3GPP TSG-RAN WG1 Meeting #100bis-e R1-2002036

e-Meeting, 20th – 30th April, 2020

Agenda Item: 7.2.2.1.3

Source: Moderator (Ericsson)

Title: Feature lead summary for Maintenance of UL Signals and Channels

Document for: Discussion, Decision

# 1 Introduction

This document contains a high level summary of the contributions made under the “UL Signals and Channels” sub-agenda item for 7.2.2 Rel-16 Maintenance of NR-based Access to Unlicensed Spectrum. According to the Chairman’s guidance, 3 email threads have been assigned to this agenda item. This summary contains a proposal for a grouping of issues into the 3 threads for discussion this meeting. To keep the scope reasonable for each thread, it is proposed to defer the other issues to the next meeting.

Once the group agrees on the topics to be discussed, updated summaries containing proposals and TPs will be circulated for each of the 3 threads.

# 2 Issues to Address This Meeting

This section contains a proposed grouping of issues for the 3 threads. Each thread contains one issue that requires some discussion and a manageable number fo The threads are grouped as follows:

* Thread A
  + 1 critical issue that will require discussion (Issue #1)
  + 1 editorial issue – easy to agree (Issue #2)
* Thread B
  + 1 critical issue that will require discussion (Issue #3)
  + 1 editorial issue – easy to agree (Issue #4)
* Thread C
  + 1 critical issue that may require some discussion (Issue #10)
  + 3 editorial (but critical) issues – easy to agree (Issue #5,6,7)

## 2.1 Email Thread A

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| **Issue** | **Description** | **Tdoc References** | **Class** |
| 1 | FDRA field for DCI 0\_0 for UL resource allocation Type 2:   * DCI 0\_0 in a CSS: Agree on rule for RB set allocation for PUSCH * DCI 0\_0 in a USS: Agree on whether or not FDRA field includes Y bits for RB set allocation + rule for RB set allocation for PUSCH (if Y bits not included) or value of Y (if Y bits included)   TPs needed to 38.212 §7.3.1.1.1 and 38.214 §6.1.2.2.3 | R1-2002321: P1,P2  R1-2002030: P1,P2  R1-2001875: P1-P3  R1-2001533: P1  R1-2001934: P1-P4  R1-2001973: P2-P4  R1-2002433: P1  R1-2001758: P1  R1-2002116: P1  R1-2002382: P1-P3  R1-2002276: P1-P2  R1-2001704: P1-P2  R1-2001651: P1-P2 | Critical |
| 2 | Clarify that minimum number of resource blocks within an interlace contained in a BWP is 10 (Interlaced transmission not supported for 10 MHz SCell)  Simple TP needed to 38.211 §4.4.4.6 | R1-2002030: P6  R1-2001533: P2  R1-2001986: §2.2 | Editorial |

For Issue 1 above, companies that did not provide their preferred alternative in their contributions are invited to provide their preferred alternative in the tables below. This is useful input to next week’s discussion.

**Issue 1-1: Alternatives for RB set allocation for PUSCH scheduled by DCI 0\_0 in CSS:**

* Alt-1: PUSCH allocated to the RB set of the active UL BWP that intersects the RB set of the active DL BWP in which DCI 0\_0 is received
* Alt-2: PUSCH allocated to RB set 0 of the active UL BWP
* Alt-3: PUSCH allocated to all RB sets of the active UL BWP
* Alt-4a/b: PUSCH allocated to RB set(s) according to the following logic:
  + Alt-4a (ref: [4]):
    - If the active UL BWP does not include all of the RBs of the initial UL BWP or the active UL BWP has different SCS than the initial UL BWP, then
      * RB set 0 of the active UL BWP
    - Otherwise
      * RB set of the initial UL BWP
  + Alt-4b (ref: [18]):
    - If the active UL BWP includes all of the RBs of the initial UL BWP and the SCS/CP of the active UL BWP is the same as that of the initial UL BWP or the initial UL BWP is active
      * the initial UL BWP
    - Otherwise
      * All RB sets of the active UL BWP

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| **Company** | **View/Position** |
| Apple | Alt-1 |
| Ericsson | Alt-1 |
| Fujitsu | Alt-1 |
| LGE | Alt-1 |
| DOCOMO | Alt-1 |
| OPPO | Alt-4a |
| Samsung | Alt-3 |
| Sharp | Alt-4b |
| Spreadtrum | Alt-2 |
| ZTE | Alt-1 |
| vivo | Alt-2 |
| Lenovo | Alt-2 |
| Qualcomm | Alt-2 |
| Nokia, NSB | Alt-1 |
| Huawei | Alt-1 |
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**Issue 1-2: Alternatives for FDRA field of DCI 0\_0 in a USS:**

* Alt-1: FDRA field of DCI 0\_1 in a USS contains X bits only
  + Alt-1a: PUSCH allocated to the RB set of the active UL BWP that intersects the RB set of the active DL BWP in which DCI 0\_0 is received
  + Alt-1b: PUSCH allocated to RB set 0 of the active UL BWP
* Alt-2: FDRA field of DCI 0\_1 in a USS contains X + Y bits
  + Alt-2a: Y is variable and given by size of active UL BWP
  + Alt-2b: Y is fixed at [4] bits

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| **Company** | **View/Position** |
| Apple | Alt-2a |
| Ericsson | Alt-1a |
| Fujitsu | Alt-1a |
| Huawei | Alt-2a |
| LGE | FFS between Alt-1a and Alt-2a |
| Lenovo | Alt-1b |
| DOCOMO | Alt-1a |
| OPPO | Alt-2a |
| Samsung | Alt-2b |
| Sharp | Alt-2 |
| Spreadtrum | Alt-1b |
| ZTE | Alt-2 |
| vivo | Alt-2a |
| Qualcomm | Alt-1b |
| Nokia, NSB | Alt-1a |
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**Company views on grouping of Email Thread A:**

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| **Company** | **View/Position** |
| Sharp | For issue 1-1, Sharp’s view [18] in Alt-4b is to schedule PUSCH in the initial UL BWP. Our proposal is not the RB-set in the initial UL BWP. That is, RB-set based PUSCH scheduling is not used for DCI format 0\_0 monitored in CSS since there may be a case where the active UL BWP (e.g., the initial UL BWP = 20 MHz) includes only a subset of one RB-set corresponding to the UL carrier (e.g. 80 MHz) if wideband operation AI (7.2.2.2.5) agrees one RB-set corresponding to the carrier bandwidth for a case of “no intra-cell guard band” configuration. |
| Lenovo, Motorola Mobility | 1. For both Issue 1-1 and Issue 1-2, we prefer a unified solution, i.e., only X bits in DCI format 0-0 in either CSS or USS. 2. We are not pretty sure about the meaning of “intersect”, does it mean the DL BWP should have overlap (partially or fully) in frequency domain with UL BWP? |
| LGE | Regarding to issue 1-1, the reference BWP to determine the size of X bit in FDRA field of DCI format 0\_0 needs to be clarified as below.  - For DCI format 0\_0 transmitted in CSS, X bit size of FDRA field in the DCI format 0\_0 is determined based on the SCS of the initial UL BWP as in legacy Rel-15.  - For DCI format 0\_0 transmitted in USS, X bit size of FDRA field in the DCI format 0\_0 is determined based on the SCS of the active UL BWP as in legacy Rel-15. |
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## 2.2 Email Thread B

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| **Issue** | **Description** | **Tdoc References** | **Class** |
| 3 | FDRA field in RAR UL grant for operation with shared spectrum channel access   * Capture UE interpreation of FDRA field when interlacing configured * Truncation/expansion rule when interlacing not configured * Agree on rule for RB set allocation for PUSCH scheduled by RAR UL grant   TP needed to 38.213 §8.3 | R1-2002030: P3,P4  R1-2001875: P4  R1-2001533: P3  R1-2001934: P5  R1-2001758: P1  R1-2002382: P4-P5  R1-2001651: P3  R1-2002383: P2  R1-2001706: P8 | Critical |
| 4 | Align procedure text in 38.213 §6.2.1 with SRS resource configuration in 38.331 capturing that SRS resource can start at any OFDM symbol in a slot.  TP needed to 38.214 §6.2.1 | R1-2002075: P1  R1-2002030: P5  R1-2001986: §2.1  R1-2002365: TP1  R1-2002529: P4  R1-2001704: P4 | Editorial |

**Company views on grouping of Email Thread B:**

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| **Company** | **View/Position** |
| Sharp | For issue 3, we provided FDRA interpretation for operation with shared spectrum channel access, with a TP. Would you allow me to add reference for it? |
| ZTE | For issue 3, our views are provided in the contribution submitted to IAP. I would like to add a reference for that. |
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## 2.3 Email Thread C

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| **Issue** | **Description** | **Tdoc References** | **Class** |
| 6 | Correction for multiplexing of coded UCI bits to PUCCH for PUCCH Format 3 considering spreading factor  TP needed to 38.212 §6.3.1.6 | R1-2001651: P4 | Critical  (but simple editorial fix) |
| 5 | Clarification on the conditions for using PUCCH Format 0,1,2,3,4 for UCI transmission  Simple TP needed to 38.213 §9.2.2 | R1-2002192: I1 | Critical  (but simple editorial fix) |
| 10 | Rule for PUCCH allocation for a carrier without intra-cell guardbands (single RB set) when interlaced PUCCH is configured, e.g., lowest 10 RBs of the first, and if configured, second interlace.  TP needed to 38.213 §9.2.1 | R1-2002382: P8 | Critical |
| 7 | Alignment of RRC parameters between 38.331 and RAN1 specs. RAN2 has consolidated the number of parameters configuring interlaced transmission. The 2 new parameters are:   * *useInterlacePUCCH-PUSCH* within the BWP-UplinkCommon IE * *useInterlacePUCCH-PUSCH* within the BWP-UplinkDedicated IE   which replace the 4 old parameters:   * *useInterlacePUCCH-Common* * *useInterlacePUSCH-Common* * *useInterlacePUCCH-Dedicated* * *useInterlacePUSCH-Dedicated*   TPs needed to 38.211, 212, 213, 214 in multiple sections. | R1-2002030: P7  R1-2001704: P3 | Editorial |

**Company views on grouping of Email Thread C:**

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| **Company** | **View/Position** |
| ZTE | We think Issue#5 is an editorial issue rather than critical. And at this moment we are not sure if the change is necessary. |
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# 3 Issues to Address Next Meeting

## 3.1 PUSCH Related

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| **Issue** | **Description** | **Tdoc References** | **Class** |
| 8 | Whether or not DCI 0\_2 supports indication of interlace allocation | R1-2002382: P6 | Discussion |

## 3.2 PUCCH Related

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| **Issue** | **Description** | **Tdoc References** | **Class** |
| 9 | Align description of PUCCH resource in 38.213 §9.2.1 with PUCCH-Resouce-r16 IE in 38.331.  TP needed to 38.213 §9.2.1 | R1-2001903: P1 | Editorial |

## 3.3 SRS Related

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| **Issue** | **Description** | **Tdoc References** | **Class** |
| 11 | Support CP extension for SRS (in addition to PUCCH/PUSCH, at least for aperiodic SRS triggered by DCI 0\_1/1\_1 | R1-2002246: P1  R1-2002192: I2 | Discussion  (in AI 7.2.2.2.1?) |

## 3.4 Interlace Configuration Related

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| **Issue** | **Description** | **Tdoc References** | **Class** |
| 12 | For UL resource allocation Type 2, X bits provides the interlace allocation; however, 38.214 Section 6.1.2.2.3 does not explicitly state that X = 6/5 for 15/30 kHz SCS  Simple TP needed to 38.214 §6.1.2.2.3 | R1-2001973: P1 | Editorial |

## 3.5 Other

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| **Issue** | **Description** | **Tdoc References** | **Class** |
| 13 | Clarify that for operation with shared spectrum channel access, unpaired spectrum is always assumed, e.g., in 38.213 §12 | R1-2002246: P3 | Discussion |
| 14 | Discuss whether or not SFI that is indicated beyond the indicated end-of-COT is considered as valid for the purposes of CUL transmissions enabled by enableConfigureUL-r16. | R1-2001758: P3 | Discussion |

**Company views on issues to address next meeting:**

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| **Company** | **View/Position** |
| Sharp | We are fine with the issue 10 to deprioritize at this meeting. On the other hand, I think this issue is “Discussion” rather than “Editorial”. This is not just a correction based on the previous agreement. |
| OPPO | Agree with Sharp |
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# References

1. R1-2001533 Maintainance on uplink signals and channels Huawei, HiSilicon
2. R1-2001651 Remaining issues on physical UL channel design in unlicensed spectrum vivo
3. R1-2001704 Remaining issues on the UL channels for NR-U ZTE, Sanechips
4. R1-2001758 Discussion on the remaining issues of UL signals and channels OPPO
5. R1-2001875 Remaining issues on UL signals and channels for NR-U Fujitsu
6. R1-2001903 Remaining issues on UL signals and channels for NR-U MediaTek Inc.
7. R1-2001934 Remaining issues of UL signals and channels for NR-U LG Electronics
8. R1-2001973 Remaining issues for UL signals and channels for NR-U Lenovo, Motorola Mobility
9. R1-2001986 UL signals and channels for NR-unlicensed Intel Corporation
10. R1-2002030 UL signals and channels Ericsson
11. R1-2002075 TP for SRS configuration CATT
12. R1-2002116 UL signals and channels for NR-U Samsung
13. R1-2002192 Remaining Issues on UL Signals and Channels for NR-U Nokia, Nokia Shanghai Bell
14. R1-2002246 UL signals and channels ETRI
15. R1-2002276 Remaining issues in UL signals and channels Spreadtrum Communications
16. R1-2002321 Remaining issues of UL signals and channels Apple
17. R1-2002365 TPs on uplink signals in NRU NEC
18. R1-2002382 Remaining issues on UL signals/channels for NR-U Sharp
19. R1-2002433 Remaining issues on UL signals and channels for NR-U NTT DOCOMO, INC.
20. R1-2002529 TP for UL signals and channels for NR-U Qualcomm Incorporated