An email discussion started with the following scope:

[101-e-NR-5G\_V2X\_NRSL-SL\_PHY\_Procedure-03] Email discussion/approval regarding HARQ operation + Sidelink CSI

* + Issue 3-1: Details of indicating SL HARQ feedback related information
	+ Issue 4-2: How to determine the CQI table used for CSI reporting

Till 5/28, with potential TPs by 6/3 – Hanbyul (LGE)

Relevant agreements are as follows:

Agreements:

* SCI format 2-A includes an explicit indication of HARQ feedback enabled/disabled.
* SCI format 2-B includes an explicit indication of HARQ feedback enabled/disabled.

Agreements:

* SCI format 2-A includes a 2-bit information field providing an explicit indication for the cast type

**Conclusion:**

* It is feasible from L1 signaling perspective to use Groupcast option 1 (i.e., NACK only feedback) when Zone ID or Communication range requirement is not provided, if RAN2 decides to support this operation.
	+ No action in RAN1 unless RAN2 informs RAN1 about their decision (to support or not)
	+ Note that if RAN2 decides to support it, RAN1 needs to further discuss

Agreemensts:

* Send an LS to RAN2 in response to R1-2003255 to inform
	+ The conclusion on Groupcast option 1 when Zone ID or Communication range requirement is not provided.
	+ The agreement as above

Agreements:

* The CQI table is derived based on the indicated MCS table
	+ No separate configuration

# **Text proposals**

TP for 38.212

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| 8.4 Sidelink control information on PSSCH< Unchanged parts are omitted >8.4.1 2nd-stage SCI formats< Unchanged parts are omitted >8.4.1.1 SCI format 2-ASCI format 2-A is used for the decoding of PSSCH, with HARQ operation when HARQ-ACK information includes ACK or 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 ID – [x] 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 x.x.x of [6, TS 38.214].- Source ID – 8 bits as defined in clause x.x.x of [6, TS 38.214].- Destination ID – 16 bits as defined in clause x.x.x of [6, TS 38.214].- HARQ feedback enabling/disabling indicator – 1 bit as defined in clause 16.3 of [5, TS 38.214]- 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].Table 8.4.1.1-1: Cast type indicator

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| --- | --- |
| **Value of Cast type indicator** | **Cast type** |
| 00 | Broadcast |
| 01 | Groupcast |
| 10 | Unicast |
| 11 | Reserved |

8.4.1.2 SCI format 2-BSCI format 2-B is used for the decoding of PSSCH, with HARQ operation when HARQ-ACK information includes only NACK.The following information is transmitted by means of the SCI format 2-B:- HARQ Process ID – [x] 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 x.x.x of [6, TS 38.214].- Source ID – 8 bits as defined in clause x.x.x of [6, TS 38.214].- Destination ID – 16 bits as defined in clause x.x.x of [6, TS 38.214].- Zone ID – 12 bits as defined in clause x.x.x of [9, TS 38.331].- Communication range requirement – 4 bits as defined in clause x.x.x of [9, TS 38.331]- HARQ feedback enabling/disabling indicator – 1 bit as defined in clause 16.3 of [5, TS 38.214]< Unchanged parts are omitted > |

TP for 38.213

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| 16.3 UE procedure for reporting HARQ-ACK on sidelink A UE can be indicated by an SCI format scheduling a PSSCH reception, in one or more sub-channels from a number of $N\_{subch }^{PSSCH}$ 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.A UE can be provided, by *periodPSFCHresource*, a number of slots in a resource pool for a period of PSFCH transmission occasion resources. If the number is zero, PSFCH transmissions from the UE in the resource pool are disabled. A UE may be indicated by higher layers to not transmit a PSFCH in response to a PSSCH reception [11, TS 38.321].If a UE receives a PSSCH in a resource pool and a ~~ZYX~~ HARQ feedback enabling/disabling indicator field = 1 in a SCI format ~~0\_~~2-A or SCI format 2-B scheduling the PSSCH reception indicates to the UE to report HARQ-ACK information for the PSSCH reception [5, TS 38.212], the UE provides the HARQ-ACK information in a PSFCH transmission in the resource pool. The UE transmits the PSFCH in a first slot that includes PSFCH resources and is at least a number of slots, provided by *MinTimeGapPSFCH*, of the resource pool after a last slot of the PSSCH reception. < Unchanged parts are omitted >A UE determines a $m\_{cs}$ value, for computing a value of cyclic shift $α$ [4, TS 38.211], as in Table 16.3-2 if the UE receives a SCI format 2-A with Cast type indicator field is 01 or 10 or Table 16.3-3 if the UE receives a SCI format 2-B ~~as indicated by a SCI format scheduling a PSSCH reception~~. The UE applies one cyclic shift from a cyclic shift pair to a sequence used for the PSFCH transmission [4, TS 38.211]. **Table 16.3-2: Mapping of HARQ-ACK information bit values to a cyclic shift, from a cyclic shift pair, of a sequence for a PSFCH transmission when HARQ-ACK information includes ACK or NACK**

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| --- | --- | --- |
| **HARQ-ACK Value** | **0 (NACK)** | **1 (ACK)** |
| **Sequence cyclic shift** | 0 | 6 |

**Table 16.3-3: Mapping of HARQ-ACK information bit values to a cyclic shift, from a cyclic shift pair, of a sequence for a PSFCH transmission when HARQ-ACK information includes only NACK**

|  |  |  |
| --- | --- | --- |
| **HARQ-ACK Value** | **0 (NACK)** | **1 (ACK)** |
| **Sequence cyclic shift** | 0 | N/A |

< Unchanged parts are omitted >16.5 UE procedure for reporting HARQ-ACK on uplinkA UE can be provided PUCCH resources or PUSCH resources [12, TS 38.331] to report HARQ-ACK information that the UE generates based on HARQ-ACK information that the UE obtains from PSFCH receptions, or from absence of PSFCH receptions. For SL configured grant Type 1 or Type 2 PSSCH receptions by a UE within a time period provided by *periodSlCG*, the UE generates one HARQ-ACK information bit in response to the PSFCH receptions to multiplex in a PUCCH transmission occasion that is after a last time resource, in a set of time resources. For each PSFCH reception occasion, from a number of PSFCH reception occasions that the UE generates HARQ-ACK information to report in a PUCCH or PUSCH transmission, the UE can be indicated by ~~higher layers~~ SCI to perform one of the following and the UE constructs a HARQ-ACK codeword with HARQ-ACK information, when applicable.If the UE receives PSFCH associated with a SCI format 2-A with Cast type indicator = 10,- generate HARQ-ACK information with same value as a value of HARQ-ACK information the UE determines from a PSFCH reception in the PSFCH reception occasion and, if the UE determines that a PSFCH is not received at the PSFCH reception occasion, generate NACKIf the UE receives PSFCH associated with a SCI format 2-A with Cast type indicator = 01,~~- generate ACK when the UE determines ACK from each PSFCH reception for the number of PSFCH reception occasions; otherwise, generate NACK if the UE determines absence of PSFCH reception or determines a NACK value from a PSFCH reception at a corresponding PSFCH reception occasion~~ - generate ACK when the UE determines ACK from at least one PSFCH reception for the number of PSFCH reception occasions of a PSFCH resource with an index with $M\_{ID}$, as determined in Clause 16.3, for every identity $M\_{ID}$ of the UEs expected to receive the PSSCH, as indicated by higher layers; otherwise, generate NACK.If the UE receives PSFCH associated with a SCI format 2-B,- generate ACK when the UE determines absence of PSFCH reception for each PSFCH reception occasion from the number of PSFCH reception occasions; otherwise, generate NACK ~~- generate ACK when the UE determines ACK from at least one PSFCH reception for the number of PSFCH reception occasions of a PSFCH resource with an index with~~ $M\_{ID}$~~, as determined in Clause 16.3, for every identity~~ $M\_{ID}$ ~~of the UEs expected to receive the PSSCH, as indicated by higher layers; otherwise, generate NACK.~~The UE generates NACK when, due to prioritization, as described in Clause 16.2.4, the UE does not receive PSFCH in any PSFCH reception occasion associated with a PSSCH transmission in a resource provided by a DCI format 3\_0 with CRC scrambled by a SL-RNTI or, for a configured grant, in a resource provided in a single period and for which the UE is provided a PUCCH resource to report HARQ-ACK information.The UE generates NACK when, due to prioritization as described in Clause 16.2.4, the UE does not transmit a PSSCH in any of the resources provided by a DCI format 3\_0 with CRC scrambled by SL-RNTI or, for a configured grant, in any of the resources provided in a single period and for which the UE is provided a PUCCH resource to report HARQ-ACK information. The UE generates ACK if the UE does not transmit a PSCCH with a SCI format 0\_1 scheduling a PSSCH in any of the resources provided by a configured grant in a single period and for which the UE is provided a PUCCH resource to report HARQ-ACK information.< Unchanged parts are omitted > |

TP for 38.214

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| 8.5.2 Channel state information8.5.2.1 CSI reporting quantities8.5.2.1.1 Channel quality indicator (CQI)The UE shall derive CQI as specified in section 5.2.2.1, with the following changes- PDSCH replaced by PSSCH- uplink slot replaced by sidelink slot- downlink physical resource blocks replaced by sidelink physical resource blocks- Transport Block Size determination according to Clause 8.1.3.2- CSI reference resource according to ~~TODO~~ Clause 8.5.2.3- interference measurements are not supported- sub-band differential CQI is not supported- *cqi-Table* is determined as indicated by Additional MCS table indicator in a SCI format 1-A, - *cqi-Table* = ‘table1’ if Additional MCS table indicator indicates Table 5.1.3.1-1, - *cqi-Table* = ‘table2’ if Additional MCS table indicator indicates Table 5.1.3.1-2, - *cqi-Table* = ‘table3’ if Additional MCS table indicator indicates Table 5.1.3.1-3The UE does not perform CQI measurement nor reporting if the SCI format 1-A indicates an MCS table that the UE does not support. |