dormant BWP Asia Pacific Telecom co. Ltd CR Rel-16 38.321 16.2.1 0901 - F LTE\_NR\_DC\_CA\_enh-Core

CR wants to capture that the UE shall also abort the corresponding RA procedure in a case that the active DL BWP for the serving cell is switched to dormant BWP.

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| Company | Need for CR | Comments |
| Nokia | No | In our view 5.15.1 already indicates that UE does not perform RACH on dormant BWP thus we consider this is already clear. But technicall we don’t see anything wrong with the CR otherwise.  1> if a BWP is activated and the active DL BWP for the Serving Cell is dormant BWP:  …  2> not transmit on RACH on the BWP; |
| Qualcomm | No | From techinque perspective, we don’t think it is worth capturing it in spec:   * The only type of RACH procedure allowed in SCells are PDCCH order, which is initiated by Network. It is rather strange for a NW to first initiate a PDCCH order and then immediately switch that SCell to dormant BWP. * Thus, it is more like an corner case (if not error case), and so we don’t think it is worth capturing in the spec. |
| Asia Pacific Telecom (APT) | Yes | First of all, we would like to point out that the current behavior in MAC spec is not correct since it’s not reasonable for the UE to initiate a new RA procedure on a cell when switching to dormant BWP on that cell. This new ongoing RA procedure would be redundant in this case.  **To reply Nokia’s comment:**  In current 38.321, we also capture that the UE could not transmit on RACH on the SCell if the SCell is deactivated, and we clearly capture that the UE should abort the ongoing RA procedure even the UE could not transmit on RACH on this SCell.  NR 38.321  1> if the SCell is deactivated:  …  2> not transmit on RACH on the SCell;  …  When SCell is deactivated, the ongoing Random Access procedure on the SCell, if any, is aborted.  In fact, we consider the UE could not transmit on RACH is the reason why this change is needed. To follow the same logic as deactivated SCell case, we should revise the current behavior for dormant SCell case to avoid confusion.  **To reply Qualcomm’s comment:**  In LTE, we have a NOTE to capture that the UE should abort the ongoing RA procedure on an SCell when the SCell is in dormant state.  LTE 36.321  NOTE:    When SCell is in Dormant State, any ongoing Random Access procedure on the SCell is aborted.  From this perspective, we think this case indeed exists, so it’s better to align the same behavior in NR. |
| Samsung | No strong opinion | Regardless of having this CR, the intended behavior would be the same as before. |

[R2-2010022](file:///C:\\Users\\terhentt\\Documents\\Tdocs\\RAN2\\RAN2_112-e\\R2-2010022.zip) Timing of direct SCell activation upon RRC configuration Ericsson CR Rel-16 38.321 16.2.1 0956 - F LTE\_NR\_DC\_CA\_enh-Core

The CR proposes to solve issues regarding direct scell activation timing by adding a reference to 38.133 for the direct SCell activation case, such that the reference to 38.213 applies only for the case of MAC CE activation

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| --- | --- | --- |
| Company | Need for CR | Comments |
| Nokia | Maybe | We think this would be one way to remove any inclarities about timing. Alternatively RAN1 updates 38.213 to refer to 38.133. |
| Qualcomm | No strong view | This solution was discussed in RAN2#111-e. It was not agreed because some company mentioned 38.213 had a reference to 38.133, and thereby no need to capture a new reference in 38.321.  We think if 38.213 indeed had a referece to 38.133, then this CR is not needed. But we can follow majority. |
| Asia Pacific Telecom (APT) | No strong view | It may be better to update 38.213 since the timing for SCell activation/deactivation is captured in 38.213 section 4.3. |
| Samsung | Yes | It seems fine for clarity. |

[R2-2009550](file:///C:\\Users\\terhentt\\Documents\\Tdocs\\RAN2\\RAN2_112-e\\R2-2009550.zip) BWP support for dormancy Nokia, Nokia Shanghai Bell discussion Rel-16 LTE\_NR\_DC\_CA\_enh-Core

This paper considers about SCell dormancy and required BWP support capability basically saying that UE should support 2 dedicated BWPs in order to support SCell dormancy and that dormant BWPs are included in the BWP budget allowed by amount of supported BWPs.

NOTE: RAN1 is also discussing this so it might be good not to hurry for agreement but it would be good to get views on this one from RAN2 perspective (e.g. need to do any updates to 38.306?)

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| Company | Need for CR | Comments |
| Nokia | Yes (proponent) | Not much to add initially apart from what is in the paper. |
| Qualcomm | No | From technique perspective, this clarification will cause issue:   * Please note that SCell dormancy capability is **per-BC** but BWP capability is **per-band**. * Then, if BWP is a pre-requisite for SCell dormancy (i.e. if this CR agreed), it means if supporting SCell dormancy for a particular BC, then UE has to also support BWP switch for all the respective bands. For example, we have a BC with 3 bands (B1/B2 in FR1 and B3 in FR2), and the UE reports support dormancy for this BC where dormancy/non-dormancy transition is configured to only happen in B1 and B2. Then pre-requisite implies the UE has to also support BWP switch in B3. We think it is NOT an UE intended bevhavior.   Alternatively, we agree another clarification proposed by Nokia in their RAN1 contribution: **clarify that one dormant BWP and one non-dormant BWP are dedicated BWPs even for UEs not supporting both 6-2 and 6-3.** |
| Asia Pacific Telecom (APT) | No | We share the same concern as Qualcomm. It’s required to clarify the intended behavior for BC and the bands first. |
| Samsung | No | Similar view with Qualcomm. |

## 2.2 Early Measurement Reporting

### 2.2.1 Measurement validity

*Applicability to serving carrier measurements:*

[R2-2009551](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2009551.zip) Measurement applicability and validity Nokia, Nokia Shanghai Bell CR Rel-15 36.331 15.11.0 4468 - F LTE\_euCA-Core

[R2-2009552](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2009552.zip) Measurement applicability and validity Nokia, Nokia Shanghai Bell CR Rel-16 36.331 16.2.1 4469 - F LTE\_euCA-Core, LTE\_NR\_DC\_CA\_enh-Core

[R2-2009553](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2009553.zip) Measurement applicability and validity Nokia, Nokia Shanghai Bell CR Rel-16 38.331 16.2.0 2090 - F LTE\_NR\_DC\_CA\_enh-Core

First change reason:

1. When UE initialized idle mode measurements UE will perform measurements for each entry in *measIdleCarrierListEUTRA “*if UE supports carrier aggregation between serving carrier and the carrier frequency and bandwidth indicated by *carrierFreq* and *allowedMeasBandwidth* within the corresponding entry*”.* It may happen that after reselection UE would reselect to carrier which is listed in the *measIdleCarrierListEUTRA.* It is not so clear whether UE is actually now measuring serving frequency based on this (UE likely does not support “CA”between serving and serving frequency)*.* But we assume serving carrier should be also part of measured carriers..

Regarding first change in above CRs please provide your view:

|  |  |  |
| --- | --- | --- |
| Company | Need for CR | Comments |
| Nokia | Yes (proponent) | As explained in the CR there is ambiquity in measuring serving frequency. This should be clarified. |
| Qualcomm | Yes | Serving carrier should always be measured. |
| Samsung | No | We don’t see the need of additional condition. |

Second change is reason for change is stated:

* When T331 expires UE will delete the *VarMeasIdleConfig* but it does not delete *VarMeasIdleReport.* UE will delete *VarMeasIdleReport* upon succesfull delivery of measurement results (in the UEInformationRequest procedure) or getting new configuration (RRC connection release). Looks that if the UE e.g. measured something and then remains in idle for 1h, it will still report last measured value. Or even: if UE once measured something in idle mode, it will store the result until some eNB with ask for it via UEInformationRequest, even e.g. if in the meantime it connected/disconnected to some/many other eNBs.

Regarding second change in above CRs please provide your view:

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| --- | --- | --- |
| Company | Need for CR | Comments |
| Nokia | Yes (proponent) | As explained in the CR if UE keeps measurements after T331 expiry and later reconnects to the NW (and possibly after having connected to eNBs which did not request UE to report idle mode measurements) UE could still report totally irrelevant measurements which could be very difficult in NW to see. |
| Qualcomm | No | * Deleting stored measurements after T331 expiry was specified in LTE Rel-15 euCA. Thus, it is NBC UE behavior, which will cause operability issues. * Even after T331 expiry, the measurement may still be useful, e.g. when UE doesn’t move in FR1 deployment. Then, this spec change will be an overkill. * Please note that one same note was capturd in 36.331/38.331:   “NOTE: It is up to UE implementation whether to continue IDLE mode measurements according to SIB5 configuration after T331 has expired or stopped.“  So, in some UE implementation, the UE will continue EMR after T331 expiry, e.g. perform measurement just before triggering RACH. Then this spec change will make these UE implementation not workable.  Based on above justifications, this change is not accpetable to us. |
| Samsung | No | We already discussed this issue several meetings ago. UE will report valid measurement results according to RAN4 requirements. |

*Indication of T331 expiration in measurements:*

[R2-2010024](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2010024.zip) Early measurement requirements Ericsson discussion LTE\_NR\_DC\_CA\_enh-Core

In the LS from RAN4 ([R4-2012297](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_96_e/Docs/R4-2012297.zip)) indicated that UE could continue measuring idle/inactive measurements after T331 expiry but NW would not be aware which requirements were applied. Thus it is proposed to indicate if measurements were done prior T331 expiry.

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| Company | Need for CR | Comments |
| Nokia | No | In our view it is not useful to continue to do measurements after T331 expiry and there is no need to inform NW about that. So easier would be just to stop those measurements. If the second change from CR set (R2-200951-200953) would be agreed then we would not have this problem as UE clear the varMeasIdleReport and there is no procedure to update that after T331 expiry. |
| Qualcomm | No | As we indicated before, it is UE implementation to ensure the reporting is valid even after T331 expires. We don't think it is helpful for NW to know whethet it is before or after T331 expires because how to handle it after T331 expires is up to UE implementation.  Even if 1-bit is reported to NW, we don’t think why NW can do better without knowing the details of UE implementation. |
| Samsung | No | It should be up to UE implementation as it was. UE will report vaild measurement results according to RAN4 requirements. |

### 2.2.2 Storing of measurement results

*Clarification to IDLE mode measurement storing procedural text:*

[R2-2010023](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2010023.zip) Serving cell results for early measurements Ericsson CR Rel-16 38.331 16.2.0 2162 - F LTE\_NR\_DC\_CA\_enh-Core

CR consider serving cell measurement reporting in early measurements and that e.g. in case only non serving cell inter-frequencies are configured UE would not store serving cell measurements at all.

Also CR claims UE may store serving cell measurements multiples times and that reportQuantity used for serving cell reporting is not clear.

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| --- | --- | --- |
| Company | Need for CR | Comments |
| Nokia | Maybe | We consider that if CR is needed main motivation is to ensure that UE stores serving cell measurements even if only inter-frequencies are configured. Other problems stated in the CR do not seem to be that valid/critical. |
| Qualcomm | Yes | We support this CR. The UE behavior of current spec is not reasonable. |
| Samsung | No | If serving freq is not part of freqList, the UE is missing some configuration parameters e.g. which quantities to report, whether to perform beam reporting. Supporting serving reporting for this case requires defining how to handle such absence. Seems simpler (and sufficient) to just not report serving cell in such a case |

### 2.2.3 Usage of SIB indication

*Usage of SIB indication for early measurements:*

[R2-2010653](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2010653.zip) Reporting of dle/inactive measurement not obtained in the current cell Huawei, HiSilicon CR Rel-16 36.331 16.2.1 4528 - F LTE\_NR\_DC\_CA\_enh-Core

[R2-2010654](file:///C:\Users\terhentt\Documents\Tdocs\RAN2\RAN2_112-e\R2-2010654.zip) Reporting of dle/inactive measurement not obtained in the current cell Huawei, HiSiliconf CR Rel-16 38.331 16.2.0 2268 - F LTE\_NR\_DC\_CA\_enh-Core

Change "these measurement results" to "stored EUTRA idle/inactive measurement results" or "stored NR idle/inactive measurement results"

In addition, for completeness, also capture that the two fields also control reporting the availability of stored idle/inactive measurement results

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| Company | Need for CRs | Comments |
| Nokia | Second change not OK,  First change is OK (but maybe not critical) | Technically first change seems tob editorial but makes wording slightly better in our view. But the sentence adding “ and is not required to report the availability of EUTRA idle/inactive measurement results.“ seems tob e unnecessary and even wrong as it seems to imply that it is up to UE implementation to indicate availability of measurements. |
| Qualcomm | Same view as Nokia | 1st is acceptable. 2nd is not necessary. |
| Samsung | Yes for the first change but No for the second change. | Fine with the first change but not necessary. But the second change is not needed because we already have the same condition for reporting availability in the procedural text. |

# 3 Conclusion

**TO BE DONE 2nd MEETING WEEK MONDAY**

# 4 Contact Information

|  |  |
| --- | --- |
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