[104-e-NR-5G\_V2X-01]: PS-1: SL max data rate – till 1/28, with potential CRs till 2/2– Jeongho (Samsung)

* Editorial changes for FD-OCC, CSI-RS resources, reference in SCI fields, MCS threshold for SL PT-RS can be discussed in the CR preparation.

In this email thread, RAN1 will discuss to confirm the overhead value for the SL max data rate.

***Issue#1: Confirm the overhead values for SL max data rate***

* [5, Samsung], [7, Ericsson]
* In TS38.306, there are brackets for the overhead value in calculation of SL max data rate. RAN1 needs to confirm those values.
* It is recommended to remove brackets.
* A draft LS can be seen in the same folder of this document.

Proposal

The following text proposal is adopted for TS38.306 and send an LS to RAN2 to inform.

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| 4.1.5 Supported max data rate for SL For NR sidelink, the approximate data rate is computed as follows.  wherein  Rmax = 948/1024,  is the the maximum number of supported layers for sidelink transmission (or reception) given by UE capability on supporting rank 2 PSSCH transmission and higher layer parameter *rankTwoReception*,  is the maximum supported modulation order between 6 or 8 given by higher layer parameter *sl-Tx-256QAM* and *sl-Tx-256QAM*,  is the scaling factor for sidelink transmission and reception given by higher layer parameter *scalingFactorTxSidelink* and *scalingFactorRxSidelink* respectively, as specified in TS 36.331 [17] and TS 38.331 [9], and can take the values 1, 0.8, 0.75, and 0.4.  is the numerology (as defined in TS 38.211 [6])  is the average OFDM symbol duration in a subframe for numerology , i.e. . Note that normal cyclic prefix is assumed.  is the maximum possible RB allocation in bandwidth BW for PSSCH, where BW is the UE supported maximum bandwidth in the given band or band combination,  is the overhead and takes the following values  0.23, for frequency range FR1 for SL  0.25, for frequency range FR2 for SL |

Each company is encouraged to provide the views on the above issue and proposal.

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| Company | Views |
| Sharp | Fine with the proposal. |
| vivo | We are fine to confirm the RAN1 working assumption, but please note that RAN1 cannot agree on a TP of RAN2 spec. We can only inform RAN2 about RAN1’s decision and leave the spec change to RAN2. |
| ZTE,Sanechips | OK with typo correction, prefer to capture it in the reply LS  is the maximum supported modulation order between 6 or 8 given by higher layer parameter *sl-Tx-256QAM* and *sl-Rx-256QAM*, |
| Ericsson | Fine with the proposal and the corresponding LS to RAN2. |
| NEC | Ok |
| Apple | We are fine with the proposal of confirming the working assumption. |
| Intel | Agree with the proposals |
| Nokia, NSB | OK in principle, but it would it be better to also make it clear here that the text above is just a suggestion to RAN2. The corresponding wording in the draft LS looks good. |
| OPPO | Agree to confirm the 2 values, the LS is also fine for us. |
| CATT, GOHIGH | Fine with the proposal and LS to RAN2. |

**Summary**

All companies agree to confirm the overhead values and to send a related LS. But, rather than agreeing a TP, it’s better to make an agreement and send it to RAN2 to reflect to the specification.

Proposal (offline consensus)

* The following values, OH, are used for the calculation of SL max data rate.
  + 0.23 for FR1 in SL
  + 0.25 for FR2 in SL
* RAN1 sends an LS to RAN2 to inform the agreed overhead value for SL max data rate and also to fix the type as below.
  + is the maximum supported modulation order between 6 or 8 given by higher layer parameter *sl-Tx-256QAM* and *sl-Rx-256QAM*,

Summary#2

The following agreements were made.

Agreements:

* The following value, OH, are used for the calculation of SL max data rate.
  + 0.25 for FR2 in SL
* RAN1 sends an LS to RAN2 to inform the agreed overhead value for SL max data rate and also to fix the typo as below.
  + *Qm* is the maximum supported modulation order between 6 or 8 given by higher layer parameter *sl-Tx-256QAM* and *sl-Rx-256QAM*

Agreements:

* The following value, OH, are used for the calculation of SL max data rate.

0.217 for FR1 in SL

***Issue#Editorial:***

The following issues will be treated in CR preparation session.

- [4, Intel]: FD-OCC

- [6, Sharp]: CSI-RS resources

- [8, Nokia, NSB], [44, CATT, GOHIGH]: Reference in SCI fields

- (If agreed in MIMO session for UL PT-RS) [3, LG] MCS threshold for SL PT-RS

## #1 FD-OCC

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| Tdoc, Source | R1-2100629 (Intel) |
| Reason for Change | Current specification for PSCCH DMRS does not follow FD-OCC agreement |
| Summary for Change | Correct indexing of reference symbol sequence resulting in FD-OCC |
| Text Proposal | ----------------begin text proposal for 38.211, section 8.4.1.3.2 ------------------------- 8.4.1.3.2 Mapping to physical resources The sequence shall be multiplied with the amplitude scaling factor in order to conform to the transmit power specified in [5, 38.213] and mapped in sequence starting with to resource elements in a slot on antenna port according to  <<<unchanged text omitted>>>  -----------------------end text proposal for 38.211 -------------------------------- |

## #2 CSI-RS Resource

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| Tdoc, Source | R1-2101532 (Sharp) |
| Reason for Change | The current specifications for NR Uu CSI-RS is not applicable to SL CSI-RS where the resource blocks are confined within the corresponding PSCCH/PSSCH transmission |
| Summary for Change | Adding a description to confine SL CSI-RS in PRBs corresponding to PSCCH/PSSCH |
| Text Proposal | ----------------begin text proposal for 38.211, section 8.4.1.5.3 -------------------------  8.4.1.5.3 Mapping to physical resources  Mapping to resource elements shall be done according to clause 7.4.1.5.3 with the following exceptions:  - only 1 and 2 antenna ports are supported, ;  - only density is supported;  - zero-power CSI-RS is not supported;  - the quantity is an amplitude scaling factor to conform with the transmit power specified in clause 8.2.1 of [6, TS 38.214].  - The starting position and number of resource blocks in which the UE shall assume the CSI-RS is transmitted is respectively the lowest resource block of the lowest subchannel and the number of resource blocks of the corresponding PSCCH/PSSCH transmission.  <<<unchanged text omitted>>>  -----------------------end text proposal for 38.211 -------------------------------- |

## #3 Reference in SCI fields

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| Tdoc, Source | R1-2101760 (Nokia, NSB), R1-2100333 (CATT, GOHIGH) |
| Reason for Change | Incorrect references |
| Summary for Change | Fix incorrections |
| Text Proposal | ----------------begin text proposal for 38.212, section 8.4.1 -------------------------  8.4.1.1 SCI format 2-A  SCI format 2-A is used for the decoding of PSSCH, with HARQ operation when HARQ-ACK information includes ACK or NACK, when HARQ-ACK information includes only NACK, or when there is no feedback of HARQ-ACK information.  The following information is transmitted by means of the SCI format 2-A:  - HARQ process number – bits as defined in clause 8.1 of [6, TS 38.214].  - New data indicator – 1 bit as defined in clause 8.1 of [6, TS 38.214].  - Redundancy version – 2 bits as defined in clause 8.1 of [6, TS 38.214].  - Source ID – 8 bits as defined in clause 8.1 of [6, TS 38.214].  - Destination ID – 16 bits as defined in clause 8.1 of [6, TS 38.214].  - HARQ feedback enabled/disabled indicator – 1 bit as defined in clause 8.1 of [6, TS 38.214] and 16.3 of [5, TS 38.213].  - Cast type indicator – 2 bits as defined in Table 8.4.1.1-1.  - CSI request – 1 bit as defined in clause 8.2.1 of [6, TS 38.214].  << unchanged parts omitted >>  8.4.1.2 SCI format 2-B  SCI format 2-B is used for the decoding of PSSCH, with HARQ operation when HARQ-ACK information includes only NACK, or when there is no feedback of HARQ-ACK information.  The following information is transmitted by means of the SCI format 2-B:  - HARQ process number – bits as defined in clause 8.1 of [6, TS 38.214].  - New data indicator – 1 bit as defined in clause 8.1 of [6, TS 38.214].  - Redundancy version – 2 bits as defined in clause 8.1 of [6, TS 38.214].  - Source ID – 8 bits as defined in clause 8.1 of [6, TS 38.214].  - Destination ID – 16 bits as defined in clause 8.1 of [6, TS 38.214].  - HARQ feedback enabled/disabled indicator – 1 bit as defined in clause 8.1 of [6, TS 38.214] and 16.3 of [5, TS 38.213].  - Zone ID – 12 bits as defined in clause 5.8.11 of [9, TS 38.331].  - Communication range requirement – 4 bits determined by higher layer parameter *sl-ZoneConfigMCR-Index*.  <<<unchanged text omitted>>>  -----------------------end text proposal for 38.212 -------------------------------- |

## #4 MCS Threshold for SL PT-RS

* TBD

## # Companies’ views

Each company is encouraged to provide the views on the above issue and proposal.

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| Company | Views |
|  | #1 FD-OCC:  #2 CSI-RS Resource:  #3 Reference in SCI fields: |
| Qualcomm | #1 FD-OCC: We do not agree with this change. First, it is not editorial and needs a detailed impact analysis. We’re also concerned about the impact on performance due to the potential increase of cross-correlation of the resulting DMRS sequences. The FD-OCC for PUSCH DMRS is also specified in the same manner as the current text for PSCCH DMRS.  #2 CSI-RS Resource: Is this change necessary? 8.2.1 in 38.214 already states “A UE transmits sidelink CSI-RS within a unicast PSSCH transmission”.  #3 Reference in SCI fields: We’re ok with the change  We’d also like to bring up a parameter name alignment issue: In 8.1.3.2 in 38.214, *sl-PSSCH-DMRS-TimePattern* is used instead of *sl-PSSCH-DMRS-TimePatternList* as the parameter is called in 38.331. |
| Samsung | #1 FD-OCC: This CR is not necessary. Current spec captures the agreed FD-OCC well. This CR is to change the sequence mapping but this is unnecessary. Moreover, at this stage, this CR will has an critical impact on implementation.  #2 CSI-RS Resource: We agree with QC’s point. Since 38.214 already capture this, CR is not necessary.  #3 Reference in SCI fields: These corrections are O.K |
| LGE | #1: The change is not needed. The mechanism of applying OCC to DMRS is the same as other DMRS such as PUSCH DMRS or PDSCH DMRS. In other words, the DMRS sequence value already does not need to be fixed across OCC values. Following is copy and paste of PDSCH DMRS part:    #2: We share the same understanding of Qualcomm and Samsung. TS38.214 already covers this issue.  #3: We have another approach.  Regarding HARQ process number, NDI, RV fields, the same description used in DCI format 0\_0 can be reused. Following is the copy and paste of relevant part of DCI format 0\_0:  - New data indicator – 1 bit  - Redundancy version – 2 bits as defined in Table 7.3.1.1.1-2  - HARQ process number – 4 bits  In our understanding, TS38.214 just include how to set values for these fields, but not the definition of them.  In this point of view, we do not need to add reference for HARQ feedback enabled/disabled indicator and need to remove TS38.213 as reference. Instead, we may need to add table in TS38.212 to define HARQ feedback enabled/disabled indicator. For instance, 0 means disabled and 1 means enabled. |
| vivo | #1: This change is not needed. The current FD-OCC mechanism is same as that for PUSCH DMRS, as also pointed out by QC, LGE.  #2: This change is not needed, as 38.214 already implements the agreement correctly.  #3: We agree that the current reference to 38.213 is not correct, but the reference to 38.214 is also not correct. Instead, the better reference should be **section 5.22.1.3, TS 38.321**. |
| Ericsson | #1 and #2: These changes are not needed in our view.  #3: We agree that the references need to be modified. In addition to the changes proposed, the following is needed in 8.4.1.1:  - Cast type indicator – 2 bits as defined in Table 8.4.1.1-1 and in clause 8.1 of [6, TS 38.214].  - CSI request – 1 bit as defined in clause 8.2.1 of [6, TS 38.214] and in clause 8.1 of [6, TS 38.214]. |
| Huawei, HiSilicon | #1. The change seems incorrect. The term and definition of and are reused from PDCCH DMRS, as per agreement for PSCCH DMRS as in RAN1#98bis:  *Agreements:*   * *Rel-15 NR PDCCH DMRS pattern is reused for PSCCH DMRS pattern.*   + *For frequency-domain pattern for PSCCH DMRS, reuse Rel-15 NR PDCCH DMRS, i.e., comb-4 fixed RE mapping for PSCCH DMRS.*   FD-OCC was additionally captured by the term which was given by the Table 8.4.1.3.2-1. The spec is clear without an error.  #2. The proposed change was already covered in 8.2.1 of TS38.214 as  “A UE transmits sidelink CSI-RS within a unicast PSSCH transmission … ”  in addition to giving full detail via higher layer parameters on time and frequency location:  “ The following parameters for CSI-RS transmission are configured ~~via the higher layer parameter [TBD]~~ for each CSI-RS configuration:  - *sl-CSI-RS-FirstSymbol* indicates the first OFDM symbol in a PRB used for SL CSI-RS  - *sl-CSI-RS-FreqAllocation* indicates the number of antenna ports and the frequency domain allocation for SL CSI-RS.  (…)  ”  We noticed the [TBD] and duplicate word “parameter” here can be deleted now, shown in red.  #3. It may be good that we can keep the same consistency in term of definition in L1 control signalling in single spec. As per LG’s suggestion, we can change to as follows, for both 2nd-stage SCI formats:  - HARQ process number – bits ~~as defined in clause 16.4 of [5, TS 38.213~~].  - New data indicator – 1 bit ~~as defined in clause 16.4 of [5, TS 38.213]~~.  - Redundancy version – 2 bits as defined in ~~clause 16.4 of [6, TS 38.214]~~ Table 7.3.1.1.1-2.  On HARQ feedback enabled/disabled indicator, we do not need the change. The field value is already covered in 16.3 of TS 38.213 as follows, and no able is needed.  (…)  If a UE receives a PSSCH in a resource pool and the HARQ feedback enabled/disabled indicator field in an associated SCI format 2-A or a SCI format 2-B has value 1 [5, TS 38.212], the UE provides the HARQ-ACK information in a PSFCH transmission in the resource pool.  (…)  Also fine to fix RRC parameter name misalignment, e.g. *sl-PSSCH-DMRS-TimePatternList,* can be captured. |
| Nokia, NSB | #1, #2: not needed  #3: OK. One can debate whether the proposed references actually define the fields or just specify how to set them. But for many of the fields there is no explicit definition and the text which specifies how to set the field is the closest we currently have to a definition. Note that also for DCI format 3\_0 and 3\_1, the fields are “defined” indirectly by reference to the text which specifies how to set them |
| OPPO | #1 FD-OCC: Not necessary, sequence elements FD-OCC applied to are not necessarily fixed.  #2 CSI-RS Resource: Not needed as pointed out by other companies.  #3 Reference in SCI fields: OK. |
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# Reference

1. R1-2100135 Draft TP on physical strucutre for NR sidelink OPPO
2. R1-2100410 Maintenance on physical layer structure for NR sidelink vivo
3. R1-2100514 Discussion on essential corrections in physical layer structure LG Electronics
4. R1-2100629 Correction to FD-OCC for PSCCH Intel Corporation
5. R1-2101174 Maintenance for NR Sidelink Physical Layer Structure Samsung
6. R1-2101532 Remaining issues on physical layer structure and procedures for NR sidelink Sharp
7. R1-2101709 Draft\_CR\_TS38.306 Ericsson
8. R1-2101760 Remaining details for Physical layer structure for sidelink Nokia, Nokia Shanghai Bell
9. R1-2100136 Remaining open issues and corrections for physical layer procedure OPPO
10. R1-2100335 Discussion and TPs on physical layer procedures in NR V2X CATT, GOHIGH
11. R1-2100516 Discussion on essential corrections in physical layer procedure LG Electronics
12. R1-2100631 Corrections to sidelink procedures Intel Corporation
13. R1-2100735 Remaining issues on physical layer procedures for NR sidelink Fujitsu
14. R1-2100800 Remaining issues on sidelink physical layer procedure Spreadtrum Communications
15. R1-2101344 Remaining Issues of Sidelink Physical Layer Procedures Apple
16. R1-2101438 Remaining Issues in Physical Layer Procedure Qualcomm Incorporated
17. R1-2101583 Maintenance for sidelink physical layer procedure NTT DOCOMO, INC.
18. R1-2101649 Remaining issues on type-1 HARQ-ACK codebook considering multiple sidelink reosurce pools ASUSTeK
19. R1-2101650 Remaining issues on sidelink procedure ASUSTeK
20. R1-2101733 Correction on determination of PSFCH resources based on a set of configured PRBs Huawei, HiSilicon
21. R1-2100137 Remaining open issues and corrections for mode 1 and mode 2 RA OPPO
22. R1-2100204 Remaining details of sidelink resource allocation mode 2 Huawei, HiSilicon
23. R1-2100334 Discussion and TPs on resource allocation in NR V2X CATT, GOHIGH
24. R1-2100411 Maintenance on resource allocation mechanisms for NR sidelink vivo
25. R1-2100515 Discussion on essential corrections in resource allocation for Mode 1 and 2 LG Electronics
26. R1-2100630 Corrections to Mode-2 resource allocation Intel Corporation
27. R1-2100734 A remaining issue on Mode-1 resource allocation for NR sidelink Fujitsu
28. R1-2100799 Remaining issues in NR sidelink mode 2 resource allocation Spreadtrum Communications
29. R1-2100937 Remaining issues on mode1 ZTE, Sanechips
30. R1-2100938 The slot set for SL resource allocation procedure ZTE, Sanechips
31. R1-2100945 Remaining issues on resource allocation mode 2 NEC
32. R1-2101073 Remaining issues on resource allocation mode 2 for NR V2X ETRI
33. R1-2101175 Draft CR on Sidelink Physical Duration to Logical Slot Conversion Samsung
34. R1-2101176 Maintenance for NR Sidelink Mode 2 Operation Samsung
35. R1-2101345 Remaining Issue of Mode 1 Resource Allocation Apple
36. R1-2101346 Remaining Issues of Mode 2 Resource Allocation Apple
37. R1-2101436 Remaining Issues in Mode 1 Resource Allocation Qualcomm Incorporated
38. R1-2101437 Remaining Issues in Mode 2 Resource Allocation Qualcomm Incorporated
39. R1-2101533 Remaining issues on resource allocation for NR sidelink Sharp
40. R1-2101571 Remaining issues on sidelink mode 2 ASUSTeK
41. R1-2101581 Maintenance for resource allocation mechanism mode 1 NTT DOCOMO, INC.
42. R1-2101582 Maintenance for sidelink synchronization and mode 2 NTT DOCOMO, INC.
43. R1-2101759 Remaining details for Resource allocation for sidelink - Mode 2 Nokia, Nokia Shanghai Bell
44. R1-2100333 Discussion and TPs on sidelink synchronization mechanism and physical layer structure in NR V2X CATT, GOHIGH
45. R1-2100412 Maintenance on NR sidelink synchronization and procedures vivo
46. R1-2100936 Remaining issues on sidelink synchronization ZTE, Sanechips
47. R1-2101534 Remaining issues on synchronization mechanism for NR sidelink Sharp
48. R1-2101732 Correction on PSBCH payload generation Huawei, HiSilicon
49. R1-2101707 Draft\_CR\_TS38.212 Ericsson
50. R1-2101708 Draft\_CR\_TS38.213 Ericsson