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-A  SCI 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   |  |  | | --- | --- | | **Value of Cast type indicator** | **Cast type** | | 00 | Broadcast | | 01 | Groupcast | | 10 | Unicast | | 11 | Rerserved |   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.  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 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 value, for computing a value of cyclic shift [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**   |  |  |  | | --- | --- | --- | | **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 uplink  A 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 NACK  If 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 , as determined in Clause 16.3, for every identity 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 , as determined in Clause 16.3, for every identity 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 information  8.5.2.1 CSI reporting quantities  8.5.2.1.1 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 5.1.3.1-3 |