**3GPP TSG-RAN WG1 #102-e R1-200xxxx**

**e-Meeting, Aug 17- Aug 28, 2020**

**Source: Moderator (Ericsson)**

**Title: Email discussion [102-e-NR-MRDC-CA-Dormancy-01]**

**Agenda item:** **7.2.10**

**Document for:** **Discussion and Decision**

# 1 Introduction

This document provides summary of email discussion [102-e-NR-MRDC-CA-Dormancy-01]on following issues discussed during preparation phase of RAN1#102-eMeeting

Below are the topics identified in [R1-2006995](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_102%5CDocs%5CR1-2006995.zip) [16]

[102-e-NR-MRDC-CA-Dormancy-01] Email discussion/approval of the following from [R1-2006995](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_102%5CDocs%5CR1-2006995.zip) until 8/20; if necessary, endorse remaining TPs by 8/26 – Ravi (Ericsson)

* Topic 1-1: Processing time and HARQ timing for Case 2 dormancy indication – [3],[9],[11],[13],[14]
* Topic 1-2: Whether to have restriction that DCI format 1\_1/0\_1 with dormancy indication is only in first 3 symbols of a slot – [2], [3], [4], [8], [11], [13], [14]
* Topic 1-3: Spec clarification TPs in [9], [13] (TP1 and TP3 in [9]; TP2 and TP3 in [13])

# 2. Discussion

### 2.1 Topic 1-1

Please provide your input to below question Q1 on this topic, preferably by 08/18 (evening PST).

#### Question 1

Q1. Regarding processing time and HARQ timing for Case 2 dormancy indication, what is your preference among Options 1a,1b, 2a,2b,2c below?

* Option 1: Reuse SPS PDCCH release values (i.e., keep current text in section 10.3 of 38.213)

10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells

< text not relevant for the discussion omitted>

A UE is expected to provide HARQ-ACK information in response to a detection of a DCI format 1\_1 indicating SCell dormancy after  symbols from the last symbol of a PDCCH providing the DCI format 1\_1. If *processingType2Enabled* of *PDSCH-ServingCellConfig* is set to *enable* for the serving cell with the PDCCH providing the DCI format 1\_1, for ,  for , and  for ; otherwise, for , for , for , and for , where  is the smallest SCS configuration between the SCS configuration of the PDCCH providing the DCI format 1\_1 and the SCS configuration of a PUCCH with the HARQ-ACK information in response to the detection of the DCI format 1\_1.

* Option 2: Relax the processing time by 4 symbols compared to SPS PDCCH release values (Agree to TP below from [R1-2006663](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006663.zip))

10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells

< unchanged text omitted>

A UE is expected to provide HARQ-ACK information in response to a detection of a DCI format 1\_1 indicating SCell dormancy after  symbols from the last symbol of a PDCCH providing the DCI format 1\_1. If *processingType2Enabled* of *PDSCH-ServingCellConfig* is set to *enable* for the serving cell with the PDCCH providing the DCI format 1\_1, for ,  for , and  for ; otherwise, for , for , for , and for , where  is the smallest SCS configuration between the SCS configuration of the PDCCH providing the DCI format 1\_1 and the SCS configuration of a PUCCH with the HARQ-ACK information in response to the detection of the DCI format 1\_1.

* Option 3 : Below proposal from section 3.1 of [R1-2005626](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2005626.zip)
	+ If the UE detects a non-scheduling DCI format 1\_1 dormancy indication through a PDCCH reception ending in slot , the UE provides corresponding HARQ-ACK information in a PUCCH transmission within slot , where  is a number of slots and is indicated by the PDSCH-to-HARQ\_feedback timing indicator field in the DCI format, if present, or provided by dl-DataToUL-ACK, or by dl-DataToUL-ACKForDCIFormat1\_2 for DCI format 1\_2.  corresponds to the last slot of the PUCCH transmission that overlaps with the non-scheduling dormancy indication DCI format 1\_1. UE is not expected to have the HARQ-ACK feedback for non-scheduling dormancy indication DCI format 1\_1 before the allowed interruption time duration.
	+ Discuss further TP (if any) to clarify this
* Option 4: Below proposal from section 2.1 of [R1-2006430](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006430.zip)
	+ For the cases when interruptions on Pcell due to BWP change on Scell(s) are not allowed, if any, minimum HARQ-ACK processing requirement follows HARQ-ACK timeline (i.e. Nth symbol after last symbol of PDCCH).
	+ For the case when interruptions on Pcell due to BWP change on Scell(s) are allowed, minimum HARQ-ACK processing requirement is the later among HARQ-ACK timeline (i.e. Nth symbol after last symbol of PDCCH) and first symbol of a slot where new BWP is activated.
	+ Discuss further TP (if any) to clarify this
* Option 5: Below proposal from [R1-2006786](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006786.zip)
	+ The UE is not expected to be scheduled with that requires the UE to transmit the HARQ-ACK for Case 2 PDCCH within the switch delay between dormancy and non-dormancy on SCells triggered by the Case 2 PDCCH. Adopt the proposed text proposal.

|  |
| --- |
| ---------------------------------------- Start of text proposal to Section 10.3 in TS 38.213 --------------------------------------->>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> unchanged text omitted <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> unchanged text omitted <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<A UE is not expected to be scheduled with that requires the UE to provide HARQ-ACK information in response to a detection of a DCI format 1\_1 indicating SCell dormancy within the transition time between dormancy and non-dormancy behaviors on SCells. .>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> unchanged text omitted <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<---------------------------------------------------------- End of text proposal ---------------------------------------------------------- |

Companies are requested to indicate their view about the above question in the Table below.

|  |  |  |
| --- | --- | --- |
| **Company Name** | **Preferred Option(s)****If multiple, list most preferred first** | **Comments (Topic 1-1, Q1)** |
| Samsung | Option 1 |  |
| Intel | Option 1 or 2 |  |
| ZTE | Option 1, Option 2 | As discussed in the UE feature session, it seems Option 2 can be the compromised solution. |
| Nokia, NSB | Option 1 or 4 |  |
| Ericsson | Option 1, 2 | Option 1 is preferred but also OK with Option 2  |
| CATT  | Option 1 |  |
| OPPO | Option 1 | We did not see the interruption of PCell, by Scell BWP switching. If that is the case, the Dormancy indication case1 should also treat the problem. |
| LG | Option 1 | It is not desirable to introduce diverging timing relationships for each different case. |
| Huawei | Option 2 | Preference is option1 while it seems option 2 is more likely to be the compromise.  |
| vivo | Option1 | For option 5, our understanding of the intention was to make it an error case so that the UE cannot be indicated to transmit HARQ-ACK during the BWP switching period. We think this should be avoided by proper gNB scheduling since it is clear that UE is not required to transmit anything during the switching period. There is no difference either we specify the error case or not.  |
| Qualcomm | Option 5 | Since there is no RAN4 conclusion yet for the case that the UE is not required to have interruption time, the worst case with non-zero interruption time should be assumed.  |
| MTK | Option 2 or Option 6 | Option 2 seems like a compromise to us.However, we just found that **if Case 2 (non-scheduling DCI 1\_1) dormancy indication uses SPS timeline**, then the following UE behavior is applied:* For **Case 2** indication in **slot n**, UE provides corresponding **HARQ-ACK in slot (n+k1)**, where **k1 is**
	+ **PDSCH-to-HARQ\_feedback** field **in DCI** which indicates the applied **dl-DataToUL-ACK**

However, **if RAN4 defines interruption** for **Case 2 dormancy** indication, then the time duration of **k1 (indicated by dl-DataToUL-ACK)** slots shown above should be **larger than** SCells dormant BWP switch delay: and **the largest value** of **dl-DataToUL-ACK (15 slots)** is **smaller than the single-cell BWP switch delay in FR2 120kHz for Type 2 UE (18 slots), while RAN4 are defining even longer switch delay for multi-CC BWP switch**.Since the ASN.1 spec is fixed and can not be changed now, we are wondering whether we should revisit -- Option 6: use virtual PDSCH timeline (**where k0+k1 is used to determine HARQ-ACK timing**) for Case 2 dormancy indication HARQ-ACK.Sorry to spot the issue late, we just want to find a most suitable solution and are open to any possible methods. |

### 2.2 Topic 1-2

Please provide your input to below question Q1 on this topic, preferably by 08/18 (evening PST).

#### Question 1

Q1. Regarding restricting DCI format 1\_1/0\_1 with dormancy indication to be only in first 3 symbols of a slot, what is your preference between Option 1,2,3, below?

* Option 1
	+ DCI format 1\_1/0\_1 on primary cell with dormancy indication that indicates a BWP change between dormant and non-dormant BWPs of SCell(s) is restricted to be only in first 3 symbols of a slot
		- Discuss further TP (if any) to clarify this
* Option 2
	+ For DCI format 1\_1/0\_1 on primary cell with dormancy indication that indicates a BWP change between dormant and non-dormant BWPs of SCell(s), there is no additional restriction that it should be only in first 3 symbols of a slot
		- Discuss further TP (if any) to clarify this
* Option 3
	+ Restriction is introduced via UE capability ignalling.
		- UE indicating the capability expects to receive DCI format 1\_1/0\_1 on primary cell with dormancy indication that indicates a BWP change between dormant and non-dormant BWPs of Scell(s) only in first 3 symbols of a slot
		- UE not indicating the capability can receive the DCI format 1\_1/0\_1 on primary cell with dormancy indication that indicates a BWP change between dormant and non-dormant BWPs of Scell(s) at any location in the slot where PDCCH reception is allowed.
		- Discuss further TP (if any) to clarify this

Companies are requested to indicate their view about the above question in the Table below.

|  |  |  |
| --- | --- | --- |
| **Company Name** | **Preferred Option****If multiple, list most preferred first** | **Comments (Topic 1-2, Q1)** |
| Samsung | Option 1 |  |
| Intel | Option 2 |  |
| ZTE | Option 1, Option 2 | Both Option 1 and Option 2 are acceptable to us. Option 1 is consistent with Rel-15 implementation design, and Option 2 offers some more flexibility. |
| Nokia, NSB | Option 3 | Existing restriction should be removed from RAN1 specification also for regular BWP switching. Separate capability could be defined for regular BWP switching and dormancy BWP switching.  |
| Ericsson | Option 2, 3 | Option 2 is preferred but also OK with Option 3 |
| CATT | Option 2 | RAN4 had agreed 38.133CR0844 in RAN4#95-e in May/June on the delay requirement of SCell dormancy in R4-2008608 as follows,If the BWP switch is triggered within DRX active time, and one of the two BWPs in a BWP switching is a dormant BWP [TS 38.321, 7], UE shall be able to complete active BWP switching within- TBWPswitchDelay, provided that the BWP switching request is received in any of the first 3 OFDM symbols of a slot corresponding to the serving cell where BWP switching occurs, or- TBWPswitchDelay + 1, provided that the BWP switching request is received after the first 3 OFDM symbols of a slot corresponding to the serving cell where BWP switching occurs  |
| OPPO | Option 2 with change | I think Option 2 may not formed as intended. The restriction should be only for Scell dormancy. However, legacy DCI based BWP switching will results in non-dormant BWP to dormant BWP.The option 2 should be:* + For DCI format 1\_1/0\_1 on primary cell ~~with dormancy indication~~ that indicates a BWP change between dormant and non-dormant BWPs of SCell(s) by dormancy indication, there is no additional restriction that it should be only in first 3 symbols of a slot

RAN4 already agree to support one more slot delay for dormancy indication. We need match with the specs. |
| LG | Option 1 as first preference, Option 2 as second | Option 1 seems sufficient for utilization of dormancy behavior. But option 2 may be ok if there is sufficient gain. |
| Huawei | Option 2 as first | Option 1 is also OK. |
| vivo | Option 1 | Reuse the existing BWP switching framework. The RAN1 spec is clear already, no further TP is needed. RAN4 spec should be revised accordingly to keep consistent with RAN1.  |
| Qualcomm | Option 1  |  |
| MTK | Option 1, Option 3 | Option 1 is preferred, but also OK with Option 3 |

### 2.5 Topic 1-3

Please provide your input to below questions Q1, Q2, Q3 and Q4 on this topic, preferably by 08/18 (evening PST).

#### Question 1

Q1. Is it OK to agree to the TP1 for 38.213 Section 9.1.3.1 in section 2.1.1 of [R1-2006123](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006123.zip)?

Companies are requested to indicate their view about the above question in the Table below.

|  |  |  |
| --- | --- | --- |
| **Company Name** | **Yes/No** | **Comments (Topic 1-3, Q1)** |
| Samsung | Yes |  |
| Intel | No | We prefer there is only one DCI in a PDCCH MO if the DCI indicating BWP switching.  |
| ZTE | No | The first change and the third change seem to be ok. But for the second change, it seems that MRDC cross-carrier scheduling is discussing the same issue, i.e., *Issue #2: Take the issue #2 (Proposal 1 of ‘6297 and proposal 3 of ‘6123 up in the RAN1#102e.*As the previous related agreements was made in cross-carrier scheduling discussion, our preference is to move this issue to cross-carrier scheduling thread. So that we can have a common design for both SCell dormancy and SPS release if necessary. |
| Nokia, NSB |  | This is discussed in Karri’s thread, so no need to discuss in two places. |
| Ericsson |  | The change “…or SPS PDSCH release, or Scell dormancy indication without scheduling a PDSCH reception associated with…” is OK.The other change about DAI counting order is being discussed in [102-e-NR-MRDC-CA-Cross-CC-Unaligned-CA] thread (issue #2) and can be finalized there as it applies to cases other than SCell dormancy indication as well.  |
| CATT | Yes | We are OK with the principle of exclude DCI for case 2 SCell dormancy indication with clarified text regardless which email thread is discussed.  |
| OPPO | Partially ok. | The C/T-DAI should take into account. The others need further consideration with other CA issue. |
| Huawei |  | Maybe to look at it in another thread. |
| vivo | No | Regarding the TP1 of [9] in Topic 1-3, i.e. the DAI issue for case-2 dormancy DCI for cross-carrier scheduling with different numerologies, our understanding is that due to the following spec, in the concerned scenario a case-2 dormancy DCI shall include CIF=0 thus the DCI belongs to the PCell for DAI accumulation and there is only one DCI expected per MO, so this issue does not exist.Section 10.3 in TS 38.213-g20:If a UE is provided search space sets to monitor PDCCH for detection of DCI format 1\_1, and if- the CRC of DCI format 1\_1 is scrambled by a C-RNTI or a MCS-C-RNTI, and if - a one-shot HARQ-ACK request field is not present or has a '0' value, and if- the UE detects a DCI format 1\_1 on the primary cell that does not include a carrier indicator field, or detects a DCI format 1\_1 on the primary cell that includes a carrier indicator field with value equal to 0, and if…We are also fine to move the discussion to [102-e-NR-MRDC-CA-Cross-CC-Unaligned-CA] |
| Qualcomm |  | Intel’s proposal is preferred to minimize further spec change.In UE feature discussion, it was clarified that only multiple “unicast” scheduling DCIs are allowed in one MO if the UE supports the capability, the 2nd change is not needed.  |
| MTK |  | This seems to be discussed in [102-e-NR-MRDC-CA-Cross-CC-Unaligned-CA]. |

#### Question 2

Q2. Is it OK to agree to the TP3 for 38.214 Section 6.2.1.3 in section 2.3.1 of [R1-2006123](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006123.zip)?

Companies are requested to indicate their view about the above question in the Table below.

|  |  |  |
| --- | --- | --- |
| **Company Name** | **Yes/No** | **Comments (Topic 1-3, Q2)** |
| Samsung | Yes |  |
| Intel | Yes |  |
| ZTE | No | We are a little concerned about this TP. With the current spec, the order of the serving cells is configured by RRC. With this TP, the order of the serving cells (where the current active DL BWP is not the dormant DL BWP) is dynamically updated. It increases the implementation complexity for both the UE and network to track the BWP status of each SCell. |
| Nokia, NSB | No | We also prefer keep order based on RRC. Is anything broken if TP is not agreed? |
| Ericsson | No | Similar view as Nokia. |
| CATT | No | Current spec is clear enough.  |
| OPPO | No | First one may be ok. However, seems current specs. already ask no SRS for dormancy. And, we should not change the order of BWPs. |
| Huawei | No | Similar view as ZTE. Also, there seems to be on-going discussion between other WGs (RAN2 and RAN4) on the handling of SRS in dormancy. The proposed changes probably needs to be looked at later. |
| vivo | No | Same reason as expressed above |
| Qualcomm | No | It seems straightforward that UE will only take the non-dormant serving cell for SPS transmission, similarly, here the spec does not need to mention that the serving cell is not a de-activated cell. |
| MTK | No | Similar view as Nokia. |

#### Question 3

Q1. Is it OK to agree to the TP2 for 38.213 sub-clause 12 in section 2.3 of [R1-2006663](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006663.zip)?

Companies are requested to indicate their view about the above question in the Table below including views on any impact from Topic 1-2

|  |  |  |
| --- | --- | --- |
| **Company Name** | **Yes/No** | **Comments (Topic 1-3, Q3)** |
| Samsung | Yes |  |
| Intel | Yes |  |
| Nokia, NSB | No | We are not willing to agree on this TP until topic 1-2 is resolved |
| Ericsson | Yes | Note: The current spec text is incorrect as it restricts all DCI formats in first 3 symbols (i.e., DCI format 2\_6, DCI format 0\_1,1\_1 with dormancy indication) which is not consistent with previous agreements. |
| CATT | Yes | This is critical.  |
| ZTE |  | It seems this issue should be discussed after finalization of Topic 1-2 first. |
| OPPO |  | Agree with ZTE |
| Huawei | No | Same as Nokia. |
| vivo | No | This should be discussed together with topic 1-2 |
| Qualcomm | No | This can be deferred after Topic 1-2. |
| MTK |  | This should be discussed after topic 1-2 is concluded |

#### Question 4

Q1. Is it OK to agree to the TP3 for 38.213 sub-clause 12 in section 2.3 of [R1-2006663](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006663.zip)?

Companies are requested to indicate their view about the above question in the Table below including views on any impact from Topic 1-2

|  |  |  |
| --- | --- | --- |
| **Company Name** | **Yes/No** | **Comments (Topic 1-3, Q4)** |
| Samsung | Yes |  |
| Intel | Yes |  |
| ZTE |  | It seems this issue should be discussed after finalization of Topic 1-2 first because the conclusion of Topic 1-2 may impact the timeline of this TP here. |
| Nokia, NSB | No | We are not willing to agree on this TP until topic 1-2 is resolved |
| Ericsson | Yes |  |
| CATT | Yes |  |
| OPPO |  | Agree with ZTE |
| Huawei | No | wait |
| vivo | No | This should be discussed together with topic 1-2 |
| Qualcomm | No | The proposal did not take dormancy BWP switch on multiple SCells triggered by the same DCI. In this case, there can be interruption among cells. The exact UE behavior should be studied in RAN4. Even the single dormant BWP switching delay time is not finalized yet. Besides, this does not cover the case that PCell has a data scheduled by Case 1 dormancy indication DCI. |
| MTK |  | This should be discussed after topic 1-2 is concluded |

# 3 Conclusions

TBU

# 4 References

1. [R1-2005359](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2005359.zip) Remaining issues on Scell dormancy like behavior vivo
2. [R1-2005421](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2005421.zip) Remaining Issues of SCell Dormancy and Cross-carrier Scheduling ZTE
3. [R1-2005626](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2005626.zip) Remaining issues on Rel-16 carrier aggregation MediaTek Inc.
4. [R1-2005665](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2005665.zip) PDCCH location for SCell dormancy CATT
5. [R1-2005788](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2005788.zip) Remaining issues on CA Huawei, HiSilicon
6. [R1-2005856](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2005856.zip) Remaining issues on MR-DC & eCA Intel Corporation
7. [R1-2005958](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2005958.zip) TP on SCell dormancy for alignment NEC
8. [R1-2006035](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006035.zip) Remaining issues for Scell dormancy OPPO
9. [R1-2006123](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006123.zip) On maintenance of Scell dormancy and CCS with different SCSs Samsung
10. [R1-2006285](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006285.zip) Remaining issues on Multi-RAT Dual-Connectivity and Carrier Aggregation enhancements Spreadtrum Communications
11. [R1-2006430](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006430.zip) Remaining issues on Efficient CA design Nokia, Nokia Shanghai Bell
12. [R1-2006552](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006552.zip) Corrections for SCell Dormancy Sharp
13. [R1-2006663](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006663.zip) Maintenance for reduced latency Scell management for NR CA Ericsson
14. [R1-2006786](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_102-e/Docs/R1-2006786.zip) Remaining issues on SCell dormancy Qualcomm Incorporated
15. [R1-2001419](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_100_e/Docs/R1-2001419.zip) Text proposals from email discussion [100e-NR-LTE\_NR\_DC\_CA\_enh-ScellDormancy-01] Ericsson
16. [R1-2006995](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_102%5CDocs%5CR1-2006995.zip) Summary of efficient and low latency serving cell configuration/activation/setup, RAN1#102-e, August 2020.