**3GPP TSG-RAN WG4 Meeting # 95-e R4-200XXXX**

**Electronic Meeting, 25 May – 5 June, 2020**

**Agenda item:** 6.6.3.2

**Source:** Moderator (Ericsson)

**Title:** Email discussion summary for [95e][213] LTE\_NR\_DC\_CA\_RRM\_2

**Document for:** Information

# Introduction

This email discussion is intended to cover MR-DC topics in AI 6.6.3.2 (RRM Core requirements: Efficient and low latency serving cell configuration, activation and setup).

The following topics are covered:

* Topic #1: Direct SCell Activation (AI 6.6.3.2.1)
* Topic #2: SCell Dormancy (AI 6.6.3.2.2)

Please follow these instructions:

* use track changes when providing comments
* suffix the updated file with your company’s name
* do not step up version number of this document (only done by moderator)

# Topic #1: Direct SCell activation

The only contributions for Direct SCell activation are change requests, where four out of five have been endorsed at RAN4#94-e-Bis. Please provide input on the CRs already during the 1st round of discussions.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Title** |
| R4-2006063 | ZTE | [CR] Delay requirements for direct SCell activation  Formal version of endorsed draft CR R4-2005328. |
| R4-2007782 | Ericsson | CR 38.133 (8.3.4-5) Corrections to Direct SCell activation  Formal version of endorsed draft CR R4-2005327. |
| R4-2007785 | Ericsson | CR 38.133 (8.3.4-5) Addition of interruption windows for Direct SCell Activation |
| R4-2007836 | Huawei, HiSilicon | CR on interruption requirements for direct SCell activation for 38.133  Formal version of endorsed draft CR R4-2005413. |
| R4-2007837 | Huawei, HiSilicon | CR on interruption requirements for direct SCell activation for 36.133  Formal version of endorsed dtaft CR R4-2004354. |

## Open issues summary

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

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | **Others:** |

### 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2006063 | Formal version of endorsed draft CR R4-2005328. |
| Company A |
| Company B |
|  |
| R4-2007782 | Formal version of endorsed draft CR R4-2005327. |
| Company A |
| Company B |
|  |
| R4-2007785 | Company A |
| Company B |
|  |
| R4-2007836 | Formal version of endorsed draft CR R4-2005413. |
| Company A |
| Company B |
|  |
| R4-2007837 | Formal version of endorsed dtaft CR R4-2004354. |
| Company A |
| Company B |
|  |

## 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:* |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **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*

|  |  |
| --- | --- |
| **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: SCell dormancy

The following sub-topics relating to SCell dormancy are to be covered in the 1st round.

* **Sub-topic 2-1: Switching of single SCell between dormancy and non-dormancy, triggering inside active time**
  + Issue 2-1-1: Switching delay non-dormancy to dormancy, general case w.r.t. parameter change
  + Issue 2-1-2: Switching delay non-dormancy to dormancy, optimized w.r.t. parameter change
  + Issue 2-1-3: Switching delay dormancy to non-dormancy, general case w.r.t. parameter change
  + Issue 2-1-4: Switching delay dormancy to non-dormancy, optimized w.r.t. parameter change
  + Issue 2-1-5: Interruption at switching between dormancy and non-dormancy
  + Issue 2-1-6: Interruption and impact on HARQ ACK feedback
* **Sub-topic 2-2: Switching of single SCell between dormancy and non-dormancy, triggering outside active time**
  + Issue 2-2-1: Switching delay dormancy to non-dormancy
  + Issue 2-2-2: Interruption at switching between dormancy and non-dormancy
* **Sub-topic 2-4: CSI and RRM measurements during dormancy**
  + Issue 2-4-1: Measurement requirements
  + Issue 2-4-2: Interruptions
* **Sub-topic 2-5: Impact analysis on dormant BWP configuration**
  + Issue 2-5-1: RAN4 recommendation

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2006520 | vivo | On Scell domancy RRM requirements  **Proposal 1: Switching delay from dormancy to non-dormancy**   * + For switching during active time, switching delay is the same for     - dormancy indication via DCI 0-1 and DCI 1-1, dormancy indication via DCI 1-1 with indication per SCell group and indication per SCell, respectively   **Switching delay from non-dormancy to dormancy**   * + For switching during active time, switching delay is the same for     - dormancy indication via DCI 0-1 and DCI 1-1, dormancy indication via DCI 1-1 with indication per SCell group and indication per SCell, respectively   **Observation 1:** Regarding the switch delay, the switch duration can be defined even without the knowledge regarding the starting point when the triggering command happens unless it is proved the two items are related.  **Proposal 2:** Same set of switch delay requirements apply when triggered by either DCI 2\_6 or other DCI formats such as DCI 0\_1.  **Proposal 3:** when a BWP switch for dormancy to non-dormancy transition or vice versa involves changes in parameters listed in Table 8.2.1.2.7-2 of [2], the BWP swtich delay should use legacy BWP switch delay requirements, i.e., Type 1 or type 2 BWP switch delay requirement.    **Proposal 4:** To handle interruptions due to measurements during SCell dormancy, the legacy principle of LTE can be reused and total interruption requirements for CSI and RRM measurement during Scell dormancy shall not exceed a particular percentage value. |
| R4-2007157 | Nokia, Nokia Shanghai Bell | SCell Dormancy requirements discussion  **Observation 1:** RRC based dormancy BWP switch is not precluded.  **Proposal 1:** BWP switch delay from section 8.6 can be re-used without changes.  **Proposal 2:** Switch from non-dormancy to dormancy follow the BWP switch delay as in table 8.6.2-1.  **Proposal 3:** Switch from dormancy to non-dormancy follow the BWP switch delay as in table 8.6.2-1.  **Proposal 4:** No CSI reporting is considered in the dormancy/non-dormancy switch delay.  **Proposal 5:** WUS based dormancy BWP switch does not lead to visible switch delay provided the WUS is received early enough before On-duration.  **Observation 2:** If dormancy change only implies change of PDCCH reception status Type-1 BWP switch delay should be feasible for all UEs.  **Observation 3:** If dormancy change only implies change of PDCCH reception status BWP switch delay shorter than current Type-1 delay seems feasible for SCS type 1, 2 or 3.  **Proposal 6:** If PDCCH reception is the differentiating factor between dormant and non-dormant BWP, switch delay is shorter than 1 slot.  **Proposal 7:** A shorter dormancy BWP switch delay, Type-x (x could be 1), can be introduced.  **Proposal 8:** The new short dormancy BWP switch delay Type-x is introduced and is mandatory for all devices.  **Proposal 9:** Define when, during the BWP switch delay, the interrupt X would happen.  **Proposal 10:** Any interrupt due to BWP switch shall happen when UE receives the BWP switch request in slot n.  **Observation 4:** The dormancy SCell is activated.  **Proposal 11:** UE measurement requirements for a dormancy SCell are the same as activated SCell measurement requirements.  **Observation 5:** UE time tracking of a dormancy SCell is assumed as good as for an activated SCell.  **Proposal 12:** UE is allowed a defined amount of interrupts due dormancy SCell measurements.  **Proposal 13:** Use the existing requirements for interruptions on PCell due to measurements when an SCell is deactivated. |
| R4-2007282 | Qualcomm Inc. | Scell BWP dormancy  **Proposal 1:** For BWP transition into/out of dormancy in a single SCell, RAN4 to define the following requirements   * Inside active time (DCI 0-1 and DCI 1-1 based Case-1/2 dormancy indication)   + BWP switch delay     - Reuse Table 8.6.2-1, and add Z slot to all entries       * Z is at least one slot     - FR1 and FR2 can support same or different BWP switch delay types, e.g. Type 2 for FR1 and Type 1 for FR2     - BWP switch delay should be determined based on the smallest SCS among the SCells which are concurrently triggered, as well as the SCS of the PCell   + Interruption time at BWP switch     - If UE is capable of per-FR gap, UE is allowed to cause interruption of up to X slot to other active serving cells in the same frequency range     - If UE is not capable of per-FR gap, UE is allowed to cause interruption of up to X slot to other active serving cells     - X is defined in Table 8.2.2.2.5-1 of TS38.133     - The interruption time window is confined within the BWP switching delay from dormancy to non-dormancy * Outside active time (DCI 2-6 based SCell Group dormancy indication)   + BWP switch delay     - Timeline for inside active time serves as a baseline   + Interruption time at BWP switch     - Same as that in inside active time   **Proposal 2:** For Interruptions due to SSB-based measurements and CSI-RS reception,   * Interruptions are allowed with up to X% probability of missed ACK/NACK with the following conditions   + The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption shall not exceed requirement in Table 8.2.2.2.2-1 (1ms for 15kHz and 0.5ms for >15kHz) if victim Cells are not in the same band as the aggressor SCell. Each interruption shall not exceed requirement in Table 8.2.2.2.2-2 (1ms + SMTC duration for 15kHz and 0.5ms + SMTC duration for >15kHz) if victim Cells is in the same band as the aggressor SCell * Interruptions are allowed with up to Y% probability of missed ACK/NACK with the following conditions   + The UE is only allowed to cause interruptions immediately before and immediately after an CSI-RS OFDM symbol. Each interruption shall not exceed requirement in Table 8.2.2.2.2-1 (1ms for 15kHz and 0.5ms for >15kHz) |
| R4-2007288 | NEC | Discussion on RRM requirements for SCell dormancy  **Proposal 1:** RAN4 to optimise the Rel-15 BWP switch delay when the source and target BWP configuration are same w.r.t *locationAndBandwidth* and *SCS*.  **Proposal 2:** RAN4 to agree Table 1 as delay requirements for X1.  Table 1: Dormant BWP switch delay requirements using DCI based switch   |  |  |  |  | | --- | --- | --- | --- | |  | **NR Slot length (ms)** | **BWP switch delay X1 (slots)** | | | **If conditions for faster BWP switch all satisfied** | **All other cases** | | 0 | 1 | 1 | Rel-15 BWP switch delay | | 1 | 0.5 | 1 | | 2 | 0.25 | 2 | | 3 | 0.125 | 4 |   **Proposal 3:** Delay requirements for dormancy to non-dormancy using DCI based switch are given by: X1+ TCSI\_Reporting.  **Proposal 4:** RAN4 to agree X3 as X1 + TminimumTimeGap  **Proposal 5:** UE requirements (for CSI measurements and reporting, beam management, BFR and BFD in dormancy SCell) can follow activated SCell requirements. |
| R4-2007786 | Ericsson | On SCell dormancy  **Proposal 1:** Switching delay from dormancy to non-dormancy during DRX active time shall follow normal BWP change delay requirements for the respective UE type. Further optimizations can be introduced as future enhancements.  **Proposal 2:** Switching delay from non-dormancy to dormancy during DRX active time shall follow normal BWP change delay requirements for the respective UE type. Further optimizations can be introduced as future enhancements.  **Proposal 3:** Interruptions on other CCs for switching between dormancy and non-dormancy during DRX active time shall follow normal BWP change interruption requirements, with the exception that the parameters whose change may call for an interruption may differ.  **Proposal 4:** RAN4 to inform RAN1 on the anticipated interruptions at transitions during DRX active time, as this may have an impact on when ACK for reception of non-scheduling DCI format 1\_1 (DCI format 1\_1 indicating SCell dormancy) can be transmitted.  **Proposal 5:** The UE behaviour with respect to application of change in SCell dormancy/non-dormancy during inactive time is to be clarified.  **Proposal 6:** The UE shall follow the same measurement requirements in dormancy and non-dormancy. Relaxations may be provided by means of configurations with different periodicity in normal and dormant BWP, respectively.  **Proposal 7:** For measurements during dormancy, well-defined interruption windows shall be introduced such that scheduling of the UE on impacted component carriers can be avoided during interruptions. |
| R4-2007838 | Huawei, HiSilicon | Discussion on SCell dormancy  **Proposal 1:** RAN4 to define common switch delay requirements for   * + Dormancy to non-dormancy switch and non-dormancy to dormancy switch   + Dormancy switch with different triggering methods   **Proposal 2:** A generic dormancy switch delay requirement is defined by re-using Rel-15 BWP switch delay where any parameter can differ between regular BWP and dormant BWP.  **Proposal 3:** Rel-15 Type-1 BWP switch delay apply for dormancy switch if only parameters for PDCCH monitoring and CSI-RS reporting differ between regular BWP and dormant BWP.  **Proposal 4:** Rel-15 BWP switch interruption requirements apply for dormancy switch triggered within DRX active time.  **Proposal 5:** RAN4 to wait for RAN1 conclusions before defining interruption requirements for dormancy switch triggered outside DRX active time.  **Proposal 6:** RAN4 to specify the interruption requirements for CSI and RRM measurement during SCell dormancy by defining the limit on the percentage of interrupted slots as [x]%, where x=[0.5]. |
| R4-2008187 | Futurewei Technologies | Impact analysis on dormant BWP configuration  **Observation 1:** SCell dormancy is conducted in activated state, which shall meet the strict latency requirement of the activated state of the RRC CONNECTED.  **Observation 2:** Analysis should distinguish different scenarios of UE RF architectures.  **Observation 3:** Impact 1 - Stopping UL transmissions causes lack of DL/UL CSI necessary for efficient network/UE MIMO operations, degrading DL/UL throughput performance.  **Observation 4:** Issue 2 - The out-of-dormancy transition latency is significantly prolonged by stopped UL transmissions and hence lost TA. RAN4 need to check if Rel-15 baseline assumptions still hold.  **Observation 5:** Issue 3 - Power saving cannot be achieved for Scenario 2 where the dormant SCell shares RF/PA with a non-dormant SCell. For Scenario 1 where the dormant SCell does not share RF/PA with a non-dormant SCell, power saving is possible at the price of degraded DL/UL CSI, TA, UL beam management, and out-of-dormancy latency.  **Observation 6:** Issue 4 - With stopped SRS in dormancy, UL beam management cannot be maintained in the scenario of non-shared RF/PA and no UL/DL beam correspondence.  **Observation 7:** Issue 5 - Without UL transmission configured for a dormant BWP, closed-loop PC and PHR reporting are infeasible, negatively affecting UL transmission performance after leaving dormancy.  **Proposal 1:** Regarding Q3 in the LS from RAN2, RAN4 recommends maintaining some UL transmissions for a dormant BWP:   * SRS * FFS AP CSI reporting |
| R4-2008199 | Futurewei Technologies | Reply LS to RAN2 on dormant BWP |

Change requests:

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Title** |
| R4-2007839 | Huawei, HiSilicon | CR on delay requirements for SCell dormancy |
| R4-2007840 | Huawei, HiSilicon | CR on interruption requirements for SCell dormancy |

## 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 Switching of single SCell between dormancy and non-dormancy, triggering inside active time

This sub-topic covers switching between dormancy and non-dormancy when the trigger for switching is received during active time. Only switching of single SCell is considered here. Agreements serving as input to the discussion are provided in R4-2005329.

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

**Issue 2-1-1: Switching delay non-dormancy to dormancy, general case w.r.t. parameter change**

* Proposals
  + Option 1 (Nokia): Switch from non-dormancy to dormancy follow the BWP switch delay as in table 8.6.2-1. Optimized switching delay may be considered when only PDCCH monitoring is toggled.
  + Option 2 (Ericsson): Switching delay shall follow normal BWP change delay requirements for the respective UE type. Optimized switching delay can be introduced as future enhancement.
  + Option 3 (Qualcomm): Reuse Table 8.6.2-1, and add Z≥1 slot to all entries. Different BWP switch delay type may apply for FR1 (e.g. Type 2) and FR2 (e.g. Type 1). BWP switch delay should be determined based on the smallest SCS among the SCells which are concurrently triggered, as well as the SCS of the PCell.
  + Option 4 (NEC): Delay requirements for dormancy to non-dormancy using DCI based switch are given by Rel-15 BWP switch delay. Optimized switching delay may be considered when *locationAndBandwidth* and *SCS* are same for non-dormant and dormant BWPs.
  + Option 5 (Huawei): A generic dormancy switch delay requirement is defined by re-using Rel-15 BWP switch delay where any parameter can differ between regular BWP and dormant BWP. Optimized switching delay may apply if only PDCCH monitoring and CSI-RS reporting differ between non-dormant and dormant BWPs.
  + Option 6 (Vivo): The BWP switch delay should use legacy BWP switch delay requirements, i.e., Type 1 or Type 2 BWP switch delay requirement.
* Recommended WF
  + TBA

**Issue 2-1-2: Switching delay non-dormancy to dormancy, optimized w.r.t. parameter change**

* Proposals
  + Option 1a (Nokia): If PDCCH reception is the differentiating factor between dormant and non-dormant BWPs, switch delay is shorter than 1 slot.
  + Option 1b (Nokia): If only some measurement configurations change, a mandatory shorter dormancy BWP switch delay Type-x (x could be 1), can be introduced.

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms)** | **BWP switch delay X1 (slots)** |
| **If conditions for faster BWP switch all satisfied** |
| 0 | 1 | 1 |
| 1 | 0.5 | 1 |
| 2 | 0.25 | 2 |
| 3 | 0.125 | 4 |

* + Option 2 (NEC): When *locationAndBandwidth* and *SCS* are the same between non-dormant and dormant BWPs, switch delay X1 as below applies:
  + Option 3 (Huawei): Rel-15 Type-1 BWP switch delay apply for dormancy switch if only parameters for PDCCH monitoring and CSI-RS reporting differ between regular BWP and dormant BWP.
  + Option 4 (Ericsson, Qualcomm): Only introduce generic requirements. Optimizations can be introduced as future enhancements.
* Recommended WF
  + TBA

**Issue 2-1-3: Switching delay dormancy to non-dormancy, general case w.r.t. parameter change**

* Proposals
  + Option 1 (Nokia): Switch from non-dormancy to dormancy follow the BWP switch delay as in table 8.6.2-1. No CSI reporting shall be considered in the switching delay. Optimized switching delay may be considered when only PDCCH monitoring is toggled.
  + Option 2 (Ericsson): Switching delay shall follow normal BWP change delay requirements for the respective UE type. No CSI reporting shall be considered in the switching delay. Optimized switching delay can be introduced as future enhancement.
  + Option 3 (Qualcomm): Reuse Table 8.6.2-1, and add Z≥1 slot to all entries. Different BWP switch delay type may apply for FR1 (e.g. Type 2) and FR2 (e.g. Type 1). BWP switch delay should be determined based on the smallest SCS among the SCells which are concurrently triggered, as well as the SCS of the PCell.
  + Option 4 (NEC): Delay requirements for dormancy to non-dormancy using DCI based switch include CSI reporting and are given by: X1+ TCSI\_Reporting, where X1 is Rel-15 BWP switching delay. Optimized switching delay may be considered when *locationAndBandwidth* and *SCS* are same for non-dormant and dormant BWPs.
  + Option 5 (Huawei): A generic dormancy switch delay requirement is defined by re-using Rel-15 BWP switch delay where any parameter can differ between regular BWP and dormant BWP. Optimized switching delay may apply if only PDCCH monitoring and CSI-RS reporting differ between non-dormant and dormant BWPs.
  + Option 6 (Vivo): The BWP switch delay should use legacy BWP switch delay requirements, i.e., Type 1 or Type 2 BWP switch delay requirement.
* Recommended WF
  + TBA

**Issue 2-1-4: Switching delay dormancy to non-dormancy, optimized w.r.t. parameter change**

* Proposals
  + Option 1a (Nokia): If PDCCH reception is the differentiating factor between dormant and non-dormant BWPs, switch delay is shorter than 1 slot.
  + Option 1b (Nokia): If only some measurement configurations change, a mandatory shorter dormancy BWP switch delay Type-x (x could be 1), can be introduced.

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms)** | **BWP switch delay X1 (slots)** |
| **If conditions for faster BWP switch all satisfied** |
| 0 | 1 | 1 |
| 1 | 0.5 | 1 |
| 2 | 0.25 | 2 |
| 3 | 0.125 | 4 |

* + Option 2 (NEC): When *locationAndBandwidth* and *SCS* are the same between dormant and non-dormant BWPs, switch delay requirements are given by X1+ TCSI\_Reporting, with X1 as below:
  + Option 3 (Huawei): Rel-15 Type-1 BWP switch delay apply for dormancy switch if only parameters for PDCCH monitoring and CSI-RS reporting differ between regular BWP and dormant BWP.
  + Option 4 (Ericsson, Qualcomm): Only introduce generic requirements. Optimizations can be introduced as future enhancements.
* Recommended WF
  + TBA

**Issue 2-1-5: Interruption at switching between dormancy and non-dormancy**

* Proposals
  + Option 1 (Ericsson): Interruptions on other CCs shall follow normal BWP change interruption requirements, with the exception that the parameters whose change may call for an interruption (*locationAndBandwidth* and *SCS*) may differ.
  + Option 2 (Huawei): Rel-15 BWP switch interruption requirements apply for dormancy switch triggered within DRX active time.
  + Option 3 (Qualcomm): Interruption length as in Table 8.2.2.2.5-1 applies. The interruption time window is confined within the BWP switching delay from dormancy to non-dormancy. If UE is capable of per-FR gap, UE is allowed to cause interruption of up to X slot to other active serving cells in the same frequency range. If UE is not capable of per-FR gap, UE is allowed to cause interruption of up to X slot to other active serving cells.
  + Option 4 (Nokia): Define when, during the BWP switch delay, the interrupt X would happen. Any interrupt due to BWP switch shall happen when UE receives the BWP switch request in slot n.
* Recommended WF
  + TBA

**Issue 2-1-6: Interruption and impact on HARQ ACK feedback**

* Proposals
  + Option 1 (Ericsson): RAN4 to inform RAN1 on the anticipated interruptions at transitions during DRX active time, as this may have an impact on when ACK for reception of non-scheduling DCI format 1\_1 (DCI format 1\_1 indicating SCell dormancy) can be transmitted.
* Recommended WF
  + TBA

### Sub-topic 2-2 Switching of single SCell between dormancy and non-dormancy, triggering outside active time

This sub-topic covers switching between dormancy and non-dormancy when the trigger for switching is received outside active time, via wake-up signalling. Only switching of single SCell is considered here. Agreements serving as input to the discussion are provided in R4-2005329.

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

**Issue 2-2-1: Switching delay dormancy to non-dormancy**

* Proposals
  + Option 1 (Vivo): Same set of switch delay requirements shall apply for triggering outside active time (DCI 2\_6) as for triggering inside active time (e.g. DCI 0\_1).
  + Option 2 (Qualcomm): Timeline for triggering inside active time serves as a baseline for triggering outside active time.
  + Option 3 (Nokia): BWP switch delay for scheduled and non-scheduled DCI dormancy switch delay would be covered by the DCI BWP switch delay requirement. WUS based dormancy BWP switch does not lead to visible switch delay provided the WUS is received early enough before On-duration.
  + Option 4 (NEC): RAN4 to agree switching time for switching outside active time, X3, as X1 + TminimumTimeGap, where X1 is BWP switch delay for triggering inside active time.
* Recommended WF
  + TBA

**Issue 2-2-2: Interruption at switching between dormancy and non-dormancy**

* Proposals
  + Option 1 (Qualcomm): Same interruption requirement apply for outside as for inside active time.
  + Option 2 (Huawei): RAN4 to wait for RAN1 conclusions before defining interruption requirements for dormancy switch triggered outside DRX active time.
* Recommended WF
  + TBA

### Sub-topic 2-3 Switching of multiple SCells between dormancy and non-dormancy

This sub-topic covers switching of multiple SCells between dormancy and non-dormancy. According to an agreement from RAN4#94-e, RAN4 shall first finalize requirements for switching of single SCell before finalizing requirements on switching of multiple SCells. Agreements serving as input to the discussion are provided in R4-2005329.

### Sub-topic 2-4 CSI and RRM measurements during dormancy

This sub-topic covers measurement requirements and interruption requirements for CSI and RRM measurements during SCell dormancy. Agreements serving as input to the discussion are provided in R4-2005329.

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

**Issue 2-4-1: Measurement requirements**

* Proposals
  + Option 1 (Nokia): UE measurement requirements for a dormancy SCell are the same as activated SCell measurement requirements.
  + Option 2 (NEC): UE requirements (for CSI measurements and reporting, beam management, BFR and BFD in dormancy SCell) can follow activated SCell requirements.
  + Option 3 (Ericsson): The UE shall follow the same measurement requirements in dormancy and non-dormancy. Relaxations may be provided by means of configurations with different periodicity in normal and dormant BWP, respectively.
* Recommended WF
  + TBA

**Issue 2-4-2: Interruptions**

* Proposals
  + Option 1 (Vivo): To handle interruptions due to measurements during SCell dormancy, the legacy principle of LTE can be reused and total interruption requirements for CSI and RRM measurement during Scell dormancy shall not exceed a particular percentage value.
  + Option 2 (Nokia): UE is allowed a defined amount of interrupts due dormancy SCell measurements. Use the existing requirements for interruptions on PCell due to measurements when an SCell is deactivated.
  + Option 3 (Huawei): RAN4 to specify the interruption requirements for CSI and RRM measurement during SCell dormancy by defining the limit on the percentage of interrupted slots as [x]%, where x=[0.5].
  + Option 4 (Qualcomm): For Interruptions due to SSB-based measurements and CSI-RS reception,
    - Interruptions are allowed with up to X% probability of missed ACK/NACK with the following conditions
      * The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption shall not exceed requirement in Table 8.2.2.2.2-1 (1ms for 15kHz and 0.5ms for >15kHz) if victim Cells are not in the same band as the aggressor SCell. Each interruption shall not exceed requirement in Table 8.2.2.2.2-2 (1ms + SMTC duration for 15kHz and 0.5ms + SMTC duration for >15kHz) if victim Cells is in the same band as the aggressor SCell
    - Interruptions are allowed with up to Y% probability of missed ACK/NACK with the following conditions
      * The UE is only allowed to cause interruptions immediately before and immediately after an CSI-RS OFDM symbol. Each interruption shall not exceed requirement in Table 8.2.2.2.2-1 (1ms for 15kHz and 0.5ms for >15kHz)
  + Option 5 (Ericsson): For measurements during dormancy, well-defined interruption windows shall be introduced such that scheduling of the UE on impacted component carriers can be avoided during interruptions.
* Recommended WF
  + TBA

### Sub-topic 2-5 Impact analysis on dormant BWP configuration

This sub-topic covers potential actions from RAN4 in response to LS R4-2003371 which was received at RAN4#94-e-Bis. Agreements serving as input to the discussion are provided in R4-2005329.

**Issue 2-5-1: RAN4 recommendation**

* Proposals
  + Option 1 (Futurewei): RAN4 to recommend RAN1/RAN2 to maintain some UL transmissions for a dormant BWP:
    - SRS
    - FFS AP CSI reporting
* Recommended WF
  + A further discussion is needed. The proponent has already prepared a draft LS (R4-2008199) that can be used if the Option 1 is agreeable to the group.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | **Sub-topic 2-1 Switching of single SCell between dormancy and non-dormancy, triggering inside active time:**  Issue 2-1-1 Switching delay non-dormancy to dormancy, general case w.r.t. parameter change:  Issue 2-1-2 Switching delay non-dormancy to dormancy, optimized w.r.t. parameter change:  Issue 2-1-3 Switching delay dormancy to non-dormancy, general case w.r.t. parameter change:  Issue 2-1-4 Switching delay dormancy to non-dormancy, optimized w.r.t. parameter change:  Issue 2-1-5 Interruption at switching between dormancy and non-dormancy:  Issue 2-1-6 Interruption and impact on HARQ ACK feedback:  **Sub-topic 2-2 Switching of single SCell between dormancy and non-dormancy, triggering outside active time:**  Issue 2-2-1 Switching delay dormancy to non-dormancy:  Issue 2-2-2 Interruption at switching between dormancy and non-dormancy:  **Sub-topic 2-3 Switching of multiple SCells between dormancy and non-dormancy:**  **Sub-topic 2-4 CSI and RRM measurements during dormancy:**  Issue 2-4-1 Measurement requirements:  Issue 2-4-2 Interruptions:  **Sub-topic 2-5 Impact analysis on dormant BWP configuration:**  Issue 2-5-1 RAN4 recommendation:  **Other comments:** |

### 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2007839 | Company A |
| Company B |
|  |
| R4-2007840 | Company A |
| Company B |
|  |

## 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*

|  |  |  |
| --- | --- | --- |
|  | **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”* |