**3GPP TSG RAN WG1 Meeting #106-e R1-** **210xxxx**

**e-Meeting, 16th – 27th August 2021**

**Title: Summary of NR UE Power Saving**

**Agenda item: 7.2.7**

**Source: CATT**

**Document for: Discussion**

# Final Summary of Email Discussions and Agreements

# Email Discussion [106-e-NR\_UE\_Pow\_Sav\_01]

# Email Discussion during Preparation[106-e-Prep\_NR\_UE\_Pow\_Sav]

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| **Company** | **Supporting Issues (1-1, 1-2, 1-3, or 2) and draft CR** | **Comments** |
| Huawei, HiSilicon | Issue 1-1, 1-2, 1-3 and Issue 2. | We think the four issues are essential corrections. The consequences if not resolve the issues have been provided in the realted draft CRs[2][3].We don’t agree Feature lead’s addition in the brackets of Issue#2 to say that “The existing wording and the proposed CR have exact the same meaning in English”. According to the existing wording in the specification, it can be understood that it shall set the lowest-indexed RRC configured value to the applicable minimum scheduling offset in the unintended condition, e.g., 'Minimum applicable scheduling offset indicator' field is not received in DCI format 0\_1 but is received in DCI format 1\_1. The proposed change corrects this issue. |
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# Summary of Open Issues

* **Issues 1: Procedure of SCell dormancy in TS38.213 [1][2]**
* **Issue 1-1: Remove “one or both” in TS38.213 for SCell dormancy indication by DCI format 0\_1/1\_1**

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| 38.21310.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells======skipped part=======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======skipped part======= |

* **Issue 1-2: Remove SCell dormaincy indiction with exception of “indication of SPS PDSCH release” since SCell dormancy indication is only supported for DCI format 1\_1 with CRC scrambled by C-RNTI or MCS-RNTI (no CS-RNTI).**

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| 38.21310.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells======skipped part=======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- *resourceAllocation* = *resourceAllocationType0* and all bits of the frequency domain resource assignment field in DCI format 1\_1 are equal to 0, or- *resourceAllocation* = *resourceAllocationType1* and all bits of the frequency domain resource assignment field in DCI format 1\_1 are equal to 1, or- *resourceAllocation = dynamicSwitch* and all bits of the frequency domain resource assignment field in DCI format 1\_1 are equal to 0 or 1the UE considers the DCI format 1\_1 as indicating SCell dormancy, not scheduling a PDSCH reception ~~or indicating a SPS PDSCH release~~, and for transport block 1 interprets the sequence of fields of======skipped part======= |

* **Issue 1-3: Adding text to clarify configuration of dormant BWP needed for SCell dormnacy**

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| 38.21310.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells======skipped part=======the UE considers the DCI format 1\_1 as indicating SCell dormancy, not scheduling a PDSCH reception or indicating a SPS PDSCH release, and for transport block 1 interprets the sequence of fields of- modulation and coding scheme- new data indicator- redundancy versionand of- HARQ process number- antenna port(s)- DMRS sequence initializationas providing a bitmap to each configured SCell, in an ascending order of the SCell index, where, for an activated SCell configured with *dormantBWP-Id* and *firstWithinActiveTimeBWP-Id*,- a '0' value for a bit of the bitmap indicates an active DL BWP, provided by *dormantBWP-Id*, for the UE for ~~a corresponding~~ the activated SCell - a '1' value for a bit of the bitmap indicates - an active DL BWP, provided by *firstWithinActiveTimeBWP-Id*, for the UE for ~~a corresponding~~ the activated SCell, if a current active DL BWP is the dormant DL BWP- a current active DL BWP, for the UE for ~~a corresponding~~ the activated SCell, 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======skipped part======= |

* **Issue 2:** **Change the wording “not …..or” to “neither ….. nor” inreceiving Minimum Scheduling Offset Indicator [3] (** The existing wording and the proposed CR have exact the same meaning in English)

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| 5.1.2.1 Resource allocation in time domain\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Unchanged part omitted \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*When the UE is configured with *minimumSchedulingOffsetK0* in an active DL BWP it applies a minimum scheduling offset restriction indicated by the 'Minimum applicable scheduling offset indicator'field in DCI format 1\_1 or DCI format 0\_1 if the same field is available. When the UE is configured with *minimumSchedulingOffsetK0* in an active DL BWP and it has neither received 'Minimum applicable scheduling offset indicator' field in DCI format 0\_1 nor in DCI format 1\_1, the UE shall apply a minimum scheduling offset restriction indicated based on 'Minimum applicable scheduling offset indicator' value '0'. When the minimum scheduling offset restriction is applied the UE is not expected to be scheduled with a DCI in slot *n* to receive a PDSCH scheduled with C-RNTI, CS-RNTI or MCS-C-RNTI with *K*0 smaller than $ \left⌈K\_{0min}⋅\frac{2^{μ^{'}}}{2^{μ}}\right⌉$, where *K*0minand $μ$ are the applied minimum scheduling offset restriction and the numerology of the active DL BWP of the scheduled cell when receiving the DCI in slot *n,* respectively, and $μ^{'}$ is the numerology of the new active DL BWP in case of active DL BWP change in the scheduled cell and is equal to $μ$, otherwise. The minimum scheduling offset restriction is not applied when PDSCH transmission is scheduled with C-RNTI, CS-RNTI or MCS-C-RNTI in common search space associated with CORESET0 and default PDSCH time domain resource allocation is used, in the search space set provided by *recoverySearchSpaceId* when monitoring PDCCH as described in [6, TS 38.213] or when PDSCH transmission is scheduled with SI-RNTI, MSGB-RNTI or RA-RNTI. The application delay of the change of the minimum scheduling offset restriction is determined in Clause 5.3.1.\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Unchanged part omitted \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*6.1.2.1 Resource allocation in time domain\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Unchanged part omitted \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*When the UE is configured with *minimumSchedulingOffsetK2* in an active UL BWP it applies a minimum scheduling offset restriction indicated by the '*Minimum applicable scheduling offset indicator*' field in DCI format 0\_1 or DCI format 1\_1 if the same field is available. When the UE is configured with *minimumSchedulingOffsetK2* in an active UL BWP and it has neither received '*Minimum applicable scheduling offset indicator*' field in DCI format 0\_1 nor in DCI format 1\_1, the UE shall apply a minimum scheduling offset restriction indicated based on '*Minimum applicable scheduling offset indicator*' value '0'. When the minimum scheduling offset restriction is applied the UE is not expected to be scheduled with a DCI in slot *n* to transmit a PUSCH scheduled with C-RNTI, CS-RNTI, MCS-C-RNTI or SP-CSI-RNTI with *K*2 smaller than$\left⌈K\_{2min}⋅\frac{2^{μ^{'}}}{2^{μ}}\right⌉$, where *K*2min and $μ$ are the applied minimum scheduling offset restriction and the numerology of the active UL BWP of the scheduled cell when receiving the DCI in slot *n*, respectively, and $μ^{'}$ is the numerology of the new active UL BWP in case of active UL BWP change in the scheduled cell and is equal to $μ$, otherwise. The minimum scheduling offset restriction is not applied when PUSCH transmission is scheduled by RAR UL grant or fallbackRAR UL grant for RACH procedure, or when PUSCH is scheduled with TC-RNTI. The application delay of the change of the minimum scheduling offset restriction is determined in Clause 5.3.1.\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Unchanged part omitted \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |

# Contributions summary and proposals

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| Huawei, HiSilicon [1] [2] | * Remove “one or both” in TS38.213 for SCell dormancy indication by DCI format 0\_1/1\_1
* Remove SCell dormaincy indiction with exception of “indication of SPS PDSCH release”Adding text to clarify configuration of dormant BWP needed for SCell dormnacy
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| Huawei, HiSilicon [3] | * Change the wording “not …..or” to “neither ….. nor” inreceiving Minimum Scheduling Offset Indicator
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# Reference

1. R1-2106514 Discussion on corrections of Scell dormancy for power saving Huawei, HiSilicon
2. R1-2106515 Corrections of Scell dormancy for power saving Huawei, HiSilicon
3. R1-2108188 Correction on cross-slot scheduling based power saving Huawei, HiSilicon