**3GPP TSG RAN WG1 Meeting #106-e R1-21xxxx**

**E-meeting, August 16th – 27th, 2021**

**Agenda Item: 7.2.10**

**Source: Moderator (Huawei)**

**Title: Summary of [106-e-NR-MRDC-CA-01] on SCell dormancy**

**Document for: Discussion and Decision**

# Introduction

This contribution summarizes the discussion for the below:

[106-e-NR-MRDC-CA-01] Email discussion/approval on corrections to 38.213 on SCell dormancy (R1-2106505, R1-2107262 and R1-2107996) until August 20 – Yi Wang (Huawei)

The assigned thread does not clearly indicate the three issues should be merged in a single CR, if approved, however it has been the majority interest to do as such. The final draft CR will be provided after consensus is made for each proposal, including potential updates.

# Discussion

## R1-2106505

The change in [1] aims to remove the redundant description of “or in response to a detection of a DCI format 1\_1 indicating SCell dormancy” since the case that UE has not received any PDCCH within the monitoring occasions for DCI format 1\_1 indicating SCell dormancy on any serving cell *c* already leads to the same thing and a UE shall not expect to feedback HARQ-ACK information in that case.

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| <Unchanged part omitted> 9.1.3.2 Type-2 HARQ-ACK codebook in physical uplink shared channel If a UE would multiplex HARQ-ACK information in a PUSCH transmission that is not scheduled by a DCI format or is scheduled by a DCI format that does not include a DAI field, then  - if the UE has not received any PDCCH within the monitoring occasions for DCI formats scheduling PDSCH receptions, or SPS PDSCH release, or DCI format 1\_1 indicating SCell dormancy on any serving cell and the UE does not have HARQ-ACK information in response to a SPS PDSCH reception~~, or in response to a detection of a DCI format 1\_1 indicating SCell dormancy,~~ to multiplex in the PUSCH, as described in clause 9.1.3.1, the UE does not multiplex HARQ-ACK information in the PUSCH transmission;  - else, the UE generates the HARQ-ACK codebook as described in clause 9.1.3.1, except that *harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*.  <Unchanged part omitted> |

Companies view is invited:

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| --- | --- |
| Company | Comment |
| Huawei, HiSilicon | Ok for the change and no additional text change is needed. |
| Intel | We are supportive to the changes. |
| vivo | OK with the change. |
| MTK | Ok for the change |
| ZTE | Ok for the change. |
| NTT DOCOMO | Ok for the change |
| CATT | We don’t see the need of this change. Our understanding is that the sentence “the UE does not have HARQ-ACK information in response to a SPS PDSCH reception, or in response to a detection of a DCI format 1\_1 indicating SCell dormancy” refers to Case 2 SCell dormancy indication by non-scheduled DCI format 1\_1. This is different to the sentence before that is referred to Case 1 SCell dormancy indication by scheduled DCI format 1\_1. |
| Qualcomm | OK with the change. |
| OPPO | OK with the change |
| Ericsson | OK– it seems to be editorial change removing redundant text. |
| Moderator(Huawei) | To CATT  It is correct understanding that it is for case 2 - there is no SCell dormancy indication Case-1 already in the specification, which is taken as normal PDSCH scheduling case and there is “SCell dormancy indication” defined only Case-2. To be specific, Case-1 can be included in “*if the UE has not received any PDCCH within the monitoring occasions for DCI formats scheduling PDSCH receptions*” and Case-2 is included by “*or DCI format 1\_1 indicating SCell dormancy*”, thus there is no need to repeat – actually not possible for UE to re-check whether “*UE does not have HARQ-ACK information*” for Case-2. The Change aims to remove this non-happen condition.    To all  CATT seems to be questioning the correctness. With the moderator’s explanation, hopefully it is now clear. All others seems to be Ok, while one company view it is editorial like. Given the above, my suggestion is to take it into draft CR phase.  Please check section 2.4. |

## R1-2107262

The change in [2] aims to complete the HARQ feedback procedure for HARQ feedback timing in case that a PDCCH is used for indicating SCell dormancy, by reusing the same mapping between the RRC configured parameters and DCI field values. Since there is no new RRC parameter defined for this case, the change seems straightforward.

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| 9.2.3 UE procedure for reporting HARQ-ACK <Unchanged part omitted>  For DCI format 1\_0, the PDSCH-to-HARQ\_feedback timing indicator field values map to {1, 2, 3, 4, 5, 6, 7, 8}. For a DCI format, other than DCI format 1\_0, scheduling a PDSCH reception or a SPS PDSCH release, or indicating SCell dormancy, the PDSCH-to-HARQ\_feedback timing indicator field values, if present, map to values for a set of number of slots provided by *dl-DataToUL-ACK*, *dl-DataToUL-ACK-r16*, or *dl-DataToUL-ACKForDCIFormat1\_2*, as defined in Table 9.2.3-1.  <Unchanged part omitted> |

Companies view is invited:

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| --- | --- |
| Company | Comment |
| Huawei, HiSilicon | Ok for the change and no additional text change is needed. |
| Intel | Since there is also the case of Type3 HARQ-ACK triggering without scheduled PDSCH, a simpler way may be to delete the list, instead of adding everything into the list.  For DCI format 1\_0, the PDSCH-to-HARQ\_feedback timing indicator field values map to {1, 2, 3, 4, 5, 6, 7, 8}. For a DCI format, other than DCI format 1\_0, ~~scheduling a PDSCH reception or a SPS PDSCH release,~~ the PDSCH-to-HARQ\_feedback timing indicator field values, if present, map to values for a set of number of slots provided by *dl-DataToUL-ACK*, *dl-DataToUL-ACK-r16*, or *dl-DataToUL-ACKForDCIFormat1\_2*, as defined in Table 9.2.3-1. |
| vivo | The change seems not critical as some text in the same section describes how to determine the feedback timing for SCell dormancy.  If companies think the current text may be confusing, the change proposed by Intel seems better. |
| MTK | Fine with the change. To our understanding, the PDSCH-to-HARQ\_feedback timing indicator field works in the same ways for “SPS PDSCH release” and “SCell dormancy”. |
| ZTE | Ok with the change. The proposal from Intel is also fine. |
| NTT DOCOMO | Ok for the change proposed by Intel |
| CATT | We are OK with the change. |
| Qualcomm | We are fine with the change. For Type3 HARQ-ACK, it should be discussed in NR-U. Therefore, we prefer Huawei’s original version. |
| OPPO | OK with the change. We share view as Qualcomm that For Type3 HARQ-ACK, it should be discussed in NR-U and it is included in [Editorial CRs email discussion for Rel.16 NR-U]. |
| Ericsson | OK. |
| Moderator(Huawei) | All companies consider it is correct. A few companies prefer Intel revision – which to moderator is doable and simpler. However there is also one company concerning the revision from Intel.  My suggestion is to take it into draft CR phase using the original text change. If later on NR-U session make any decision, we can come back - please check section 2.4. |

## R1-2107996

The change in [3] tends to improve the readability of specification texts on the interpretation of the bitmap values for SCell dormancy indication in case of absence or value of 0 for carrier indicator field in DCI format 0\_1 or a DCI format 1\_1. The change is aligned with the agreements of “*When UE is configured with CIF, ‘DCI format 0-1/1-1 on primary cell with CIF≠0’ is not used for Case 1 Scell dormancy indication*” and only corrects the relevant indentations in specification.

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| 10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells  <Unchanged part omitted>  If a UE is provided search space sets to monitor PDCCH for detection of DCI format 0\_1 and DCI format 1\_1 and if one or both of DCI format 0\_1 and DCI format 1\_1 include a Scell dormancy indication field,  - the Scell dormancy indication field is a bitmap with size equal to a number of groups of configured Scells, provided by *dormancyGroupWithinActiveTime*,  - each bit of the bitmap corresponds to a group of configured Scells from the number of groups of configured Scells  - if the UE detects a DCI format 0\_1 or a DCI format 1\_1 that does not include a carrier indicator field, or detects a DCI format 0\_1 or DCI format 1\_1 that includes a carrier indicator field with value equal to 0  - a ‘0’ value for a bit of the bitmap indicates an active DL BWP, provided by *dormantBWP-Id*, for the UE for each activated Scell in the corresponding group of configured Scells  - a ‘1’ value for a bit of the bitmap indicates  - an active DL BWP, provided by *firstWithinActiveTimeBWP-Id*, for the UE for each activated Scell in the corresponding group of configured Scells, if a current active DL BWP is the dormant DL BWP  - a current active DL BWP, for the UE for each activated Scell in the corresponding group of configured Scells, if the current active DL BWP is not the dormant DL BWP  - the UE sets the active DL BWP to the indicated active DL BWP  <Unchanged part omitted> |

Companies view is invited:

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| --- | --- |
| Company | Comment |
| Huawei, HiSilicon | Ok for the change and no additional text change is needed. |
| Intel | We are supportive to the changes |
| vivo | OK with the change. |
| MTK | Ok for the change |
| ZTE | Ok with the change. |
| NTT DOCOMO | Ok for the change |
| CATT | OK with the change. |
| Qualcomm | OK with the change. |
| OPPO | OK with the change. |
| Ericsson | OK. |
| Moderator(Huawei) | All companies consider it is correct. My suggestion is to take it into CR phase. Please check section 2.4. |

## Draft CR for the three changes

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| Cover page   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | | | | | | | | | | | | ***Title:*** | Corrections on SCell dormancy indication | | | | | | | | | | |  |  | | | | | | | | | | | ***Source to WG:*** | Huawei, OPPO, Ericsson | | | | | | | | | | | ***Source to TSG:*** | R1 | | | | | | | | | | |  |  | | | | | | | | | | | ***Work item code:*** | LTE\_NR\_DC\_CA\_enh-Core | | | | |  | ***Date:*** | | | 2021-08-17 | |  |  | | | |  | |  | | |  | | ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 | |  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed e?planations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | | |  |  | | | | | | | | | | | ***Reason for change:*** | | **Change#1**:  With the description “*UE has not received any PDCCH within the monitoring occasions for DCI formats scheduling PDSCH receptions, or SPS PDSCH release, or DCI format 1\_1 indicating SCell dormancy on any serving cell*  in section 9.1.3.2, it is not possible for UE to have HARQ-ACK information in response to a non-detected DCI format 1\_1 indicating SCell dormancy.  **Change#2**:  It is not clear how to determine PDSCH-to-HARQ\_feedback timing indicator field values for DCI indicating SCell dormancy.  It is straightforward to reuse the same solution as DCI scheduling a PDSCH reception or a SPS PDSCH release, i.e. configured by high layer signaling.  **Change#3:**  The interpretation of the bitmap values for SCell dormancy indication in case of absence or value of 0 for carrier indicator field in DCI format 0\_1 or a DCI format 1\_1 is unclear, due to incorrect indentations. | | | | | | | | | |  | |  | | | | | | | | | | ***Summary of change:*** | | **Change#1**:  Delete “in response to a detection of a DCI format 1\_1 indicating SCell dormancy”.  **Change#2:**  Capture the mapping for PDSCH-to-HARQ\_feedback timing indicator field values for DCI indicating SCell dormancy.  **Change#3:**  Correct the indentation such that the apprppriate subbullets are under the condition related to the carrier indicator field. | | | | | | | | | |  | |  | | | | | | | | | | ***Consequences if not approved:*** | | **Change#1**:  The descrption of specification impose unnecessary conditions for UE to check for codebook generation and is redundant.  **Change#2:**  PDSCH-to-HARQ\_feedback timing indicator field value for DCI indicating SCell dormancy is undefined.  **Change#3:**  Incorrect/unclear bit value interpretion. | | | | | | | | | |  | |  | | | | | | | | | | ***Clauses affected:*** | | 9.1.3.2, 9.2.3, 10.3 | | | | | | | | | |  | |  | | | | | | | | | |  | | **Y** | **N** |  | | | |  | | | | ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | | | ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | | | ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | | |  | |  | | | | | | | | | | ***Other comments:*** | |  | | | | | | | | | |  | |  | | | | | | | | | | ***This CR's revision history:*** | | Initial version | | | | | | | | |   CR(the formatting issue will be automatically fixed when using a dedicated CR with change marks)  <Unchanged part omitted> 9.1.3.2 Type-2 HARQ-ACK codebook in physical uplink shared channel If a UE would multiplex HARQ-ACK information in a PUSCH transmission that is not scheduled by a DCI format or is scheduled by a DCI format that does not include a DAI field, then  - if the UE has not received any PDCCH within the monitoring occasions for DCI formats scheduling PDSCH receptions, or SPS PDSCH release, or DCI format 1\_1 indicating SCell dormancy on any serving cell and the UE does not have HARQ-ACK information in response to a SPS PDSCH reception~~, or in response to a detection of a DCI format 1\_1 indicating SCell dormancy,~~ to multiplex in the PUSCH, as described in clause 9.1.3.1, the UE does not multiplex HARQ-ACK information in the PUSCH transmission;  - else, the UE generates the HARQ-ACK codebook as described in clause 9.1.3.1, except that *harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*.  <Unchanged part omitted> 9.2.3 UE procedure for reporting HARQ-ACK <Unchanged part omitted>  For DCI format 1\_0, the PDSCH-to-HARQ\_feedback timing indicator field values map to {1, 2, 3, 4, 5, 6, 7, 8}. For a DCI format, other than DCI format 1\_0, scheduling a PDSCH reception or a SPS PDSCH release, or indicating SCell dormancy, the PDSCH-to-HARQ\_feedback timing indicator field values, if present, map to values for a set of number of slots provided by *dl-DataToUL-ACK*, *dl-DataToUL-ACK-r16*, or *dl-DataToUL-ACKForDCIFormat1\_2*, as defined in Table 9.2.3-1.  <Unchanged part omitted>  10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells  <Unchanged part omitted>  If a UE is provided search space sets to monitor PDCCH for detection of DCI format 0\_1 and DCI format 1\_1 and if one or both of DCI format 0\_1 and DCI format 1\_1 include a Scell dormancy indication field,  - the Scell dormancy indication field is a bitmap with size equal to a number of groups of configured Scells, provided by *dormancyGroupWithinActiveTime*,  - each bit of the bitmap corresponds to a group of configured Scells from the number of groups of configured Scells  - if the UE detects a DCI format 0\_1 or a DCI format 1\_1 that does not include a carrier indicator field, or detects a DCI format 0\_1 or DCI format 1\_1 that includes a carrier indicator field with value equal to 0  - a ‘0’ value for a bit of the bitmap indicates an active DL BWP, provided by *dormantBWP-Id*, for the UE for each activated Scell in the corresponding group of configured Scells  - a ‘1’ value for a bit of the bitmap indicates  - an active DL BWP, provided by *firstWithinActiveTimeBWP-Id*, for the UE for each activated Scell in the corresponding group of configured Scells, if a current active DL BWP is the dormant DL BWP  - a current active DL BWP, for the UE for each activated Scell in the corresponding group of configured Scells, if the current active DL BWP is not the dormant DL BWP  - the UE sets the active DL BWP to the indicated active DL BWP  <Unchanged part omitted> |

Companies view is invited:

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| Company | Comment |
| Intel | Regarding the revision of section 9.3, we think our change is simpler and better. So, the full paragraph is just to define PDSCH-to-HARQ\_feedback timing indicator field for DCI format 1\_0 and for other DCI formats.  If the intention is agreeable, it seems not reasonable to enforce an additional CR to correct for ‘Type3 HARQ-ACK triggering without scheduled PDSCH’. Therefore, it avoids a ‘LS’ to NR-U people.  Having said all above, if majority companies still prefer the current version. It is fine for us. |
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# Conclusions

The final merged draft CR will include the following changes (TBD).

# References

1. R1-2106505 Corrections on HARQ-ACK for case 2 dormancy indication in 38.213 Huawei, HiSilicon
2. R1-2107262 Draft CR on PDSCH-to-HARQ feedback timing indicator field values OPPO
3. R1-2107996 Draft CR for correction of SCell Dormancy Ericsson