**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.

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## 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.

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### 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.

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### 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.

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### 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**

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| **<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.

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## 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**

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| **<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.

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## 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**

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| **<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**

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|  | **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**

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| --- | --- | --- | --- |
|  | **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**

|  |  |
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| **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.

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# 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.