**3GPP TSG-RAN WG4 Meeting # 98-e-Bis R4-210XXXX**

**Electronic Meeting, 25 Jan – 05 Feb, 2021**

**Agenda item:** 7.5.2.2, 7.5.3.2

**Source:** Moderator (Ericsson)

**Title:** Email discussion summary for [98e][211] LTE\_NR\_DC\_CA\_RRM\_2

**Document for:** Information

# Introduction

This email discussion is intended to cover the following topics

* + 7.5.2.2 Efficient and low latency serving cell configuration, activation and setup [LTE\_NR\_DC\_CA\_enh-Core]
  + 7.5.3.2 Efficient and low latency serving cell configuration, activation and setup [LTE\_NR\_DC\_CA\_enh-Perf]
    - 7.5.3.2.1 Test cases for direct SCell activation
    - 7.5.3.2.2 Test case for SCell Dormancy

The following issues are to be discussed starting from first round:

* Topic #1: Core requirement maintenance
  + Sub-topic 1-1: Maintenance for Direct SCell activation core requirements
    - Issue 1-1-1: Measurement periodicity in SCell activation requirement for known SCell case
    - Issue 1-1-2: TCI state activation for direct SCell activation
  + Sub-topic 1-2: Maintenance for SCell dormancy core requirements
    - Issue 1-2-1: Incremental delay D’ for SCell dormancy switching on multiple CCs
    - Issue 1-2-2: Incremental delay D’ and number of CCs for SCell dormancy switching
* Topic #2: Test cases for Direct SCell activation
  + Sub-topic 2-1: Test cases for direct SCell activation
    - Issue 2-1-1: Whether to test for delay and interruption at direct SCell activation
* Topic #3: Test cases for SCell dormancy
  + Sub-topic 3-1: Test cases for SCell dormancy
    - Issue 3-1-1: Pre-defined CSI-RS configuration for sparse CSI measurements
    - Issue 3-1-2: Pre-defined Dormant BWP configuration
    - Issue 3-1-3: Whether to only test switching from dormancy to non-dormancy
    - Issue 3-1-4: Whether to specify DCI formats to use in tests for triggering during active time
    - Issue 3-1-5: Value for ps-Offset in test for triggering outside active time
    - Issue 3-1-6: Common test framework

Additionally, companies are encouraged to discuss and align draft test cases starting from first round.

* See clause 2.3.1 for test case drafts for Direct SCell activation
* See clause 3.3.1 for test case drafts for SCell dormancy

Please note the following guideline from «RAN4#98-e E-meeting Arrangements and Guidelines» on reducing length of file name for email discussion documents.

* Length of file names shall be reduced, e.g.​
* At the beginning of first round, moderators share / ftp / tsg\_ran / WG4\_Radio / TSGR4\_98\_e / Inbox / Drafts / [98e][101] NR\_NewRAT\_SysParameters\Summary\_101\_1st round\_v01.docx​
* After update by company A: Summary\_101\_1st round\_v02\_companyA​
* After update by company B: Summary\_101\_1st round\_v03\_companyA\_companyB​
* After update by company C: Summary\_101\_1st round\_v04\_companyB\_companyC​

# Topic #1: Core requirement maintenance

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

Agenda Item 7.5.2.2 Efficient and low latency serving cell configuration, activation and setup [LTE\_NR\_DC\_CA\_enh-Core]

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2100227**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100227.zip) | Apple | «Activation time in direct SCell activation»  **Observation 1:** measCycleSCell is no longer suitable as a condition to differentiate activation delay requirements for direct SCell activation.  **Proposal 1: u**pdate Tactivation\_time for known SCell in FR1:  If the SCell is known and belongs to FR1, Tactivation\_time is:   * + TFirstSSB+ 5ms, if the Tsample\_interval is equal to or smaller than 160ms.   + TFirstSSB\_MAX + Trs + 5ms, if the Tsample\_interval is larger than 160ms.   Where Tsample\_interval is defined as:   * + If no DRX is configured or DRX cycle>320ms, Tsample\_interval = Max(MGRP, SMTC period, DRX cycle) × CSSFinter   + Otherwise, Tsample\_interval = 1.5 × Max(MGRP, SMTC period, DRX cycle) × CSSFinter |
| [**R4-2100228**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100228.zip) | Apple | «CR on activation time in direct SCell activation» |
| R4-2101012 | Apple | «CR on activation time in direct SCell activation (R17)» (Rel-17 Cat A) |
| [**R4-2101212**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101212.zip) | MediaTek Inc. | «Discussion on direct Scell activation and dormancy Scell»  **Observation 1:** For UE who report D’ = 800us or 1000us, the maximum number of SCells for simultaneous dormant BWP switching using PCell scheduling DCI could be only 2 or 3  **Proposal 1:** RAN4 to correct the direct SCell activation time for the cases that TCI state is still needed  **Proposal 2:** Introduce a new UE capability for the incremental delay for BWP switch processing on additional CCs for dormancy indication involving BWP switching on multiple CCs. The candidate values for the incremental delay D’ are:   * + D’ = 100us or 200us for UE indicating type1 in bwp-SwitchingDelay   + D’ = 200us or 400us for UE indicating type2 in bwp-SwitchingDelay |
| [**R4-2101213**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101213.zip) | MediaTek Inc. | «CR on TS38.133 for direct Scell activation» |
| R4-2101214 | MediaTek Inc. | «CR on TS38.133 for direct Scell activation» (Rel-17 Cat A) |
| [**R4-2101377**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101377.zip) | vivo | «Remaining issues for Scell dormancy RRM requirements»  **Observation 1:** The mechanism for triggering switching of multiple SCells between dormancy where cross carrier scheduling is used and non-dormancy and simultaneously BWP switch over multiple CCs are different.  **Observation 2:** Currently definition D have a good coverage and provide enough flexibility for implementation. Further optimization on D’ to address the different triggering mechanism is possible however we believe the benefit in practice is limited  **Proposal 1:** The value set of D’ is a subset of D.  **Proposal 2:** For the type 1, D’ is {100us, 200us} and for type 2, D’ is {200us, 400us, 800us} |
| [**R4-2101388**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101388.zip) | vivo | «CR for adding capability D’ for SCell dormancy BWP switch requirement» |
| [**R4-2101389**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101389.zip) | vivo | «CR for adding capability D’ for SCell dormancy BWP switch requirement» (Rel-17 Cat A) |
| [**R4-2102254**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102254.zip) | Nokia, Nokia Shanghai Bell | «CR clarifying the UE measurement requirements for an SCell with dormant BWP» |
| R4-2102255 | Nokia, Nokia Shanghai Bell | «CR clarifying the UE measurement requirements for an SCell with dormant BWP» (Rel-17 Cat A) |
| [**R4-2102256**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102256.zip) | Nokia, Nokia Shanghai Bell | «Discussion related to multiple SCell dormancy BWP switch»  **Proposal 1:** Remove 800us and 1000us from the capability of incremental delay for each additional CC involved in DCI-based simultaneous multiple BWP switch for type 2 UE.  **Proposal 2:** A Type 2 UE with D3, D4 and D5 delay capability which indicate support of this feature is only applicable for a maximum number of supported CCs for 120KHz SCS. |
| [**R4-2102257**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102257.zip) | Nokia, Nokia Shanghai Bell | «Correction to simultaneous DCI based BWP switch delay on multiple CCs» |
| R4-2102258 | Nokia, Nokia Shanghai Bell | «Correction to simultaneous DCI based BWP switch delay on multiple CCs» |
| [**R4-2102351**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102351.zip) | Ericsson | «On incremental delay for dormancy switching on multiple CCs»  **Proposal 1:** Update definition of TMultipleBWPswitchDelay such that incremental delay D is described as depending on capability bwp-SwitchingMultiCC-r16 for switching between non-dormant BWPs, and on new capability [scellDormancy-SwitchingMultiCC-r16] for switching between non-dormant and dormant BWPs.  **Proposal 2:** Send LS to RAN1/RAN2 on the need for a new capability scellDormancy-SwitchingMultiCC-r16 with the following parameter value sets:  scellDormancy-SwitchingMultiCC-r16   * + UE supporting bwp-SwitchingDelay Type 1: {100us, 200us}   + UE supporting bwp-SwitchingDelay Type 2: {200us, 400us, 800us, 1000us} |
| [**R4-2102352**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102352.zip) | Ericsson | «CR 38.133 (8.2 8.6) Corrections related to SCell dormancy switching» |
| R4-2102353 | Ericsson | «CR 38.133 (8.2 8.6) Corrections related to SCell dormancy switching» (Rel-17 Cat A) |
| [**R4-2102366**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102366.zip) | Ericsson | «CR 36.133 Removal of brackets for SCell dormancy» |
| R4-2102367 | Ericsson | «CR 36.133 Removal of brackets for SCell dormancy» (Rel-17 Cat A) |
| [**R4-2102749**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102749.zip) | Huawei, HiSilicon | «CR on SCell dormancy switching» |
| R4-2102750 | Huawei, HiSilicon | «CR on SCell dormancy switching R17» (Rel-17 Cat A) |
| [**R4-2102881**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102881.zip) | Qualcomm Incorporated | «Cat-F CR to Removal of brackets for SCell Dormancy and Simultaneous DCI based BWP switch delay on multiple CCs in Rel-16» |
| R4-2102882 | Qualcomm Incorporated | «Cat-A CR to Removal of brackets for SCell Dormancy and Simultaneous DCI based BWP switch delay on multiple CCs in Rel-17» (Rel-17 Cat A) |
| [**R4-2102883**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102883.zip) | Qualcomm Incorporated | «Cat-F CR to Removal of brackets for SCell Dormancy and Simultaneous DCI based BWP switch delay on multiple CCs in Rel-16 LTE» |
| R4-2102884 | Qualcomm Incorporated | «Cat-A CR to Removal of brackets for SCell Dormancy and Simultaneous DCI based BWP switch delay on multiple CCs in Rel-17 LTE» (Rel-17 Cat A) |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 1-1: Maintenance for Direct SCell activation core requirements

*Open issues and candidate options before e-meeting:*

**Issue 1-1-1:**  Measurement periodicity in SCell activation requirement for known SCell case

The direct SCell activation requirement is currently by reference inheriting the following condition on measCycleSCell for the activation time of known SCell in FR1:

If the SCell is known and belongs to FR1, Tactivation\_time is:

- TFirstSSB+ 5ms, if the SCell measurement cycle is equal to or smaller than 160ms.

- TFirstSSB\_MAX + Trs + 5ms, if the SCell measurement cycle is larger than 160ms.

As the known SCell to be directly activated has not previously been measured in deactivated state, but may have been measured as an inter-frequency neighbour cell, it is proposed in R4-2100227 to change the condition from measCycleSCell to a periodicity that is relevant to neighbour cell measurements.

* Proposals
  + Option 1 (Apple): Replace condition on measCycleSCell with Tsample\_interval defined as follows:
    - If no DRX is configured or DRX cycle>320ms, Tsample\_interval = Max(MGRP, SMTC period, DRX cycle) × CSSFinter
    - Otherwise, Tsample\_interval = 1.5 × Max(MGRP, SMTC period, DRX cycle) × CSSFinter
  + Option 2: TBA
* Recommended WF
  + [Moderator] Discussion needed.

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| **Company** | **Comments for Issue 1-1-1:** Measurement periodicity in SCell activation requirement for known SCell case |
| Apple | We observed that *measCycleSCell* is no longer suitable as a condition to differentiate activation delay requirements for direct SCell activation. The proposed update is based on existing inter-frequency measurement requirements. Even though MGRP is included in the conditions, it can mathematically cover inter-frequency measurement w/o gap scenario, assuming MGRP=0. More clarification can be added if necessary. |
| Nokia | Agree with Apple that the reference to 8.3.2 and the use of ‘SCell measurement cycle’ may not be relevant for the direct SCell activation delay at SCell addition.  How to capture the delay requirements (detailed wording) can be discussed under the CR discussion. |
| vivo | We also think that measCycleSCell is not suitable as known cell condition for direct SCell activation. But what the condition can be needs further study. The condition in option 1 means the target cell was measured at least once with Tsample\_interval. However, when there are multiple frequency layers being configured for measurement, such condition cannot ensure the target cell can be measured during the time period as it is up to UE implementation how multiple layers are measured. In addition, the target cell for direct SCell activation can also be an intra frequency cell. So, the condition needs further study. |
| Huawei | We share the observation that *measCycleSCell* may not be applicable for direct SCell activation case, and we also agreed to use the inter-frequency measurement requirements to determine whether an AGC sample is needed for direct SCell activation.  On the exact wording, we are not sure if we need to explicitly define Tsample\_interval. For Rel-15 we are discussing a relevant issue, and we suggest to define the condition as “if the SCell has been measured within last 160ms according to the inter-frequency measurement requirements in clause 9.3”. Of course, we are open to further discuss the wording. |
| Ericsson | We agree that measCycleSCell may not be adequate since in Direct SCell activation the SCell never is in deactivated state. However, this is also discussed in [201] “Issue 2-1-2: Update conditions for SCell activation delay for the case where SCell is known” and as pointed out there, one may also consider time since last measurement, and also, different threshold value.  So we agree on that the condition shall be replaced, but may need further discussions on how it shall be changed. |
| MTK | Agree the issue exist but the conditions are strange. We don’t think CSSF should be considered.   * If no DRX is configured or DRX cycle>320ms, Tsample\_interval = Max(MGRP, SMTC period, DRX cycle) * Otherwise, Tsample\_interval = 1.5 × Max(MGRP, SMTC period, DRX cycle) |

**Issue 1-1-2:**  TCI state activation for direct SCell activation

The direct SCell activation requirements are currently not accounting for delay due to TCI state activation. In R4-2101212 it is raised that there are scenarios where TCI state activation or indication is needed, and therefore it is proposed to correct the direct SCell activation time lines with respect to TCI state activation/indication.

* Proposals
  + Option 1 (MediaTek): RAN4 to correct the direct SCell activation time for the cases that TCI state is still needed:
    - For Direct activation at SCell addition (see highlight):
      * + Ndirect = TRRC\_Process + T1 + Tactivation\_time + TCSI\_Reporting - 3ms for the cases specified in clause 8.3.2 that TCI state is not indicated within Tactivation\_time; otherwise, Ndirect = TRRC\_Process + T1 + THARQ + Tactivation\_time + TCSI\_Reporting
    - For Direct activation at handover (see highlight):
      * + Ndirect = TRRC\_process + Tinterrupt + T2 + T3 + Tactivation\_time + TCSI\_Reporting - 3ms for the cases specified in clause 8.3.2 that TCI state is not indicated within Tactivation\_time; otherwise, Ndirect = TRRC\_process + Tinterrupt + T2 + T3 + THARQ +Tactivation\_time + TCSI\_Reporting
  + Option 2: TBA
* Recommended WF
  + [Moderator] Discussion needed.

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| **Company** | **Comments for Issue 1-1-2:**  TCI state activation for direct SCell activation |
| Apple | Fine with the proposal. It can be observed that if TCI state is configured, total delay would be more or less the same as legacy procedure. We can hardly benefit from direct SCell activation. If RAN2 can conclude the enhancement in R16 then the update may not be needed. But of course based on current RAN4 spec, the proposed change is OK. |
| Qualcomm | This is pending on RAN1 and RAN2. RAN1 is discussing whether TCI state activation is necessary. And RAN2 is discussing whether/how to introduce a singling if it is concluded TCI state activation is needed.  We prefer to wait for conclusion from other working groups as we sent the LS. |
| Nokia | We understand the discussion. But we read the changes in the CR such that it could depend on the feedback from RAN2 related to TCI state activation. E.g. if RAN2 decide that the TCI state activation may be within the RRC message, this would not be with Tactivation\_time but in this case the Ndirect should not be extended?  One option is to wait for the RAN2 reply and make all needed changes when RAN4 know the RAN2 decision. |
| vivo | Whether TCI state activation indication is needed or not for direct SCell activation are under discussion in RAN1/2 triggered by RAN4 LS in the last meeting. We should wait for RAN1/RAN2 conclusion firstly before we make changes to the requirements. |
| Huawei | Technically we are fine with option 1, but we are also fine to wait for the RAN1/2 conclusion as QC suggested above. |
| Ericsson | We share the same view as Qualcomm, Nokia and vivo on this. We sent an LS (R4-2017329) to RAN1 and RAN2 in previous meeting. We shall wait for RAN1 and RAN2 to come back on the issue before we update our specification. |
| NEC | We share same view as other companies that we shall wait for reply LS from RAN/Ran2 |
| MTK | Support option 1. Our understanding is that at least we need to modify the error in current spec. If RAN1/RAN2 agree to provide solution, then we can do the further update. |

### Sub-topic 1-2: Maintenance for SCell dormancy core requirements

*Open issues and candidate options before e-meeting:*

**Issue 1-2-1: Incremental delay D’ for SCell dormancy switching on multiple CCs**

In previous meeting it was agreed that the UE capability for incremental delay per CC can be different for active BWP switching (of non-dormant BWPs) and SCell dormancy switching, respectively. The agreement was captured in R4-2017213:

Agreement:

Option 1: Introduce a capability D’ for dormant BWP switching of multiple SCells that is separate from corresponding capability D for active BWP switching.

In earlier discussions it has been mentioned that D’ shall be taken from the same set of values as applies for D, but it has not been discussed whether the set of values for D’ and D shall be the same, or whether the values for D’ shall represent a subset of the values for D.

* Proposals
  + Option 1 (Nokia): Introduce the following incremental delay values:
    - D’ is {100µs, 200µs} for UE indicating type1 in bwp-SwitchingDelay
    - D’ is {200µs} for UE indicating type2 in bwp-SwitchingDelay
  + Option 2 (MediaTek): Introduce the following incremental delay values:
    - D’ is {100µs, 200µs} for UE indicating type1 in bwp-SwitchingDelay
    - D’ is {200µs, 400µs} for UE indicating type2 in bwp-SwitchingDelay
  + Option 3 (vivo): Introduce the following incremental delay values:
    - D’ is {100µs, 200µs} for UE indicating type1 in bwp-SwitchingDelay
    - D’ is {200µs, 400µs, 800µs} for UE indicating type2 in bwp-SwitchingDelay
  + Option 4 (Ericsson, Qualcomm [R4-2102891]): Introduce the following incremental delay values:
    - D’ is {100µs, 200µs} for UE indicating type1 in bwp-SwitchingDelay
    - D’ is {200µs, 400µs, 800µs, 1000µs} for UE indicating type2 in bwp-SwitchingDelay
* Recommended WF
  + TBA

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| **Company** | **Comments for Issue 1-2-1:** Incremental delay D’ for SCell dormancy switching on multiple CCs |
| Apple | We support option 4, which is aligned with the original agreement, i.e. D in multiple BWP switching requirements apply to dormancy switching as well. The motivation from our side to agree D’ in last meeting is that we would like to allow the implementation which can support different incremental delay for multiple BWP switch and multiple dormancy switch. however, this should not remove the original options (i.e. 400us, 800us and 1000us). The implementation with these options should also be allowed since it has been agreed even before the last meeting. |
| Qualcomm | Support option 4. We share the same view as Apple. Besides,  1) At least for FR1, there is almost no restriction on the number of cells. And this is per-UE capability. i.e. as the capability is not per SCS, the scheduling restriction is limited.  2) For WUS based dormant BWP switching, no such a restriction since it doesn’t require HARQ-ACK in response to WUS based dormant BWP switching  3) For non-scheduling DCI based dormant BWP switching, HARQ-ACK timeline is still under RAN1 discussion, i.e. the example analysis provided in the RAN1 LS is limited to scheduling DCI based dormant BWP switching  If any modification on simultaneous dormant BWP switching delay capability is needed due to the scheduling delay, the same argument should apply to that of simultaneous active BWP switching. |
| Nokia | In general, our view is that it needs to be accounted when the aggregated BWP switch delay for a specific UE type under the given conditions leads to possible loss of the HARQ message. Network would need to be able to identify and know the conditions such that the network can take case that UEs are configured according to its capability regarding multiple BWP switch. As pointed out by Qualcomm, RAN4 would first need to identify the conditions when the aggregated switch time can lead to loss of HARQ.  However, we do not see a need to introduce a new additional capability for this purpose but instead an update to the existing capability should be enough. This will reduce the overall UE network and system complexity.  Of the above alternatives the preference is either option 1 or option 4 conditioned that the existing capability description is updated to account for the UE timing limitations. |
| vivo | Option 3.  As mentioned in our discussion document, we think the two mechanisms, multiple BWP switch triggered by multiple DCI and multiple BWP switch triggered by one DCI have some different and some optimization on switch delay could be done when defining the value on D’. |
| Huawei | No strong view. |
| Ericsson | We support Option 4. It is based on the original agreement which does not force all UEs to be quicker than for non-dormant BWP switching, but allows UE implementations that can be quicker to benefit from it. |
| NEC | We prefer option 4. D’ can be same as D to reduce the complexity. |
| MTK | Support option 2. Dormancy BWP switching can only be trigger by cross carrier scheduling, so generally 1 more slot in the switching delay will be introduced comparing with the normal BWP switching. We think it needs further optimization and reduce the D’ value for type 2 UE. |

**Issue 1-2-2: Incremental delay D’ and number of CCs for SCell dormancy switching**

For some choices of D’, the time for switching on multiple CCs may exceed the maximum time that can be supported by other functions (e.g. HARQ feedback). See for instance discussions in LS out (R4-2012269) and LS reply (R1-2009575) on the matter.

In R4-2102256 it is proposed that, if needed (pending on outcome of Issue 1-2-1), it shall be specified for how many CCs switching can be supported.

Please note that the discussion here is solely whether to capture, somewhere, that there may be a limited applicability w.r.t. number of SCCs. Further discussions on whether such limitation shall be captured e.g. in the capability description are to be carried out in email thread **[98e][114] R16\_UE\_ feature, Issue 1-1: New feature simultaneous dormant BWP switching**.

* Proposals
  + Option 1 (Nokia): If it is agreed that a UE indicating type2in bwp-SwitchingDelay can report a D’ larger than 200µs, then it shall be specified that for SCS 120kHz, the maximum number of supported CCs will depend on the reported value D’:

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| D’ | 200µs | 400µs | 800µs | 1000µs | 200µs | 400µs | 800µs | 1000µs |
|  | DCI received within the first 3 symbols | | | | DCI received after the first 3 symbols | | | |
| #CC | 8 | 5 | 3 | 2 | 8 | 4 | 2 | 2 |

* Recommended WF
  + [Moderator] May need to be coordinated with discussions in thread [98e][218] NR\_RRM\_Enh\_RRM\_1 on BWP switching on multiple CCs. Where to capture, if agreed, is to be discussed in thread [98e][114] R16\_UE\_ feature.

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| **Company** | **Comments for Issue 1-2-2:** Incremental delay D’ and number of CCs for SCell dormancy switching |
| Apple | Agree with recommended WF that we may need to align with thread 218. We think it is ok to only capture the this as side condition for requirement in TS38.133. |
| Qualcomm | We don’t think this is necessary information that should be implemented in the spec. Even if this is captured, it is one of many possible examples, e.g. scheduling DCI vs. non-scheduling DCI (case 2 and WUS), numerology differences b/w cells, configured K0/K2, etc. |
| Nokia | Agree that this needs broader coordinated discussion within the different email threads. |
| vivo | Agree with the recommended WF. We think it is ok to capture the fact that the number of CCs supported is limited/reduced for some SCS and switch delay combination . |
| Huawei | We are fine to capture some generic statement in the spec e.g. there could be some restrictions on the number of CCs for multi-CC BWP or dormancy switch considering the switching delay and the K0/K2 values.  We do not think RAN4 needs to define the exact number of CCs, as there are many factors/cases to be considered as QC mentioned above.  We also agree with the moderator that where to capture should be aligned with email 114 and 218. |
| Ericsson | Share view with Huawei on that it is not necessary to specify this limitation in detail. If anything, one can point out on a high level in 38.133 that the combination of k0/k1/k2, SCS etc may put a cap on number of CCs that can be switched. |
| NEC | No strong view, we are OK with either options of adding generic statement or specifying exact number of CC |
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## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| [**R4-2100228**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100228.zip) | «CR on activation time in direct SCell activation», Apple |
| Qualcomm: pending on Issue 1-1-1. |
| Nokia: We propose some re-structuring of the proposed changes: 1) ‘except …in FR1’ in principle includes FR2. We propose to move the newly added text for Tactivation\_time ‘up’ before the ‘except …. in FR1’ and then use ‘Otherwise, for unknown target cell in FR1’. We can provide text example. |
| Huawei: support in principle, and we can discuss on the wording as we commented for 1-1-1. |
| Ericsson: We do not agree with the current version of the CR. When changing based on which metric the measurement rate is determined, the threshold value (160ms) needs to be changed, too. |
| MTK: As we commented in Issue 1-1-1. We agree the issue but the formula of Tsample\_interval needs to be studied. |
| [**R4-2101213**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101213.zip) | «CR on TS38.133 for direct Scell activation», MediaTek Inc. |
| Qualcomm: we can discuss it after Sub-topic 1-2 is settled. |
| Nokia: we understand the reasoning behind the proposal. We are mostly wondering if it would be better to return to this when RAN2 has replied the LS? One clarifying question to the THARQ – is it referring to the HARQ for the TCI state activation command? |
| Ericsson: We think we shall wait until RAN1/RAN2 has come back on how to handle the TCI state activation. |
| [**R4-2101388**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101388.zip) | «CR for adding capability D’ for SCell dormancy BWP switch requirement», vivo |
| Qualcomm: we can discuss it after Sub-topic 1-2 is settled. |
| Nokia: The CR wording for capturing the possible UE requirements for the cases under discussion need to be reviewed based on the outcome of the discussion (Issues 1-2-1 and 1-2-2) |
| Huawei: in the CR D' is applied for multi-CC BWP switch with cross-carrier scheduling, but we understand the existing capability D should still apply, and D’ should be used only for multi-CC dormancy switch. Also the CR seems to be not based on latest spec (at least one paragraph in the spec is missing). |
| Ericsson: It seems there is some confusion in the CR about how parameter D’ is to be used. D’ is the incremental processing time per CC for dormancy switching on multiple CCs. |
| [**R4-2102254**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102254.zip) | «CR clarifying the UE measurement requirements for an SCell with dormant BWP», Nokia, Nokia Shanghai Bell |
| Qualcomm: SCell with dormant BWP is still considered as an active cell, hence, technically no need to add clarification. |
| Nokia: To Qualcomm: we agree this is the agreement. However, it is not captured in RAN4 specification. We are open to discuss how to capture dormant SCell measurement requirements, but it seems clearer (for future) to capture somewhere in RAN4 that the dormant SCell is regarded as activated SCell and measurement requirements for activated SCell applies. |
| Ericsson: Agree with Qualcomm that a clarification may not be needed. However, have no strong opinion about it. |
| [**R4-2102257**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102257.zip) | «Correction to simultaneous DCI based BWP switch delay on multiple CCs», Nokia, Nokia Shanghai Bell |
| Qualcomm: do not see a reason for the change. |
| Nokia: The reasoning for the change is aligning the specification in 8.6.2A and 8.6.2. 8.6.2 states ‘TdormantBWPswitchDelay =TBWPswitchDelay+ X’ and having same in 8.6.2A will make the requirements aligned and clear. |
| Ericsson: We are fine with the CR. Without the CR there is some inconsistency in the descriptions in 8.6.1 and 8.6.2. |
| [**R4-2102352**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102352.zip) | «CR 38.133 (8.2 8.6) Corrections related to SCell dormancy switching», Ericsson |
| Qualcomm: support in principle |
| Nokia: We are fine removing the [] as proposed in the first 4 changes of the CR. However, the change related to the 5th change needs more discussion. Our view is that the current text is sufficient. One clarifying question: it is not clear what ‘for switching between non-dormant BWPs’ refer to – the word ‘between non-dormant’ should be removed? |
| To Nokia: we can clarify the wording. The background to the proposed change is that we have an expression TMultipleBWPswitchDelay = TBWPswitchDelay + D\*(N-1) which is reused when specifying switching time for switching between non-dormant and dormant BWPs:  If the BWP switch is triggered on multiple CCs simultaneously within or outside DRX active time, and one of the two BWPs on each CC in a BWP switching is a dormant BWP [TS 38.321, 7], UE shall be able to complete active BWP switching within  - TMultipleBWPswitchDelay+X, provided that the dormancy indication is received in any of the first 3 OFDM symbols of a slot in the serving cell where DCI for dormancy indication is received, or  The problem here is that the expression TMultipleBWPswitchDelay = TBWPswitchDelay + D\*(N-1) would, potentially, use different value D depending on whether it is a switching between two BWPs where none is a dormant BWP (“non-dormant BWP” in the CR), or a switching between two BWPs where one is a dormant BWP. There are two different capabilities involved (*bwp-SwitchingMultiCCs-r16* for switching between BWPs where none is a dormant BWP, and some new capability for switching between BWPs where one is a dormant BWP) and we suggest that to be captured where D is defined. |
| [**R4-2102366**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102366.zip) | «CR 36.133 Removal of brackets for SCell dormancy», Ericsson |
| Qualcomm: support |
| Nokia: CR is agreeable |
|  |
| [**R4-2102749**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102749.zip) | «CR on SCell dormancy switching», Huawei, HiSilicon |
| Qualcomm: support in principle, and R4-2102881 can be merged into this CR. |
| Nokia: Clarifying Y is fine in the beginning of change 1 is fine. From structure point of view we’re wondering if we should move the definition of ‘Y’ to same place where X and Z are defined.  One clarifying question: ‘Y’ is also in slot length  The second change is not clear. Needs further discussion. Qualcomm has alternative text proposal.  The change in ‘DCI based BWP switch delay on multiple CCs’ is still under discussion in Issues 1-2-1, 1-2-2.  Change #2 is agreeable. |
| Huawei: To Nokia,  Y is for BWP switch delay, and X and Z are for dormancy switch delay, and that’s why they are defined in different places in the clause. Hope this addresses the first comment.  Agree that Y should also be the length of the slot, and this can be updated in a revision.  The second change is to clarify that if there is an SCS change on the scheduled cell due to dormancy switch, then the smaller one between the SCS before and after the switch should be used to determine the TBWPswitchDelay and X. Technically it is same as QC CR R4-2102881, and we are also fine to use the wording from R4-2102881.  For the change related to multiple CCs, we can further wait for the outcome. |
| Ericsson: support in principle, but would like to see the reference to new UE capability (incremental delay for dormancy switching) to be captured where D currently is described: [...]  - D is the incremental delay for each additional CC involved in simultaneous BWP switch and depends on UE capability *bwp-SwitchingMultiCCs-r16* [13], xxx  [...]  since otherwise there are two definitions of D at different places in the same clause. We have described it as follows in R4-2102352:  D is the incremental delay for each additional CC involved in simultaneous BWP switch and depends on UE capability *bwp-SwitchingMultiCCs-r16* [13] for switching between non-dormant BWPs, and [*dormancy-SwitchingMultiCCs-r16*] for switching between non-dormant and dormant BWPs. |
| [**R4-2102881**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102881.zip) | «Cat-F CR to Removal of brackets for SCell Dormancy and Simultaneous DCI based BWP switch delay on multiple CCs in Rel-16», Qualcomm Incorporated |
| Nokia: changes 1-4 regarding removal of [] is agreeable. Additionally, change 5 on clarifying the reference SCS is agreeable. Change #6 is related to Issues 1-2-1 and 1-2-2 above? If this is the case we would need to wait the outcome of the discussion. (Vivo CR in R42011388 covers same topic) |
| Ericsson: Support. Overlapping R4-2102352 and R4-2102749. |
|  |
| [**R4-2102883**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102883.zip) | «Cat-F CR to Removal of brackets for SCell Dormancy and Simultaneous DCI based BWP switch delay on multiple CCs in Rel-16 LTE», Qualcomm Incorporated |
| Nokia: Change is agreeable (same as Ericsson R4-2012366) |
| Ericsson: Support. Overlapping R4-2102366. Merge? |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

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| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: Test cases for Direct SCell activation

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

Agenda item 7.5.3.2.1 Test cases for direct SCell activation [LTE\_NR\_DC\_CA\_enh-Perf]

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2100230**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100230.zip) | Apple | «Test case for Direct SCell Activation: EN-DC, NR spCell in FR1, SCell in FR1, SCell addition» (DraftCR) |
| [**R4-2101073**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101073.zip) | NEC | «Draft CR on TC for direct SCell activation during handover in NR SA for FR2» (DraftCR) |
| [**R4-2101215**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101215.zip) | MediaTek Inc. | «CR on TS38.133 for direct SCell activation of SCell in FR2 intra-band in ENDC mode (A.5.5.X)»  **Submitted as CR, but shall be draft CR for endorsement** |
| R4-2101216 | MediaTek Inc. | «CR on TS38.133 for direct SCell activation of SCell in FR2 intra-band in ENDC mode (A.5.5.X)»  **Submitted as Cat A CR, but shall be withdrawn** |
| [**R4-2102260**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102260.zip) | Nokia, Nokia Shanghai Bell | «Draft CR for NR FR1 Intra frequency handover with direct SCell activation» (DraftCR) |
| [**R4-2102357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102357.zip) | Ericsson | «On TC3 for Direct SCell Activation»  **Proposal 1:** RAN4 to agree on whether test cases for Direct SCell Activation shall test only activation delay, or both activation delay and interruption requirement.  **Proposal 2:** RAN4 to agree on whether to cover only known SCell case or both known and unknown SCell cases by test cases for Direct SCell Activation. If test cases need to be extended to cover both cases, same sourcing company is assumed for both cases. |
| [**R4-2102358**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102358.zip) | Ericsson | «DraftCR 38.133 TC3 Direct SCell activation» (DraftCR) |
| [**R4-2102755**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102755.zip) | Huawei, HiSilicon | «draftCR to introduce TC4 for direct SCell activation» (DraftCR) |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 2-1: Test cases for direct SCell activation

*Open issues and candidate options before e-meeting:*

**Issue 2-1-1: Whether to test for delay and interruption at direct SCell activation**

Some of the test case drafts include requirements on interruptions on other serving cells, whereas others do not. It is proposed to align between test cases.

* Proposals
  + Option 1: Test case on Direct SCell activation shall test both activation delay and interruption of other serving cells.
  + Option 2: Test case on Direct SCell activation shall only test activation delay.
* Recommended WF
  + TBA

|  |  |
| --- | --- |
| **Company** | **Comments on Issue 2-1-1:** Whether to test for delay and interruption at direct SCell activation |
| Apple | As interruption requirements can be verified together with delay requirements without requiring extra testing time, we are fine with testing both. |
| Qualcomm | Share the same view and Apple |
| Nokia | Agree with Apple. Additionally, testing interruption requirements is aligned with what is done in the LTE test. |
| Huawei | Same comment as Apple/QC/Nokia. |
| Ericsson | We are fine with Option 1: testing delay and interruption in the same test case. This does mean that certain test cases need to be updated. |
| NEC | Agree with option 1. Support option 1 to reduce the testing time.  May be one general question for clarification/my understanding.  Some papers considered two time periods and some papers considered three time periods for the test. Is it needs to be consistent among all tests under this topic? |
| MTK | Support option 1 to reduce the testing time. |

## Companies views’ collection for 1st round

### DraftCRs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2100230**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100230.zip) | [TC1] «Test case for Direct SCell Activation: EN-DC, NR spCell in FR1, SCell in FR1, SCell addition», Apple |
| Nokia: Looks in general fine. One question: do we need to ensure that the SCell being added is known? Is measCycleScell needed? |
| Company B |
|  |
| [**R4-2101215**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101215.zip) | [TC2] «CR on TS38.133 for direct SCell activation of SCell in FR2 intra-band in ENDC mode (A.5.5.X)», MediaTek Inc. |
| Nokia: Looks in general fine. GP needs to added. Question for clarification: would there need to be added a time between measurements has been reported for the SCell and when the test equipment sends the reconfiguration in order to ensure known SCell conditions? Question: why is event B1 used? Is the length of T1 enough to account cell detection, measurements and reporting? |
| NEC: Just an observation. OTA test parameters are not same across papers. Do we need to have common parameters? |
|  |
| [**R4-2102358**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102358.zip) | [TC3] «DraftCR 38.133 TC3 Direct SCell activation», Ericsson |
| Nokia: look in general fine. The test does not test interrupts (under discussion). Clarifying questions: should the time between the report and SCell configuration be mentioned (similar question as to MTKs CR)? Do we need the measCycleScell parameter? |
| Company B |
|  |
| [**R4-2102755**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102755.zip) | [TC4] «draftCR to introduce TC4 for direct SCell activation», Huawei, HiSilicon |
| Company A |
| Nokia: Looks in general fine. Two questions: 1) is the same question about ensuring that the to-be SCell is in known state – should we in general for all test cases add some text and time estimate for this? Do we need to list measCycleScell? As for T1 – should this be extended to allow for minimum requirements? |
| Huawei: To Nokia,  We get the point, and agree that T1 should be extended to ensure the SCell is known based on min requirements. We will further check the proper value in the revision. On measCycleScell, we are fine to list it, but as discussed in Issue 1-1-1, it may not be applicable for direct activation. |
| [**R4-2102260**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102260.zip) | [TC5] «Draft CR for NR FR1 Intra frequency handover with direct SCell activation», Nokia, Nokia Shanghai Bell |
| NEC: One questions for my understanding. Used two cells in the test. Since the test supposed to test handover and SCell activation, is it fine or does it needs to consider three cells? |
| Company B |
|  |
| [**R4-2101073**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101073.zip) | [TC6] «Draft CR on TC for direct SCell activation during handover in NR SA for FR2», NEC |
| Nokia: looks in general fine. Some clarifications: All 3 cells in FR2 is mentioned twice in the second paragraph. UE will not report CQI for target cell 2. Which event is used for triggering measurement report for triggering the HO? In table ..1-2 cell 3 is not neighboring cell (it was the SCell)? |
| NEC: To Nokia:  Shall remove redundant text.  Our understanding is in 38.133, for FR2 handovers, A4-offset is used. We could use same offset. May be will update the table to specify offset.  Since the SCell is not added before RRCReconfig message for direct SCell activation, considered as neighbor cell. Please let us know if it needs to be updated. |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Suggestion on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #3: Test cases for SCell dormancy

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

Agenda item 7.5.3.2.2 Test cases for SCell dormancy [LTE\_NR\_DC\_CA\_enh-Perf]

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2100231**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100231.zip) | Apple | «Test case for SCell Dormancy: EN-DC, NR spCell in FR1, SCell FR1, DCI 2\_6 within/after 3 OFDM symbols» (DraftCR)  **File cannot be unzipped** |
| [**R4-2101074**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101074.zip) | NEC | «Draft CR on TC for SCell dormancy in NR SA for FR1» (DraftCR) |
| [**R4-2101217**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101217.zip) | MediaTek Inc. | «CR on TS38.133 for E-UTRAN – NR SCell FR1 dormant BWP switch with FR1 PSCell in non-DRX in synchronous EN-DC (A.4.5.X)»  **Submitted as CR, but shall be draft CR for endorsement** |
| R4-2101218 | MediaTek Inc. | «CR on TS38.133 for E-UTRAN – NR SCell FR1 dormant BWP switch with FR1 PSCell in non-DRX in synchronous EN-DC (A.4.5.X)»  **Submitted as Cat A CR, but shall be withdrawn** |
| [**R4-2102259**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102259.zip) | Nokia, Nokia Shanghai Bell | «Draft CR for test case 7 for Dormant SCell BWP switch delay» (DraftCR) |
| [**R4-2102359**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102359.zip) | Ericsson | «On TCs 6 and 8 for SCell dormancy switching»  **Proposal 1:** Add pre-defined CSI-RS configurations to TS 38.133 clause A.3.14 for periodic CSI-RS with 40ms periodicity.  **Proposal 2:** Add pre-defined Dormant BWP to TS 38.133 clause A.3.9.2 with same parameters as for DLBWP.1.1. |
| [**R4-2102360**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102360.zip) | Ericsson | «DraftCR 38.133 TCs 6 and 8 SCell dormancy switching» (DraftCR) |
| [**R4-2102756**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102756.zip) | Huawei, HiSilicon | «Further discussion on test for SCell dormancy»  **Proposal 1:** Test the switching from dormancy to non-dormancy but not the switching from non-dormancy to dormancy.  **Proposal 2:** Leave the choice of scheduling method (Case 1 or Case 2) for the test cases with DCI 0\_1/1\_1 to RAN5 or TE implementation.  **Proposal 3:**  For test cases with DCI 2\_6, set the gap between PDCCH WUS and the next DRX on-duration as in Table 1.   * + **Table 1: maximum dormancy switching delay for RRM test cases**  |  |  |  | | --- | --- | --- | |  | **NR Slot length** | **Dormancy switching delay (Slots)** | |  | **(ms)** |  | | 0 | 1 | 6 | | 1 | 0.5 | 9 | | 2 | 0.25 | 15 | | 3 | 0.125 | 28 | |
| [**R4-2102757**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102757.zip) | Huawei, HiSilicon | «draftCR to introduce TC3 for SCell dormancy» (DraftCR) |
| [**R4-2102886**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102886.zip) | Qualcomm Incorporated | «DraftCR on EN-DC NR SpCell in FR1 and 2 NR SCells in FR2 for Dormant SCell switch via DCI 2\_6 within and after 3 OFDM symbols» (DraftCR) |
| [**R4-2102887**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102887.zip) | Qualcomm Incorporated | «Test framework for SCell dormancy performance requirements»  **Proposal 1:** RAN4 to establish a common test framework for SCell dormancy requirements in terms of test methods for requirement verification, e.g. # missing HARQ-ACK/NACKs within specific windows, etc. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 3-1: Test cases for SCell dormancy

*Open issues and candidate options before e-meeting:*

**Issue 3-1-1: Pre-defined CSI-RS configuration for sparse CSI measurements**

In R4-2102359 it is proposed to have sparser CSI measurements during SCell dormancy. In order not to potentially having to define related CSI-RS parameters in each test case, it is proposed to add a sparse CSI-RS configuration to clause A.3.14.

* Proposals
  + Option 1 (Ericsson): Add pre-defined CSI-RS configurations to TS 38.133 clause A.3.14 for periodic CSI-RS with 40ms periodicity.
  + Option 2: TBA
* Recommended WF
  + TBA

|  |  |
| --- | --- |
| **Company** | **Comments on Issue 3-1-1:** Pre-defined CSI-RS configuration for sparse CSI measurements |
| Apple | Fine with the proposal. |
| Qualcomm | Looks okay. |
| Nokia | Although not necessary for testing purposes (extends the time a bit) and we’re not testing power consumption, we can agree to defining a new set of other companies see the need. |
| Huawei | Option 1 is fine. |
| NEC | No strong view |
| MTK | Support option 1 |

**Issue 3-1-2: Pre-defined Dormant BWP configuration**

In R4-2102359 it is proposed to define Dormant BWP in clause A.3.9.2 for usage in test cases for SCell dormancy.

* Proposals
  + Option 1 (Ericsson): Add pre-defined Dormant BWP to TS 38.133 clause A.3.9.2 with same parameters as for DLBWP.1.1.
  + Option 2: TBA
* Recommended WF
  + TBA

|  |  |
| --- | --- |
| **Company** | **Comments on Issue 3-1-2:** Pre-defined Dormant BWP configuration |
| Apple | Fine with the proposal. |
| Qualcomm | Looks okay in principle. Can Ericsson explain the difference between BWP.1.1 and BWP.1.3? Any reason why it should be BWP.1.1 nor BWP.1.3? |
| Nokia | This would be fine but then should the dormant BWP specific parameters be defined as well? |
| Huawei | Not sure if we need a new BWP configuration in A.3.9.2.2. Could we just set BWP.1.1 as the dormant BWP? This can be done by setting the IE dormantBWP-Id-r16 to the index of BWP.1.1.  Maybe we missed something, so we are open to further discuss. |
| Ericsson | To Qualcomm: The difference is that BWP.1.1 is defined over the full bandwidth, whereas BWP.1.2 and BWP.1.3 are defined only over parts of the channel bandwidth. Choosing BWP.1.1 as template for the dormant BWP is just out of simplicity (it will overlap SSBs, CSI-RS, etc).  To Nokia: parameters that are not varying between test cases could be captured in the predefined configuration; otherwise captured in the test case.  To Huawei: Let us check and discuss further. |
| NEC | Not sure whether we need new BWP config. But no strong view. |
| MTK | Fine with the proposal. |

**Issue 3-1-3: Whether to only test switching from dormancy to non-dormancy**

In R4-2102756 it is proposed to only test switching from dormancy to non-dormancy.

* Proposals
  + Option 1 (Huawei): Test the switching from dormancy to non-dormancy but not the switching from non-dormancy to dormancy.
  + Option 2: TBA
* Recommended WF
  + TBA

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| **Company** | **Comments on Issue 3-1-3:** Whether to only test switching from dormancy to non-dormancy |
| Apple | In our CR we test both from dormancy to non-dormancy and from non-dormancy to dormancy, respectively with DCI received within and after 3 OFDM symbols. To address the concern raised in R4-2102756, one possible solution is to only transmit CSI-RS for CQI in dormant BWP. UE shall report out of range when working in non-dormancy BWP. |
| Qualcomm | We do not share the same view as Huawei. In our understanding, during BWP transition from non-dormancy to dormancy, interruption requirements to other serving cells can be verified. |
| Nokia | First we would like to understand the reasoning why only to test dormancy to non-dormancy? Secondly, we believe both switches can be tested in same test case and testing that the UE enter dormancy in timely manner within the required delay is also important. Testing whether the UE entered dormancy can be done by continue to schedule the UE in the dormant SCell during dormancy and as UE is not monitoring the PDCCH of the dormancy SCell the UE will not send HARQ ack/nack. This is not increasing the test case complexity or run time significantly. |
| Huawei | We prefer option 1.  The motivation of the proposal is to simplify the test design. From importance and necessity perspective, we do see no strong need to test switching from non-dormancy to dormancy.  We can also compromise if other companies have strong view to test it, but we need to then discuss whether and how to verify the delay of the switching. Using CSI reporting (proposed by Apple) may not be accurate since it depends on CSI-RS and CSI reporting configuration and UE implantation in CQI estimation. Using scheduling (proposed by Nokia) may not be possible – there is no PDCCH in the dormant BWP so the TE cannot send the DCI to the UE. To avoid spec efforts, we can consider to only test interruption for switching from non-dormancy to dormancy. |
| Ericsson | We have same understanding as Qualcomm on that at least interruptions can be verified for both transitions. |
| NEC | In our view, it is beneficial to test both scenarios. Moreover from company CRs it can be verified in a single test. |
| MTK | Disagree with option 1. The interruption requirements to other serving cells can be verified during BWP transition from non-dormancy to dormancy, |

**Issue 3-1-4: Whether to specify DCI formats to use in tests for triggering during active time**

In R4-2102756 it is proposed to let RAN5 or TE vendors decide whether to test using DCI format 0\_1 or 1\_1for dormancy indication.

* Proposals
  + Option 1 (Huawei): Leave the choice of scheduling method (Case 1 or Case 2) for the test cases with DCI 0\_1/1\_1 to RAN5 or TE implementation.
  + Option 2: TBA
* Recommended WF
  + TBA

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| **Company** | **Comments on Issue 3-1-4:** Whether to specify DCI formats to use in tests for triggering during active time |
| Apple | Fine with the proposal. |
| Qualcomm | Case 1 should be a default one. Or we can consider Case 1 based BWP switching from dormant to non-dormant and Case 2 based BWP switching from non-dormant to dormant. We’re open to further discussion but do not see a reason to leave it to RAN5. |
| Nokia | No strong view here. Question is more whether RAN4 need to define test case for both? |
| Huawei | No strong view, but Case 1 v.s. Case 2 seems to have no impact on the test setup or the test requirements, so we do not see particular reason to specify it in RAN4. It is noted that RAN4 does not need to specify every detail of the test. |
| Ericsson | We support Qualcomm’s proposal above on using both Case 1 and Case 2 in the same test case, as this would limit the number of test cases while still providing essentially the same test coverage. But we also agree with Huawei that RAN4 does not need to specify every detail unless it is critical for the tested functionality. |
| MTK | No strong view |

**Issue 3-1-5: Value for ps-Offset in test for triggering outside active time**

In R4-2102756 it is proposed to apply a *ps-Offset* that is based on worst case with respect to UE capability on dormancy switching. In R4-2102359 it is instead proposed that the exact value of *ps-Offset* shall depend on capabilities reported by the UE.



* Proposals
  + Option 1 (Huawei): For test cases with DCI 2\_6, set the gap *ps-Offset* between PDCCH WUS and the next DRX on-duration as in Table 1.
    - * **Table 1: maximum dormancy switching delay for RRM test cases**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length** | **Dormancy switching delay (Slots)** |
|  | **(ms)** |  |
| 0 | 1 | 6 |
| 1 | 0.5 | 9 |
| 2 | 0.25 | 15 |
| 3 | 0.125 | 28 |

* + Option 2 (Ericsson): For test cases with DCI 2\_6, set the gap *ps-Offset* between PDCCH WUS and next onDuration to the allowed SCell dormancy switching time given the UE’s reported capabilities.
  + Option 3: TBA
* Recommended WF
  + TBA

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| **Company** | **Comments on Issue 3-1-5:** Value for ps-Offset in test for triggering outside active time |
| Apple | Trying to find some middle ground, we suggest to follow option 1 for switch from dormancy to non-dormancy, and follow option 2 for switch from non-dormancy to dormancy. |
| Qualcomm | Support Option 2 in principle because it has to do with NW flexibility and resource prediction. However, depending on DRX on-duration configuration and scheduling on other cells, there can be uncertainties in the test scenario. For example, UE received WUS with no time margin compared to its reported capability, and if the dormant BWP switching time is larger than the gap b/w the WUS and the associated DRX on-duration, and if DRX on-duration length is 1ms, then there seems to be an ambiguity issue. We suggest further discussion on this taking into account these aspects if companies agree. Our preference is to figure out proper test configurations to support Option 2. |
| Nokia | We support option 2. Using fixed value based on worst case UE capability does not seem reasonable (which is how we read option 1). We are fine developing a test where the offset is assumed to account the potential interrupts from the switching. |
| Huawei | We support option 1 from simplicity pov because option 2 means the test setup needs to be adjusted based on the UE capability, but we are also fine with option 2 if other companies do not think this complexity is an issue. |
| Ericsson | Support Option 2. We agree with Qualcomm that we can look further into how to secure conclusive outcome of the testing. Regarding the DRX configuration, UE can be scheduled long enough starting at onDuration to keep inactivity timer running plus allowing observability regarding interruptions during active time. For switching from dormancy to non-dormancy, one can additionally observe whether UE is ready to receive in now non-dormant SCell from the start of onDuration.  The intention by having ps-Offset configured on basis of reported capabilities is that then one can verify both UE switching time and end-point for interruption. With Option 1, one would not know whether the UE can support switching times according to reported capabilities when switching outside active time, and then additional margin would have to be used in the network.  For Apple’s proposal, it would make more sense to use Option 2 at least for the switching from dormancy to non-dormancy, as this would allow not only interruptions to be verified but also the switching delay on the concerned SCell (whether UE is ready to receive PDCCH on SCell at start of onDuration). But we do not see why not to use Option 2 for switching in both directions. |
| NEC | We agree with comments from Ericsson and support option 2. |
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**Issue 3-1-6: Common test framework**

R4-2102887

* Proposals
  + Option 1 (Qualcomm): RAN4 to establish a common test framework for SCell dormancy requirements in terms of test methods for requirement verification, e.g. # missing HARQ-ACK/NACKs within specific windows, etc.
  + Option 2: TBA
* Recommended WF
  + TBA

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| **Company** | **Comments on Issue 3-1-6:** Common test framework |
| Qualcomm | This is a high-level proposal. We can focus on the technical discussion on Issue 3-1-1 to 3-1-5. And we would like to encourage companies to have a look at the test procedure illustrated in R4-2102887. |
| Nokia | Having an agreed common setup framework for development of the test cases seems reasonable. It would help in aligning the final test cases. |
| Huawei | Agree with option 1, and the TCs should be aligned as much as possible. |
| NEC | Agree that all the test cases can follow common framework. |
| MTK | Support option 1 |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

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| **CR/TP number** | **Comments collection** |
| [**R4-2100231**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100231.zip) | [TC1] «Test case for SCell Dormancy: EN-DC, NR spCell in FR1, SCell FR1, DCI 2\_6 within/after 3 OFDM symbols», Apple |
| Nokia: As a general comment for all test cases we support the Qualcomm proposal on trying to agree on a common test setup framework for all test cases. This will help aligning the final test cases and ensure the quality. |
| NEC: Agree with comments from Nokia. |
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| [**R4-2101217**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101217.zip) | [TC2] «CR on TS38.133 for E-UTRAN – NR SCell FR1 dormant BWP switch with FR1 PSCell in non-DRX in synchronous EN-DC (A.4.5.X)», MediaTek Inc. |
| Company A |
| Company B |
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| [**R4-2102757**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102757.zip) | [TC3] «draftCR to introduce TC3 for SCell dormancy», Huawei, HiSilicon |
| Company A |
| Company B |
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| [**R4-2102886**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102886.zip) | [TC4] «DraftCR on EN-DC NR SpCell in FR1 and 2 NR SCells in FR2 for Dormant SCell switch via DCI 2\_6 within and after 3 OFDM symbols», Qualcomm Incorporated |
| Company A |
| Company B |
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| [**R4-2101074**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101074.zip) | [TC5] «Draft CR on TC for SCell dormancy in NR SA for FR1», NEC |
| Company A |
| Company B |
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| [**R4-2102360**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102360.zip) | [TC6] «DraftCR 38.133 TCs 6 and 8 SCell dormancy switching», Ericsson |
| Company A |
| Company B |
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| [**R4-2102259**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102259.zip) | [TC7] «Draft CR for test case 7 for Dormant SCell BWP switch delay», Nokia, Nokia Shanghai Bell |
| Company A |
| Company B |
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| [**R4-2102360**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102360.zip) | [TC8] «DraftCR 38.133 TCs 6 and 8 SCell dormancy switching», Ericsson |
| Company A |
| Company B |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Suggestion on WF/LS assignment*

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| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |