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

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

**Agenda item:** 7.2.4

**Source:** Moderator (Sharp)

**Title:** [106-e-NR-5G\_V2X-10] Discussion on editorial changes for recommendation to the editors

**Document for:** Discussion and Decision

# Introduction

This document is a summary of the following email discussion.

[106-e-NR-5G\_V2X-10] Discussion on editorial changes for recommendation to the editors by August 18 – Chao (Sharp)

* [R1-2108198](file:///C%3A%5Cluochao%5Cworkset%5Ccurrent%5Cmtgs%5CTSGR1_106-e%5Cemail-discussions%5CDocs%5CR1-2108198.zip): Clarification on frequency resources for PSFCH transmission
* [R1-2106506](file:///C%3A%5Cluochao%5Cworkset%5Ccurrent%5Cmtgs%5CTSGR1_106-e%5Cemail-discussions%5CDocs%5CR1-2106506.zip), [R1-2107220](file:///C%3A%5Cluochao%5Cworkset%5Ccurrent%5Cmtgs%5CTSGR1_106-e%5Cemail-discussions%5CDocs%5CR1-2107220.zip), [R1-2108080](file:///C%3A%5Cluochao%5Cworkset%5Ccurrent%5Cmtgs%5CTSGR1_106-e%5Cemail-discussions%5CDocs%5CR1-2108080.zip), [R1-2108081](file:///C%3A%5Cluochao%5Cworkset%5Ccurrent%5Cmtgs%5CTSGR1_106-e%5Cemail-discussions%5CDocs%5CR1-2108081.zip): Editorial corrections on RE mapping and CSI-RS sequence generation and sidelink reference signal scaling factors.
* [R1-2108082](file:///C%3A%5Cluochao%5Cworkset%5Ccurrent%5Cmtgs%5CTSGR1_106-e%5Cemail-discussions%5CDocs%5CR1-2108082.zip), [R1-2108190](file:///C%3A%5Cluochao%5Cworkset%5Ccurrent%5Cmtgs%5CTSGR1_106-e%5Cemail-discussions%5CDocs%5CR1-2108190.zip): Correction on the field description of DCI Format 3\_0
* [R1-2106860](file:///C%3A%5Cluochao%5Cworkset%5Ccurrent%5Cmtgs%5CTSGR1_106-e%5Cemail-discussions%5CDocs%5CR1-2106860.zip): Draft CR on editorial changes for RRC parameters in TS 38.213

# Discussion

## ISSUE#1: Clarification on frequency resources for PSFCH transmission

Note 2.1-1: the title of ISSUE#1 came from the first issue discussed in email thread “*[106-e-Prep-NR-Rel-16\_5G\_V2X]*” where contributions R1-2106475 [1] (“*Correction on PSFCH resource determination*”) and R1-2108198 [2] (“*Correction on frequency resources for PSSCH transmissions*”) were grouped for discussion.

### TP#1 for TS 38.213

R1-2108198 [2] proposed the changes as captured in TP#1.

Note 2.1.1-1: comparing to R1-2108198 [2], additional unchanged parts were removed by Moderator in TP#1 for conciseness.

* **TP#1 for TS 38.213**

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| **<Unchanged parts are omitted>**16.3 UE procedure for reporting HARQ-ACK on sidelink A UE can be indicated by an SCI format scheduling a PSSCH reception, in a number of sub-channels, to transmit a PSFCH with HARQ-ACK information in response to the PSSCH reception. The UE provides HARQ-ACK information that includes ACK or NACK, or only NACK.**<Unchanged parts are omitted>** |

####  Round#1 discussion on TP#1

Please provide your views on TP#1 in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| vivo | This part of the text is associated with the following text in the same section:- if *sl-PSFCH-CandidateResourceType* is configured as *allocSubCH*, and the PRBs are associated with one or more sub-channels from the sub-channels of the corresponding PSSCH.Not sure why only one of them is proposed for change if is the number of sub channels of PSSCH. |
| OPPO | Text consistency should be considered if this correction is applied. |
| NTT DOCOMO | The intention of the text ‘in one or more sub-channels from a number of sub-channels,’ is unclear for us. It seems that the subsequent texts specify well, so the whole part should be removed rather than only ‘one or more sub-channels from’. |
| NEC |  is defined here to represent the scheduled number of subchannels in the SCI and the number could be one or more sub-channels. To us, we defined in the beginning of this clause and then we can use it thereafter for simplicity. Our suggestion is* A UE can be indicated by an SCI format scheduling a PSSCH reception, in one or more sub-channels denoted by ,
* if *sl-PSFCH-CandidateResourceType* is configured as *allocSubCH*, and the PRBs are associated with the sub-channels of the corresponding PSSCH.
 |
| Huawei, HiSilicon | The correct reading of the original text is to associate the part between the commas (“in one or more sub-channels from a number of sub-channels”) with the transmission of PSFCH, not the scheduling of PSSCH. The original text is hence correct, and the premise on the draftCR’s cover sheet is not correct. If further clarity is essential - it may not be - then deleting the whole part between commas is better:A UE can be indicated by an SCI format scheduling a PSSCH reception~~, in one or more sub-channels from a number of sub-channels,~~ to transmit a PSFCH with HARQ-ACK information in response to the PSSCH reception.There is no need to remove the text where it later appears (see vivo’s comment), because it is correct to once again state that PSFCH is ***within a subset*** of PSSCH resources. |
| Qualcomm | We’re ok with the proposed change since it improves specifications clarity.However, subsequent appearances of similar wording should be kept since they correctly state that a PSSCH transmission’s PSFCH resources are contained within one or more of the sub-channels used for that PSSCH. |
| Ericsson | In our view, this clarification is not needed. The new TP says the same as the old text. There are more parts of the specification with the same sentence construction. |
| Apple | Fine with the changes. Maybe the similar changes are needed for the place pointed out by vivo.  |
| Nokia, NSB | Agree with the proposed change; regarding Huawei’s reading of the original text, if that was the intention then it would still be incorrect since the PSFCH transmission is not within the PSSCH sub-channels, it is in PRBs associated with the PSSCH sub-channels and these PRBs are not necessarily within the associated sub-channel.Also agree with vivo’s point and think that “one or more” in that instance should be replaced by “the”. The subject of this sentence is the total of all the PRBs associated with all the N\_{subch}^{PSSCH} sub-channels. |
| Sharp | We share Nokia’s understanding that “*the PSFCH transmission is not within the PSSCH sub-channels*”, as (1). PRBs for PSFCH and subchannels for PSSCH are separately configured; (2). Mapping of PSSCH to PSFCH is a function of SRC ID, which means for a given number of subchannels in a given slot, the RB for PSFCH can vary across all RBs configured for PSFCH. In that sense, the spec text as highlighted by vivo are actually also problematic.Regarding Ericsson’s comment, if we all agree that N\_{subch}^{PSSCH} is the number of subchannels of PSSCH (as indicated in SCI), then * it is unclear where this (i.e. “*N\_{subch}^{PSSCH} is the number of subchannels of PSSCH (as indicated in SCI*”) has been made clear in the current spec.
* if we take Huawei’s interpretation that it is about PSFCH, then it says PSFCH is in one or more of the N\_{subch}^{PSSCH} subchannels, it is inconsistent with the PSSCH-to-PSFCH mapping rule as specified in the same clause;
* if we take other companies’ interpretation that it is about PSSCH, then it says PSSCH is in one or more of the N\_{subch}^{PSSCH} subchannels, contradictory to the definition of N\_{subch}^{PSSCH} itself.

We are fine with NEC’s second proposed change, and for the first change, OK with “deleting the whole part”, or simple say * A UE can be indicated by an SCI format scheduling a PSSCH reception of sub-channels
 |
| ZTE,Sanechips | Similar view as vivo |
| Samsung | We are fine with the proposed change. The phrase “in one or more sub-channels from a number of sub-channels” describes the PSSCH reception, hence there is no need for “one or more sub-channels from” as all the sub-channels are used for PSSCH. can of course be one or more.The second appearance of “one or more sub-channels” is needed as commented by Qualcomm. |
| LG | Regarding the relationship between PRB set for PSFCH and subchannels for PSSCH, we did not agree that PSFCH PRBs are always confined within the subchannel(s) of the corresponding PSSCH. We had a lengthy discussion, and this kind of restriction is not agreed. That’s why the PRBs for PSFCH is currently (pre)configured via bitmap of PRBs. To avoid misinterpretation, we are OK with the change. N\_such^PSSCH itself is the number of sub-channels for a PSSCH reception. |

####  Round#2 discussion on TP#1

In Round#1 discussion, most companies seem to be fine with some changes, in one way or another, and one company believes no change is necessary.

Even among companies that are fine with some changes, there seems to be different technical understandings on the following two issues, and without aligning the technical understandings there seems to be no easily agreeable way forward on any change.

* **ISSUE#1-1: In the sentence “*A UE can be indicated by an SCI format scheduling a PSSCH reception, in one or more sub-channels from a number of sub-channels, to transmit a PSFCH with HARQ-ACK information in response to the PSSCH reception.*”, whether “*in one or more sub-channels from a number of sub-channels*” describes frequency resources for a PSSCH or frequency resources for a PSFCH.**
* **ISSUE#1-2: whether a PSFCH transmission is confined within the sub-channel(s) of a corresponding PSSCH.**

On the potential different interpretations of spec text caused by ISSUE#1-1, it seems removing “*in one or more sub-channels from a number of sub-channels*” as a whole can be one way forward in accommodating different views. (In the next occurrence of , the current spec already explains it like “… the sub-channels of the corresponding PSSCH” anyway, so maybe it is not strictly necessary to “define” the notation at the beginning of the clause)

On ISSUE#1-2, not all companies have expressed a view, so it may be worth some technical discussions in a second round.

And on the yellow-highlighted spec text in vivo’s comment in Round#1 discussion, Moderator’s understanding is that and respectively correspond to the two cases in the following RAN1 agreements. Companies may take this into account in the discussions.

|  |
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| Agreement:  One of the following two options is (pre-)configured per resource pool.  Option 1: The set of PRBs for the candidate PSFCH resource is determined by the starting sub-channel and slot used for that PSSCH.  Option 2: The set of PRBs for the candidate PSFCH resource is determined by the sub-channel(s) and slot used for that PSSCH. |

In light of the above observations, two TPs are prepared below, where TP#1-1 corresponds to “yes” to ISSUE#1-2, and TP#1-2 corresponds to “no” to ISSUE#1-2.

* **TP#1-1 for TS 38.213**

|  |
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| **<Unchanged parts are omitted>**16.3 UE procedure for reporting HARQ-ACK on sidelink A UE can be indicated by an SCI format scheduling a PSSCH reception to transmit a PSFCH with HARQ-ACK information in response to the PSSCH reception. The UE provides HARQ-ACK information that includes ACK or NACK, or only NACK.**<Unchanged parts are omitted>** |

* **TP#1-2 for TS 38.213**

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| --- |
| **<Unchanged parts are omitted>**16.3 UE procedure for reporting HARQ-ACK on sidelink A UE can be indicated by an SCI format scheduling a PSSCH reception to transmit a PSFCH with HARQ-ACK information in response to the PSSCH reception. The UE provides HARQ-ACK information that includes ACK or NACK, or only NACK.**<Unchanged parts are omitted>**A UE determines a number of PSFCH resources available for multiplexing HARQ-ACK information in a PSFCH transmission as where is a number of cyclic shift pairs for the resource pool provided by *sl-NumMuxCS-Pair* and, based on an indication by *sl-PSFCH-CandidateResourceType*,- if *sl-PSFCH-CandidateResourceType* is configured as *startSubCH*, and the PRBs are associated with the starting sub-channel of the corresponding PSSCH; - if *sl-PSFCH-CandidateResourceType* is configured as *allocSubCH*, and the PRBs are associated with the sub-channels of the corresponding PSSCH.**<Unchanged parts are omitted>** |

Please provide your views on which of the following options should be agreed/concluded in the table below.

* Option 1-1: Adopt TP#1-1 for recommendation to the editors.
* Option 1-2: Adopt TP#1-2 for recommendation to the editors.
* Option 1-3: No change is necessary.
* Option 1-4: None of the above. (please specify your proposed way forward in this case)

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| --- | --- |
| **Company** | **View** |
| LG | Option 1-2 seem clearer to reflect the agreement.  |
| NEC | Option 1-2 with modification. We think it should be NO to issue 1-2, the PSFCH PRB is counted in contiguous way and there are also part of frequency not configured for PSFCH. So, PSFCH transmission cannot be confined within the sub-channel(s) of a corresponding PSSCH.For no ambiguity purpose, we still prefer to define the notation somewhere because “ sub-channels of the corresponding PSSCH” is not exactly equals to “ is the allocated number of sub-channels of the corresponding PSSCH”. For example, if PSSCH has 5 subchannels, one can still say “... are associated with the 2 sub-channels of the corresponding PSSCH...”**<Unchanged parts are omitted>**16.3 UE procedure for reporting HARQ-ACK on sidelink A UE can be indicated by an SCI format scheduling a PSSCH reception to transmit a PSFCH with HARQ-ACK information in response to the PSSCH reception. The UE provides HARQ-ACK information that includes ACK or NACK, or only NACK.**<Unchanged parts are omitted>**A UE determines a number of PSFCH resources available for multiplexing HARQ-ACK information in a PSFCH transmission as where is a number of cyclic shift pairs for the resource pool provided by *sl-NumMuxCS-Pair* and, based on an indication by *sl-PSFCH-CandidateResourceType*,- if *sl-PSFCH-CandidateResourceType* is configured as *startSubCH*, and the PRBs are associated with the starting sub-channel of the corresponding PSSCH; - if *sl-PSFCH-CandidateResourceType* is configured as *allocSubCH*, and the PRBs are associated with the allocated sub-channels of the corresponding PSSCH. (or we add here : where is the sub-channel number allocated for the corresponding PSSCH )**<Unchanged parts are omitted>** |
| OPPO | Option 1-2 can be supported, it is general and clear enough. |
| Huawei, HiSilicon | TP1-1 is sufficient. TP1-2 fixes a non-existent problem, because the wording already merely says “associated with”, and does not say “within”. (We don’t agree with the logic for what TP corresponds to what status of what sub-issue!). |
| vivo | Option 1-2 |
| Samsung | Option 1-1 is sufficient |
| Qualcomm | We agree with TP 1-1 but don’t think the additional change in TP 1-2 is strictly necessary. |
| Sharp | Option 1-2 |
| ZTE, Sanechips | Option 1-2 seems more clearer. |
| Nokia, NSB | Option 1-2 |

## ISSUE#2: Editorial corrections on RE mapping and CSI-RS sequence generation and sidelink reference signal scaling factors

### TP#2-1 for TS 38.211

R1-2106506 [3] proposed the changes as captured in TP#2-1 (where the last change was also proposed in R1-2107220 [4]).

* **TP#2-1 for TS 38.211**

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| --- |
| **<Unchanged parts omitted>**8.3.1.5 Mapping to virtual resource blocksFor each of the antenna ports used for transmission of the PSSCH, the block of complex-valued symbols shall be multiplied with the amplitude scaling factor in order to conform to the transmit power specified in [5, TS 38.213] and mapped to resource elements in the virtual resource blocks assigned for transmission, where is the first subcarrier in the lowest-numbered virtual resource block assigned for transmission.The mapping operation shall be done in two steps:- first, the complex-valued symbols corresponding to the bit for the 2nd-stage SCI in increasing order of first the index over the assigned virtual resource blocks and then the index , starting from the first PSSCH symbol carrying an associated DM-RS and meeting all of the following criteria:- the corresponding resource elements in the corresponding physical resource blocks are not used for transmission of the associated DM-RS, PT-RS, or PSCCH;- secondly, the complex-valued modulation symbols not corresponding to the 2nd -stage SCI shall be in increasing order of first the index over the assigned virtual resource blocks, and then the index with the starting position given by [6, TS 38.214] and meeting all of the following criteria:- the resource elements are not used for 2nd-stage SCI in the first step; - the corresponding resource elements in the corresponding physical resource blocks are not used for transmission of the associated DM-RS, PT-RS, CSI-RS, or PSCCH.**<Unchanged parts omitted>**8.4.1.2.2 Mapping to physical resources**<Unchanged parts omitted>**For the purpose of PT-RS mapping, the resource blocks allocated for PSSCH transmission are numbered from 0 to from the lowest scheduled resource block to the highest. The corresponding subcarriers in this set of resource blocks are numbered in increasing order starting from the lowest frequency from 0 to . The subcarriers to which the PT-RS shall be mapped are given bywhere- - is given by Table 8.4.1.2.2-1 for the DM-RS port associated with the PT-RS port according to clause 8.2.3 in [6, TS 38.214].  **<Unchanged parts omitted>** |

####  Round#1 discussion on TP#2-1

Please provide your views on TP#2-1 in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| vivo | OK with the changes. |
| OPPO | OK. |
| NTT DOCOMO | OK with the changes. |
| NEC | OK |
| Huawei, HiSilicon | OK |
| Qualcomm | We’re ok with the changes. |
| Ericsson | OK |
| Apple | OK |
| Nokia, NSB | OK |
| Sharp | OK |
| ZTE,Sanechips | OK |
| Samsung | Agree with changes |
| LG | OK |
| Nokia, NSB | OK |

####  Round#2 discussion on TP#2-1

It seems there is consensus on TP#2-1, so the following is proposed.

* **Proposal 1: Adopt TP#2-1 for recommendation to the editors.**

In case you have a concern on Proposal 1, please provide it in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| LG | OK |
| NEC | OK |
| OPPO | OK |
| Huawei, HiSilicon | OK |
| vivo | OK |
| Samsung | OK |
| Qualcomm | OK |
| Sharp | OK |
| ZTE, Sanechips | OK |
| Nokia, NSB | OK |

### TP#2-2 for TS 38.211

R1-2107220 [4] proposed the changes as captured in TP#2-2, plus a change which was captured in TP#2-1, above.

* **TP#2-2 for TS 38.211**

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| \*\*\* Unchanged text is omitted \*\*\*8.4.1.5.2 Sequence generationThe sequence shall be generated according towhere the pseudo-random sequence is defined in clause 5.2.1. The pseudo-random sequence generator shall be initialised withat the start of each OFDM symbol where is the slot number within a radio frame, is the OFDM symbol number within a slot, and where the quantity equals the decimal representation of CRC for the sidelink control information mapped to the PSCCH associated with the CSI-RS according to with and given by clause 7.3.2 in [4, TS 38.212].\*\*\* Unchanged text is omitted \*\*\* |

####  Round#1 discussion on TP#2-2

Please provide your views on TP#2-2 in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| vivo | OK with the change |
| OPPO | OK. |
| NTT DOCOMO | OK with the change |
| NEC | OK |
| Huawei, HiSilicon | OK |
| Qualcomm | We’re ok with the change. |
| Ericsson | OK |
| Apple | OK |
| Nokia, NSB | OK |
| Sharp | OK |
| ZTE,Sanechips | OK |
| Samsung | Agree with change |
| LG | OK |
| Nokia, NSB | OK |

####  Round#2 discussion on TP#2-2

It seems there is consensus on TP#2-2, so the following is proposed.

* **Proposal 2: Adopt TP#2-2 for recommendation to the editors.**

In case you have a concern on Proposal 2, please provide it in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| LG | OK |
| NEC | OK |
| OPPO | OK |
| Huawei, HiSilicon | OK |
| vivo | OK |
| Samsung | OK |
| Qualcomm | OK |
| Sharp | OK |
| ZTE, Sanechips | OK |
| Nokia, NSB | OK |

### TP#2-3 for TS 38.211

R1-2108080 [5] proposed the changes as captured in TP#2-3.

* **TP#2-3 for TS 38.211**

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| --- |
| **<Unchanged parts omitted>**8.3.2.3 Mapping to physical resourcesThe set of complex-valued modulation symbols shall be multiplied with the amplitude scaling factor in order to conform to the transmit power specified in [5, TS 38.213] and mapped in sequence starting with to resource elements assigned for transmission according to clause 16.4 of [5, TS 38.213], and not used for the demodulation reference signals associated with PSCCH, in increasing order of first the index over the assigned physical resources, and then the index on antenna port. The resource elements used for the PSCCH in the first OFDM symbol in the mapping operation above shall be duplicated in the immediately preceding OFDM symbol.**<Unchanged parts omitted>**8.4.1.3.2 Mapping to physical resourcesThe sequence shall be multiplied with the amplitude scaling factor  ~~in order to conform to the transmit power specified in [5, 38.213]~~ specified in clause 8.3.2.3 and mapped in sequence starting with to resource elements in a slot on antenna port according to**<Unchanged parts omitted>**8.4.3.1.3 Mapping of PSBCH and DM-RS within an S-SS/PSBCH blockThe sequence of complex-valued symbols constituting the physical sidelink broadcast channel shall be scaled by a factor to conform to the PSBCH power allocation specified in [5, TS 38.213] and mapped in sequence starting with to resource elements which meet all the following criteria:- they are not used for PSBCH demodulation reference signalsThe mapping to resource elements not reserved for PSBCH DM-RS shall be in increasing order of first the index and then the index, where and represent the frequency and time indices, respectively, within one S-SS/PSBCH block and are given by Table 8.4.3.1-1.The sequence of complex-valued symbols constituting the demodulation reference signals for the S-SS/PSBCH block shall be scaled by a factor of ~~to conform to the PSBCH power allocation specified in [5, TS 38.213]~~ and mapped to resource elements in increasing order of first and then where and are given by Table 8.4.3.1-1 and represent the frequency and time indices, respectively, within one S-SS/PSBCH block.**<Unchanged parts omitted>** |

####  Round#1 discussion on TP#2-3

Please provide your views on TP#2-3 in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| vivo | The motivation of these changes is not clear. The current text seems aligned with the wording used in Uu. |
| OPPO | 1. The scaling factor has different styles of marks: e.g. and . The DMRS and PSBCH/PSCCH are at different mark places. Besides, DMRS also has difference types as “DMRS” and “DM-RS”. Correction is necessary, but alignment should be considered.
2. For the other corrections, it is not clear about the motivation of deleting the words.
 |
| NTT DOCOMO | Further clarification is needed. |
| NEC | Agree with OPPO |
| Huawei, HiSilicon | References to the same symbol should be the same, so if e.g. PSCCH should have the same power as PSCCH-DMRS, then such changes are necessary, and similar for PSBCH and its DMRS. Deleting the words “to conform with …” is not essential/necessary. |
| Qualcomm | We are ok with the changes to the variable names but don’t think that the other changes to text are necessary. |
| Ericsson | It is not clear to us why it is necessary to delete part of the text related to “PSBCH power allocation”. Moreover, regarding the editorial changes to the name of the parameter , there are different denominations within the text proposal. This should be aligned. |
| Apple | Suggest aligning the notation formats across the spec. Further clarification is needed on deleting the words “to conform to …” |
| Nokia, NSB | OK, but notation should be made consistent. |
| Sharp | It seems the proposed changes were motivated by the fact that in the current spec, for PSSCH, a same scaling factor () is used for both PSSCH and PSSCH DMRS. And the proponent intended to align this fact for (PSCCH and PSCCH DMRS) and (PSBCH and PSBCH DMRS). It that the correct understanding of the intention?If the above understanding of the intention is correct, we would tend to think that the current spec for PSSCH should rather be changed such that, similarly to PUSCH in Uu, the scaling factor for PSSCH DMRS is (as currently specified), and the scaling factor for PSSCH is corrected from to . |
| ZTE,Sanechips | Firstly, it is necessary to align scaling factor of PSCCH and scaling factor of PSCCH DMRS, and to align scaling factor of PSBCH and scaling factor of PSBCH DMRS, i.e. the power of PSCCH DMRS and PSCCH should be the same, and the same for PSSCH DMRS and PSSCH.Secondly, we are okay to correct the formula type as OPPO mentioned.Thirdly, the words should be deleted as there is no dedicated DMRS power control formula in the referred section, which is also consistent with other Uu sections capturing the channel and the corresponding RS multiplexed. |
| Samsung | Agree only to align the parameter notation in the specifications.Don’t agree on other changes related to text deletion. |
| LG | We are OK to change the parameter name for scaling factor.  |

####  Round#2 discussion on TP#2-3

In Round#1 discussion, most companies seem to be fine with using a same scaling factor () for both PSCCH and PSCCH DM-RS (and another same scaling factor for PSBCH and PSBCH DM-RS). Two companies are of a different view that use of scaling factors for SL channels and their corresponding DM-RS should follow Uu, e.g. for PUSCH and for PUSCH DM-RS as currently specified in TS 38.211.

It is also observed from Round#1 discussion that there are a few objections to deletion of “in order to conform to …” in TP#2-3.

In Round#2 discussion, Moderator would like to find some common grounds by taking most of the comments received so far into account. As a result, TP#2-3 is updated to TP#2-3-1 considering the comments received in Round#1 discussion, i.e. alignment of notation naming styles, and objection to deletion of “to conform to …”.

* **TP#2-3-1 for TS 38.211**

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| **<Unchanged parts omitted>**8.3.2.3 Mapping to physical resourcesThe set of complex-valued modulation symbols shall be multiplied with the amplitude scaling factor in order to conform to the transmit power specified in [5, TS 38.213] and mapped in sequence starting with to resource elements assigned for transmission according to clause 16.4 of [5, TS 38.213], and not used for the demodulation reference signals associated with PSCCH, in increasing order of first the index over the assigned physical resources, and then the index on antenna port. The resource elements used for the PSCCH in the first OFDM symbol in the mapping operation above shall be duplicated in the immediately preceding OFDM symbol.**<Unchanged parts omitted>**8.4.3.1.3 Mapping of PSBCH and DM-RS within an S-SS/PSBCH blockThe sequence of complex-valued symbols constituting the physical sidelink broadcast channel shall be scaled by a factor to conform to the PSBCH power allocation specified in [5, TS 38.213] and mapped in sequence starting with to resource elements which meet all the following criteria:- they are not used for PSBCH demodulation reference signalsThe mapping to resource elements not reserved for PSBCH DM-RS shall be in increasing order of first the index and then the index, where and represent the frequency and time indices, respectively, within one S-SS/PSBCH block and are given by Table 8.4.3.1-1.The sequence of complex-valued symbols constituting the demodulation reference signals for the S-SS/PSBCH block shall be scaled by a factor of to conform to the PSBCH power allocation specified in [5, TS 38.213] and mapped to resource elements in increasing order of first and then where and are given by Table 8.4.3.1-1 and represent the frequency and time indices, respectively, within one S-SS/PSBCH block.**<Unchanged parts omitted>** |

Please provide your views on TP#2-3-1 in the table below.

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| --- | --- |
| **Company** | **View** |
| LG | We are supportive of TP#2-3-1.  |
| NEC | OK |
| OPPO | The updated TP#2-3-1 is supported.BTW, the scaling factor Beta in TS38.214 (section 8.2.1) should also be updated from “DM-RS” to “DMRS”. |
| Huawei, HiSilicon | OK |
| vivo | This TP is not needed. It does not resolve any real issue. There should not be any confusion (e.g., applying different power scaling for RS and data RE) according to the power control procedure in 213. |
| Samsung | OK |
| Qualcomm | OK |
| Sharp | OK if it is the majority view that a same scaling factor should be used for a SL channel and DM-RS. |
| ZTE,Sanechips | Ok and also fined with OPPO's suggestion |
| Nokia, NSB | OK |

### TP#2-4 for TS 38.214

R1-2108081[6] proposed the changes as captured in TP#2-4.

* **TP#2-4 for TS 38.214**

|  |
| --- |
| **<Unchanged parts omitted>**8.2 UE procedure for transmitting sidelink reference signals8.2.1 CSI-RS transmission procedureA UE transmits sidelink CSI-RS within a unicast PSSCH transmission if the following conditions hold:- CSI reporting is enabled by higher layer parameter *sl-CSI-Acquisition*; and- the '*CSI request*' field in the corresponding SCI format 2-A is set to 1.The following parameters for CSI-RS transmission are configured 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. When the UE is configured with *Qp*={1,2} CSI-RS port(s) in sidelink and the number of scheduled layers is ,- The CSI-RS scaling factor specified in clause 8.4.1.5.3 of [4, TS 38.211] is given by where is the scaling factor for the corresponding PSSCH specified in clause 8.3.1.5 of [4, TS 38.211].8.2.2 PSSCH DM-RS transmission procedureThe UE selects the DM-RS time domain pattern out of the patterns configured using the higher layer parameter *sl-PSSCH-DMRS-TimePatternList* for the resource pool on which the PSSCH is to be transmitted. If more than one DM-RS time domain pattern is configured, the selected pattern is indicated by the '*DMRS pattern*' field in the SCI format 1-A associated with the PSSCH transmission.If PSSCH DM-RS and PSCCH are mapped to the same OFDM symbol, then this mapping within a single sub-channel is only supported if higher layer parameter *sl-SubchannelSize* >= 20, i.e. the sub-channel size is at least 20 PRBs. When a sub-channel size is less than 20 PRBs and the size of PSCCH is less than the sub-channel size, a UE is not expected to choose a PSSCH DM-RS pattern to be transmitted in the same OFDM symbol with PSCCH.8.2.3 PT-RS transmission procedureTransmission of PT-RS is only supported in frequency range 2.The UE PT-RS transmission procedure specified in clause 6.2.3.1 applies for derivation of the PT-RS parameters *LPT-RS* and*, KPT-RS* and for determination of PT-RS presence, with the following changes:- *timeDensity* and *frequencyDensity* in *PTRS-UplinkConfig* are replaced by *sl-PTRS-TimeDensity* and *sl-PTRS-FreqDensity* in *SL-PTRS-Config* respectively, and *SL-PTRS-Config* is (pre)configured per resource pool;- the number of antenna ports is the same as the number of PSSCH DM-RS antenna ports and the association between a PT-RS antenna port and a PSSCH DM-RS antenna port is fixed.- The PT-RS scaling factor is given by , where is the scaling factor for the corresponding PSSCH specified in clause 8.3.1.5 of [4, TS 38.211].**<Unchanged parts omitted>** |

####  Round#1 discussion on TP#2-4

Please provide your views on TP#2-4 in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| Vivo | The editorial changes seem fine, but the added last sentence is not necessary. In 211 the scaling factor for PT-RS is already defined:The PSSCH PT-RS shall be mapped to resource elements according to  |
| OPPO | 1. Similar with TP#2-3 about the style of the factor . The mark place for “DM-RS/DMRS” and “PSSCH” should be aligned through all the spec.
2. The other correction about PT-RS scaling factor is not needed.
 |
| NTT DOCOMO | Agree with vivo. |
| NEC | Agree with OPPO, there are many DMRS/DM-RS across specs |
| Huawei, HiSilicon | Apart from the last change, this is ok, ensuring same notation between different parts of spec. |
| Qualcomm | We agree with vivo’s comment that only the changes in 8.2.1 are necessary. |
| Ericsson | The editorial change to the formula is OK. |
| Apple | Agree with OPPO. Need to align the notations across the specification.  |
| Nokia, NSB | Agree with vivo |
| Sharp | See our comment to TP#2-3. We think what should be changed is the scaling factor for PSSCH (from to ). Aligning “DMRS” and “DM-RS” is OK though much less “essential”. |
| ZTE,Sanechips | Agree with vivo on the formula in 211. The issue without the addition of the sentence in 8.2.3 is the main bullet says 6.2.3.1 **is used except for the changes in the sub-bullets, without the added sentence, the scaling factor shall be referred to as in 6.2.3.1 instead of the correct place in 211, making the spec. wrong.** |
| Samsung | Agree to change to section 8.2.1Change to section 8.2.3 is not needed. |
| LG | We share the same view with vivo.  |

####  Round#2 discussion on TP#2-4

In Round#1 discussion, it seems most companies are of the view that the first change is OK and the second change is not necessary.

TP#2-4 is thus updated to TP#2-4-1, keeping only the first change (rewritten to minimize the revision marks).

* **TP#2-4-1 for TS 38.214**

|  |
| --- |
| **<Unchanged parts omitted>**8.2 UE procedure for transmitting sidelink reference signals8.2.1 CSI-RS transmission procedure**<Unchanged parts omitted>**When the UE is configured with *Qp*={1,2} CSI-RS port(s) in sidelink and the number of scheduled layers is ,- The CSI-RS scaling factor specified in clause 8.4.1.5.3 of [4, TS 38.211] is given by where is the scaling factor for the corresponding PSSCH specified in clause 8.3.1.5 of [4, TS 38.211].**<Unchanged parts omitted>** |

Please provide your views on TP#2-4-1 in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| LG | We are supportive of TP#2-4-1. |
| NEC | OK |
| OPPO | OK |
| Huawei, HiSilicon | OK |
| vivo | OK |
| Samsung | OK |
| Qualcomm | OK |
| Sharp | OK if it is the majority view that a same scaling factor should be used for a SL channel and DM-RS. |
| ZTE,Sanechips | OK for progress |
| Nokia, NSB | OK |

## ISSUE#3: Correction on the field description of DCI Format 3\_0

### TP#3 for TS 38.212

R1-2108082 [7] and R1-2108190 [8] proposed the (same) changes as captured in TP#3.

* **TP#3 for TS 38.212**

|  |
| --- |
| **<Unchanged parts omitted>**7.3.1.4.1 Format 3\_0DCI format 3\_0 is used for scheduling of NR PSCCH and NR PSSCH in one cell. The following information is transmitted by means of the DCI format 3\_0 with CRC scrambled by SL-RNTI or SL-CS-RNTI: - Resource pool index – bits, where *I* is the number of resource pools for transmission configured by the higher layer parameter *sl-TxPoolScheduling*.- Time gap – 3 bits determined by higher layer parameter *sl-DCI-ToSL-Trans,* as defined in clause 8.1.2.1 of [6, TS 38.214]- HARQ process number – 4 bits.- New data indicator – 1 bit.**<Unchanged parts omitted>** |

####  Round#1 discussion on TP#3

Please provide your views on TP#3 in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| vivo | OK with the changes. |
| OPPO | OK. |
| NTT DOCOMO | OK with the changes. |
| NEC | OK |
| Huawei, HiSilicon | OK |
| Qualcomm | We’re ok with the changes. |
| Ericsson | OK |
| Apple | OK |
| Nokia, NSB | OK |
| Sharp | OK |
| ZTE,Sanechips | OK |
| Samsung | Agree with changes. |
| LG | OK |

####  Round#2 discussion on TP#3

It seems there is consensus on TP#3, so the following is proposed.

* **Proposal 3: Adopt TP#3 for recommendation to the editors.**

In case you have a concern on Proposal 3, please provide it in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| LG | OK |
| NEC | OK |
| OPPO | OK |
| Huawei, HiSilicon | OK |
| vivo | OK |
| Samsung | OK |
| Qualcomm | OK |
| Sharp | OK |
| ZTE,Sanechips | OK |
| Nokia, NSB | OK |

## ISSUE#4: Draft CR on editorial changes for RRC parameters in TS 38.213

### TP#4 for TS 38.213

R1-2106860 [9] proposed the changes as captured in TP#4.

Note 2.4.1-1: comparing to R1-2106860 [9], additional unchanged parts were removed by Moderator in TP#4 for conciseness.

* **TP#4 for TS 38.213**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **<Unchanged parts are omitted>**16.1 Synchronization procedures**<Unchanged parts are omitted>**A UE is provided, by *sl-NumSSB-WithinPeriod*, a number of S-SS/PSBCH blocks in a period of 16 frames. The UE assumes that a transmission of the S-SS/PSBCH blocks in the period is with a periodicity of 16 frames. The UE determines indexes of slots that include S-SS/PSBCH block as +, where- index 0 corresponds to a first slot in a frame with SFN satisfying - is a S-SS/PSBCH block index within the number of S-SS/PSBCH blocks in the period, with - is a slot offset from a start of the period to the first slot including S-SS/PSBCH block, provided by *sl-TimeOffsetSSB*- is a slot interval between S-SS/PSBCH blocks, provided by *sl-TimeInterval*For paired spectrum, an S-SS/PSBCH block can be transmitted/received only in a slot of an UL carrier. For unpaired spectrum, an S-SS/PSBCH block can be transmitted/received only in a slot of which all OFDM symbols are semi-statically configured as UL as per the higher layer parameter *tdd-UL-DL-ConfigurationCommon* of the serving cell if providedor *sl-TDD-Configuration* if provided or *sl-TDD-Config* of the received PSBCH if provided. Or if *tdd-UL-DL-ConfigurationCommon* and *sl-TDD-Configuration* are not provided for a spectrum indicated with only PC5 interface in Table 5.2E.1-1 in [TS 38.101-1], an S-SS/PSBCH block can be transmitted/received in any slot of the spectrum.For transmission of an S-SS/PSBCH block, a UE includes a bit sequence in the PSBCH payload to indicate *sl-TDD-Config* and provide a slot format over a number of slots.For paired spectrum, or if *tdd-UL-DL-ConfigurationCommon* and *sl-TDD-Configuration* are not provided for a spectrum indicated with only PC5 interface in Table 5.2E.1-1 in [TS 38.101-1], - are set to '1';else- if *pattern1* is provided by *sl-TDD-Configuration* or *tdd-UL-DL-ConfigurationCommon*; if both *pattern1* and *pattern2* are provided by *sl-TDD-Configuration* or *tdd-UL-DL-ConfigurationCommon* as described in clause 11.1- are determined based on- in *pattern1* as described in Table 16.1-1 for - in *pattern1* and *in pattern2* as described in Table 16.1-2 for where and are as described in clause 11.1- are the 7th to 1st LSBs of , respectively- for , - for , where- is the number of symbols in a slot: if *cyclicPrefix* = "ECP"; else,- is 1 if , else is 0- is 1 if , else is 0 - is the sidelink starting symbol index provided by *sl-StartSymbol*- is the granularity of slots indication as described in Table 16.1-2- , , , , are the parameters of *TDD-UL-ConfigurationCommon* as described in clause 11.1, or the parameters of *sl-TDD-Configuration* as defined in [9.3, TS 38.331]- corresponds to SL SCS as defined in [4, TS 38.211]**Table 16.1-1: Slot configuration period when one pattern is indicated**

|  |  |
| --- | --- |
|  | **Slot configuration period of *pattern1*** **(msec)** |
| 0, 0, 0, 0 | 0.5 |
| 0, 0, 0, 1 | 0.625 |
| 0, 0, 1, 0 | 1 |
| 0, 0, 1, 1 | 1.25 |
| 0, 1, 0, 0 | 2 |
| 0, 1, 0, 1 | 2.5 |
| 0, 1, 1, 0 | 4 |
| 0, 1, 1, 1 | 5 |
| 1, 0, 0, 0 | 10 |
| Reserved | Reserved |

**Table 16.1-2: Slot configuration period and granularity when two patterns are indicated**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Slot configuration period of *pattern1*** **(msec)** | **Slot configuration period of *pattern2*** **(msec)** | **Granularity in slots with different SCS** |
| 15 kHz | 30 kHz | 60 kHz | 120 kHz |
| 0, 0, 0, 0 | 0.5 | 0.5 | 1 |
| 0, 0, 0, 1 | 0.625 | 0.625 |
| 0, 0, 1, 0 | 1 | 1 |
| 0, 0, 1, 1 | 0.5 | 2 |
| 0, 1, 0, 0 | 1.25 | 1.25 |
| 0, 1, 0, 1 | 2 | 0.5 |
| 0, 1, 1, 0 | 1 | 3 | 1 | 2 |
| 0, 1, 1, 1 | 2 | 2 |
| 1, 0, 0, 0 | 3 | 1 |
| 1, 0, 0, 1 | 1 | 4 |
| 1, 0, 1, 0 | 2 | 3 |
| 1, 0, 1, 1 | 2.5 | 2.5 |
| 1, 1, 0, 0 | 3 | 2 |
| 1, 1, 0, 1 | 4 | 1 |
| 1, 1, 1, 0 | 5 | 5 | 1 | 2 | 4 |
| 1, 1, 1, 1 | 10 | 10 | 1 | 2 | 4 | 8 |

**<Unchanged parts are omitted>**16.2.1 PSSCHA UE determines a power for a PSSCH transmission on a resource pool in symbols where a corresponding PSCCH is not transmitted in PSCCH-PSSCH transmission occasion on active SL BWP of carrier of serving cell as: [dBm]where- is defined in [8-1, TS 38.101-1]- is determined by a value of *sl-MaxTransPower* based on a priority level of the PSSCH transmission and a CBR range that includes a CBR measured in slot [6, TS 38.214]; if *sl-MaxTransPower* is not provided, then ;**<Unchanged parts are omitted>**16.5 UE procedure for reporting HARQ-ACK on uplink**<Unchanged parts are omitted>**For DCI format 3\_0, if present, the PSFCH-to-HARQ\_feedback timing indicator field values map to values for a set of number of slots provided by *sl-PSFCH-ToPUCCH* as defined in Table 16.5-2.**Table 16.5-2: Mapping of PSFCH-to-HARQ\_feedback timing indicator field values to numbers of slots**

|  |  |
| --- | --- |
| **PSFCH-to-HARQ\_feedback timing indicator**  | **Number of slots**  |
| 1 bit | 2 bits | 3 bits |  |
| '0' | '00' | '000' | 1st value provided by *sl-PSFCH-ToPUCCH*  |
| '1' | '01' | '001' | 2nd value provided by *sl-PSFCH-ToPUCCH* |
|  | '10' | '010' | 3rd value provided by *sl-PSFCH-ToPUCCH* |
|  | '11' | '011' | 4th value provided by *sl-PSFCH-ToPUCCH* |
|  |  | '100' | 5th value provided by *sl-PSFCH-ToPUCCH* |
|  |  | '101' | 6th value provided by *sl-PSFCH-ToPUCCH* |
|  |  | '110' | 7th value provided by *sl-PSFCH-ToPUCCH* |
|  |  | '111' | 8th value provided by *sl-PSFCH-ToPUCCH* |

With reference to slots for PUCCH transmissions and for a number of PSFCH reception occasions ending in slot , the UE provides the generated HARQ-ACK information in a PUCCH transmission within slot , subject to the overlapping conditions in clause 9.2.5, where is a number of slots indicated by a PSFCH-to-HARQ\_feedback timing indicator field, if present, in a DCI format indicating a slot for PUCCH transmission to report the HARQ-ACK information, or is provided by *sl-PSFCH-ToPUCCH* for a transmission scheduled by a DCI format or for a SL configured grant type 2, or by *sl-PSFCH-ToPUCCH-CG-Type1* for a SL configured grant type 1. corresponds to a last slot for a PUCCH transmission that would overlap with the last PSFCH reception occasion assuming that the start of the sidelink frame is same as the start of the downlink frame [4, TS 38.211].For a PSSCH transmission by a UE that is scheduled by a DCI format, or for a SL configured grant Type 2 PSSCH transmission activated by a DCI format, the DCI format indicates to the UE that a PUCCH resource is not provided when a value of the PUCCH resource indicator field is zero and a value of PSFCH-to-HARQ feedback timing indicator field, if present, is zero. For a SL configured grant Type 2 PSSCH transmission without a corresponding PDCCH, the DCI format activating the SL configured grant Type 2 indicates to the UE that a PUCCH resource is not provided when a value of the PUCCH resource indicator field is zero and a value of PSFCH-to-HARQ feedback timing indicator field, if present, is zero. For a SL configured grant Type 1 PSSCH transmission, a PUCCH resource can be provided by *sl-N1PUCCH-AN* and *sl-PSFCH-ToPUCCH-CG-Type1*. For transmission of HARQ-ACK information corresponding only to a SL configured grant Type 2 PSSCH transmission without a corresponding PDCCH, a UE can be provided a PUCCH resource by *sl-N1PUCCH-AN-Type2*. If a PUCCH resource is not provided, the UE does not transmit a PUCCH with generated HARQ-ACK information from PSFCH reception occasions. For a PUCCH transmission with HARQ-ACK information, a UE determines a PUCCH resource after determining a set of PUCCH resources from up to four PUCCH resource sets provided by *sl-PUCCH-Config*, for HARQ-ACK information bits, as described in clause 9.2.1. The PUCCH resource determination is based on a PUCCH resource indicator field [5, TS 38.212] in a last DCI format 3\_0, among the DCI formats 3\_0 that have a value of a PSFCH-to-HARQ\_feedback timing indicator field indicating a same slot for the PUCCH transmission, that the UE detects and for which the UE transmits corresponding HARQ-ACK information in the PUCCH where, for PUCCH resource determination, detected DCI formats are indexed in an ascending order across PDCCH monitoring occasion indexes.**<Unchanged parts are omitted>** |

####  Round#1 discussion on TP#4

Please provide your views on TP#4 in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| vivo | OK with the changes. |
| OPPO | OK. |
| NTT DOCOMO | OK with the changes. |
| NEC | OK. But noted that *sl-MaxTransPower* in 16.2.1 may be corrected to *sl-MaxTxPower* as discussed in Thread#1 |
| Huawei, HiSilicon | OK |
| Qualcomm | We’re ok with the changes. |
| Ericsson | OK |
| Apple | OK |
| Nokia, NSB | OK |
| Sharp | OK |
| ZTE,Sanechips | OK |
| Samsung | Agree with changes |
| LG | OK |

####  Round#2 discussion on TP#4

It seems there is consensus on TP#4, so the following is proposed.

* **Proposal 4: Adopt TP#4 for recommendation to the editors.**

In case you have a concern on Proposal 4, please provide it in the table below.

|  |  |
| --- | --- |
| **Company** | **View** |
| LG | OK |
| NEC | OK |
| OPPO | OK |
| Huawei, HiSilicon | OK |
| vivo | OK |
| Samsung | OK |
| Qualcomm | OK |
| Sharp | OK |
| ZTE,Sanechips | OK |
| Nokia, NSB | OK |

# Summary and Conclusion

TBD

# Reference

1. R1-2106475, “Correction on PSFCH resource determination”, Huawei, HiSilicon, RAN1#106-e.
2. R1-2108198, “Correction on frequency resources for PSSCH transmissions”, Sharp, RAN1#106-e.
3. R1-2106506, “Correction on PT-RS and PSSCH RE mapping”, Huawei, HiSilicon, RAN1#106-e.
4. R1-2107220, “Draft CR for TS38.211”, OPPO, RAN1#106-e.

1. R1-2108080, “Corrections on sidelink reference signal scaling factors in TS38.211”, ZTE, Sanechips, RAN1#106-e.
2. R1-2108081, “Corrections on sidelink reference signal scaling factors in TS38.214”, ZTE, Sanechips, RAN1#106-e.
3. R1-2108082, “Editorial correction on the field description of DCI Format 3\_0”, ZTE, Sanechips, RAN1#106-e.
4. R1-2108190, “Correction on DCI format 3\_0 references”, Huawei, HiSilicon, RAN1#106-e.
5. R1-2106860, “Draft CR on editorial changes for RRC parameters in TS 38.213”, Samsung, RAN1#106-e.