**3GPP TSG-RAN WG1 #100bis-e R1-20xxxxx**

**e-Meeting, April 20th – 30th, 2020**

**Source: Ericsson**

**Title: Summary of email discussion [100b-e-NR- LTE\_NR\_DC\_CA-ScellDormancy-02]**

**Agenda item:** **7.2.10.3**

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

# 1 Introduction

This document provides summary of email discussion [100b-e-NR- LTE\_NR\_DC\_CA-ScellDormancy-02] on following issues discussed during preparation phase of RAN1#100bis-eMeeting

Below are the topics (1-1/2/3/4/5) identified in [R1-2002739](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Inbox/R1-2002739.zip) [1]

* 1-1: Processing time and HARQ timing for Case 2 dormancy indication
* 1-2: UE behavior for SCells configured with dormant BWP when DCI 2-6 is not detected
* 1-3: Handling of CIF≠0 for Case 2 dormancy indication
* 1-4: Handling of “BWP indicator field” in DCI of SCell with dormant BWP
* 1-5: DCI format 1\_1/0\_1/2\_6 with dormancy indication only in first 3 symbols of a slot

# 2. Discussion

### 2.1 Topic 1-1

Please provide your input to below questions Q1-Q3 on this topic, preferably by 04/21 (evening PST).

#### Question 1

Q1. What should be the minimum processing time requirement for time between the end of Case 2 PDCCH with SCell dormancy indication and corresponding HARQ-ACK (please provide ‘full proposal’ as much as possible)?

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

|  |  |
| --- | --- |
| **Company Name** | **Comments (1-1, Q1)** |
| vivo | We prefer to apply the same processing time requirement as SPS release PDCCH. The desirable HARQ-ACK feedback time of Case 2 PDCCH can be decided by gNB implementation considering the BWP switching gap and the UE processing time, by indicating a proper K1 value. |
| Panasonic | By reading some of the contributions touching this topic, it is understood the motivation to change/clarity the minimum processing time requirement is that the UE does not need to process PDSCH but only to deal with dormancy indication. Hence the minimum processing time requirement should not be longer than or even possibly smaller than current timeline as per the PDSCH processing capability.  Until decoding the DCI, UE does not know in advance whether the DCI format 1\_1 indicates (1) normal PDSCH scheduling, or (2) normal PDSCH scheduling + 5 Scell dormancy indication, or (3) no PDSCH scheduling but up to 15 SCell dormancy indication. So in our opinion, if UE determines the processing timeline before detecting the DCI, no special handling is needed and just reusing legacy cross-BWP scheduling requirement covering all the three case will work fine. |

#### Question 2

Q2. Is there a need to revert the RAN1 #100-e agreement on using SPS release PDCCH framework to define HARQ-ACK feedback for Case 2 SCell dormancy indication PDCCH, as proposed in [2]?

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

|  |  |  |
| --- | --- | --- |
| **Company Name** | **Yes/No** | **Comments (1-1, Q2)** |
| vivo | No | We think the current framework can be kept and as commented above, the desirable HARQ-ACK feedback time of Case 2 PDCCH can be decided by gNB implementation considering the BWP switching gap and the UE processing time, by indicating a proper K1 value. |
| ZTE | No | We failed to see the motivation to revert the RAN1#100e agreement. |
| Panasonic | No | By gNB implementation the HARQ-ACK timing can cover the BWP switching gap. There is no strong need to revert the agreement. |

#### Question 3

Q3. Is there a need to send LS to RAN4 about this issue, as proposed in [3]?

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

|  |  |  |
| --- | --- | --- |
| **Company Name** | **Yes/No** | **Comments (1-1, Q3)** |
| vivo |  | Not sure an LS is critical or not, but It would be good know RAN4 status of required switching delay and interruption gap due to transition between dormancy and non-dormancy BWP. |
| ZTE |  | We prefer not to send this LS.  We expect that once RAN4 has finished their work, RAN4 would send us the LS to inform us the outcome.  Currently, we are not sure about the intention/benefits of sending LS to RAN4. |
| Panasonic | No objection. | It is okay to send LS and acquire related outcome from RAN4. Anyway RAN4 may have better position to judge the SPS release HARQ-ACK timing requirement and potential impact from the BWP switching indicated by SCell dormancy indication. |

#### Draft Proposal

To be updated later

#### TP

To be updated later

### 2.2 Topic 1-2

Please provide your input to below questions Q1-Q2 on this topic, preferably by 04/21 (evening PST).

#### Question 1

Q1. According to current specification what is the UE behavior for the following scenario?

* UE behavior regarding which BWP to use for an SCell for an ON duration, when
  + the UE is configured with *ps-WakeUp*=true, and
  + the UE is configured with a dormant BWP for the SCell, and
  + the UE does not detect a DCI 2\_6 with SCell dormancy indication corresponding to the ON duration

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

|  |  |
| --- | --- |
| **Company Name** | **Comments (1-2, Q1)** |
| vivo | The UE behavior according to the current spec is unclear, one interpretation could be that UE stay on the current BWP under the condition defined above. |
| ZTE | The current spec only defines UE behavior of wake up or not when DCI 2\_6 is mis-detected, while it is not clear which BWP to use for SCell for the next ON duration. |
| Panasonic | Although current specification does not explicitly address this scenario, UE shall wake up in high level as per the configuration by RRC, and operate in the current BWP. |
| LG | It is natural the UE follows dormancy behavior in the most latest active time |

#### Question 2

Q2. For the following scenario, if the current specification is incorrect/unclear what should be the expected UE behavior?

* UE behavior regarding which BWP to use for an SCell for an ON duration, when
  + the UE is configured with *ps-WakeUp*=true, and
  + the UE is configured with a dormant BWP for the SCell, and
  + the UE does not detect a DCI 2\_6 with SCell dormancy indication corresponding to the ON duration

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

|  |  |
| --- | --- |
| **Company Name** | **Comments (1-2, Q2)** |
| vivo | When the following condition is met   * + the UE is configured with *ps-WakeUp*=true, and   + the UE is configured with a dormant BWP for the SCell, and   + the UE does not detect a DCI 2\_6 with SCell dormancy indication corresponding to the ON duration   The expected UE behavior should be   * If the current BWP is non-dormant BWP, UE stays on the non-dormant BWP * If the current BWP is dormant BWP, UE switches to the non-dormant BWP provided by *first-non-dormant-BWP-ID-for-DCI-outside-active-time*   When the following condition is met   * + the UE is configured with *ps-WakeUp*=false, and   + the UE is configured with a dormant BWP for the SCell, and   + the UE does not detect a DCI 2\_6 with SCell dormancy indication corresponding to the ON duration   The expected UE behavior should be   * UE stays on the current BWP. |
| ZTE | UE switches to non-dormant BWP for all the activated SCell when  the UE is configured with ps-WakeUp=true, and  the UE is configured with a dormant BWP for the SCell, and  the UE does not detect a DCI 2\_6 with SCell dormancy indication corresponding to the ON duration  The reason is: If network configures “wake-up” as the default UE behavior, network cares more about the system performance. From this perspective, it makes sense to follow the same philosophy, i.e., switch to non-dormant BWP for all the activated SCells in case of miss detection of DCI 2\_6. |
| Panasonic | We think UE shall wake up in this case as this is default behavior as per RRC parameter *ps-WakeUp*=true. Also UE shall switch to the *first-non-dormant-BWP-ID-for-DCI-inside-active-time.* |
| LG | It may be better to clarify the behavior in the specifications |

#### Draft Proposal

To be updated later

#### TP

To be updated later

### 2.3 Topic 1-3

Please provide your input to below questions Q1-Q2 on this topic, preferably by 04/21 (evening PST).

#### Question 1

Q1. According to current specification what is the UE behavior for the following scenario

* UE is configured with CIF, and detects DCI format 1-1 on primary cell with CIF≠0 and FDRA bits set according to Case 2 SCell dormancy indication.

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

|  |  |
| --- | --- |
| **Company Name** | **Comments (1-3, Q1)** |
| vivo | Current spec does not prevent to indicate CIF≠0 for a case 2 dormancy DCI, however, it is not clear what is the use case for gNB to do so. |
| ZTE | The current spec is clear that CIF≠0 could be configured for Case 2 SCell dormancy indication. With CIF≠0, network could use the candidates for SCell to transmit the Case2 DCI. |
| Panasonic | According to the current specification, there is no explicit exclusion of using CIF≠0 when UE performs SCell dormancy behavior as per the indication in DCI format 1\_1. |
| LG | If we clarify that CIF≠0’is not used, no further definition of the UE behavior is necessary |

#### Question 2

Q2. Is ot OK to agree to below proposal (discussed in RAN1#100-e)?

* When UE is configured with CIF, DCI format 1-1 on primary cell with CIF≠0’is not used for Case 2 SCell dormancy indication

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

|  |  |  |
| --- | --- | --- |
| **Company Name** | **Yes/No** | **Comments (1-3, Q2)** |
| Vivo | Yes | UE does not expect to detect a DCI format for Case 2 SCell dormancy indication with CIF≠0, the reason could be   1. There is no use case to do so 2. UE could use CIF field as a validation of the DCI |
| ZTE | No | We believe that allowing CIF≠0 for Case2 DCI could improve the scheduling flexibility, e.g., network could use the candidates for SCell to transmit the Case2 DCI in PCell. |
| Panasonic | No | Do not see strong need to add this. By adding this may better align between gNB and UE but also need additional DCI validation at UE side and also corresponding test cases. Unless there is some other concern, e.g. for other usage in the future CIF≠0 is reserved, otherwise no need to change the specification. |
| LG | Yes |  |

#### Draft Proposal

To be updated later

#### TP

To be updated later

### 2.4 Topic 1-4

Please provide your input to below questions Q1-Q2 on this topic, preferably by 04/21 (evening PST).

#### Question 1

Q1. According to current specification what is the UE behavior for the following scenarios A and B?

* UE is configured with a dormant BWP for an SCell and
  + A) the ‘BWP indicator field’ in PDCCH DCI format 1-1 detected for the SCell indicates a BWP ID corresponding to dormant BWP
  + B) the ‘BWP indicator field’ in PDCCH DCI format 0-1 detected for the SCell indicates BWP ID corresponding to dormant BWP

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

|  |  |
| --- | --- |
| **Company Name** | **Comments (1-4, Q1)** |
| vivo | The current specification seems to allow case A) and B). |
| ZTE | As the PDSCH-Config/PDCCH-Config will not be configured for the dormant BWP, the current spec implies that ‘BWP indicator field’ in PDCCH DCI format 1-1 could not be indicated as the dormant DL BWP.  If UE is under dormant DL BWP, UE cannot receive any DCI, thus there is no such case as the second bullet above described.  Based on the above analysis, Case A) and Case B) are not allowed in the current specficiation. |
| Panasonic | In our understanding, UE shall perform the PDSCH reception, PUCCH transmission or PUSCH transmission in the target BWP according to the DCI and then go to dormancy behavior in the dormant BWP. UE does not need to monitor PDCCH in the dormant BWP. |

#### Question 2

Q1. If the current specification is incorrect/unclear for the following scenarios A and B, what should be the expected UE behavior?

* UE is configured with a dormant BWP for an SCell and
  + A) the ‘BWP indicator field’ in PDCCH DCI format 1-1 detected for the SCell indicates a BWP ID corresponding to dormant BWP
  + B) the ‘BWP indicator field’ in PDCCH DCI format 0-1 detected for the SCell indicates BWP ID corresponding to dormant BWP

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

|  |  |
| --- | --- |
| **Company Name** | **Comments (1-4, Q2)** |
| vivo | UE should not expect case A) or B) to happen, i.e. defined as error case. |
| ZTE | The current spec seems fine. |
| Panasonic | So far no substantial issue is identified to change the specification. |

#### Draft Proposal

To be updated later

#### TP

To be updated later

### 2.5 Topic 1-5

Please provide your input to below questions Q1 on this topic, preferably by 04/21 (evening PST).

#### Question 1

Q1. Is there a need to introduce a condition that UE expects to receive DCI format 0-1/1-1/2-6 with SCell dormancy indication on the primary cell only in the first 3 symbols of a slot?

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

|  |  |  |
| --- | --- | --- |
| **Company Name** | **Yes/No** | **Comments (1-5, Q1)** |
| vivo | Yes, but except DCI format 2-6 | It is reasonable to restrict DCI 0-1/1-1 with SCell dormancy indication on the PCell only in the first 3 symbols.  However, it is unnecessary to add the restriction to DCI 2-6, because the minimum gap between the last DCI 2-6 monitoring occasion and DRX onduration can naturally support the potential dormancy BWP switching. |
| ZTE | Yes | There could be different Options for this issue.  Option1: If the DCI format 0-1/1-1/2-6 indicates SCell dormancy, the DCIs are expected to be within the first 3 symbols of a slot.  Option2: If the DCI format 0-1/1-1/2-6 indicates SCell dormancy **change**, the DCIs are expected to be within the first 3 symbols of a slot.  For Option1, regardless of whether the BWP of SCell has been changed or not, the DCIs are expected to be within the first 3 symbols of a slot as long as the DCIs are used for dormancy indication.  For Option2, the DCIs are expected to be within the first 3 symbols of a slot only if the DCIs are triggering BWP change for at least one SCell. Otherwise, no such kind of restriction.  Option2 is more aligned with the legacy spec description. We are open to further discuss the two options. |
| Panasonic | No | So far no strong reason is identified to do so. If concern is from BWP switching latency requirement due to SCell dormancy indication, we may need some input from RAN4. |

#### Draft Proposal

To be updated later

#### TP

To be updated later

# 3 Conclusions

To be updated later

# 4 References

1. [R1-2002739](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Inbox/R1-2002739.zip) Summary of efficient and low latency serving cell configuration/activation/setup, Moderator (Ericsson), RAN1#100bis-e, April 2020.
2. [R1-2002560](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_100b_e/Docs/R1-2002560.zip) Remaining issues for SCell dormancy Qualcomm Incorporated
3. [R1-2002185](http://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_100b_e/Docs/R1-2002185.zip) Remaining issues on SCell dormancy behavior MediaTek Inc.