3GPP TSG RAN WG1 #105-e R1-210xxxx

**e-Meeting, May 10th – 27th, 2021**

Agenda Item: 7.2.4

Source: Moderator (Ericsson)

Title: Feature lead summary#1 on Resource allocation for NR sidelink Mode 1 – Thread 4

Document for: Discussion, Decision

# List of topics

**Group M1 – SL HARQ-ACK reports to gNB**

* **M1-1-1**: SL HARQ-ACK reporting when SL FB is not used (see CATT (P1-P3), OPPO (Section 2), Ericsson)
  + This topic is related to Q1 in the LS from RAN2 (R1-2104559) which is discussed in some contributions (see LGE (P2))
  + FL assessment: A correction is needed.
* **M1-1-2**: SL HARQ-ACK reporting when the UE does not perform SL transmission on the resources provided by a DG (see Fujitsu (P1), DCM (TP1))
  + FL assessment: This has been discussed in the past without consensus. A correction could be introduced but not everyone believes it is necessary. It can be discussed together with M1-1-1.
* **M1-1-3**: SL HARQ-ACK reporting when multiple pools are configured (see vivo (TP3), ZTE (P2), ASUSTeK (TP1))
  + FL assessment: There were objections to treat this in the preparation of the previous meeting, stating that this could be addressed through configuration. In any case, a correction of a clarification of the behaviour could be discussed.
* **M1-1-4**: SL HARQ-ACK reporting in an incomplete PSFCH period (see vivo (TP4), ZTE (P1))
  + FL assessment: There were objections to treat this in the preparation of the previous meeting, stating that this could be addressed through configuration.
* **M1-1-5**: Aspects related to PUCCH power control (see vivo (TP5))
  + FL assessment: a clarification seems necessary
* **M1-1-6**: k>0 in offset between PSFCH and HARQ-ACK reporting (see Sharp (TP3))
  + FL assessment: Not a critical correction.

**Group M2 – DCI-related aspects**

* **M1-2-1**: Value of n\_CI (see vivo (TP1))
  + FL assessment: looks like a necessary correction
* **M1-2-2**: DCI size alignment (see vivo (TP2))
  + FL assessment: It is not clear that there is an issue with the specification. in any case, the change is almost editorial.
* **M1-2-3**: Configuration index in DCI format 3\_0 for SL-CS-RNTI for retransmissions (see ASUSTeK (TP5), Sharp (TP1))
  + FL assessment: clarification looks ok, but it is not clear that there is any impact if not taken.
* **M1-2-4**: Search space overlapping between SL and Uu in the same carrier (LGE (P1))
  + FL assessment: it looks like the corresponding agreements have not been captured in the spec.

**Group M3 – Editorial corrections**

* **38.213**
  + Clause 10.2A: clarification of the CG validated (ASUSTeK (TP4))
  + Clause 16.5: Correct “One HARQ-ACK information bit” (Sharp (TP4))
    - FL assessment: The correction seems reasonable but it was discussed earlier without consensus.
* **38.214**
  + Clause 8.1.2: correct reference (ASUSTeK (TP3))
  + Clause 8.1.2.1:
    - Indicate how the “Configuration index” field is set (see ZTE (P5), ASUSTeK (TP3))
    - RRC parameter name alignment *timeGapFirstSidelinkTransmission* (ASUSTeK (TP3))
  + Clause 8.4.1.2.2 typo (see OPPO (TP3))

**Group M4 – TPs corresponding to agreements in previous meetings**

* TS 38.213 Clause 16.5: Agreement/LS from RAN1#104, reply LS received in R2-2104463 (see vivo (TP6), ZTE (P4), Nokia+NSB (P1), DCM (TP2))

A few contributions discuss topics like priorities of SL HARQ feedback that have been treated by other FLs in the past. There are also some proposed editorial corrections belonging to other AIs.

FL proposal:

* For a first thread: discuss M1-1-1.
* For a second thread: one of M1-2-1 or M1-1-3.

As agreed at the start of the meeting, the following related threads will be discussed:

[105-e-NR-5G\_V2X-02] Email discussion/approval regarding

* Issue M1-1-1: SL HARQ-ACK reporting when SL FB is not used (considering LS in [R1-2104559](file:///C:\\Users\\wanshic\\OneDrive%20-%20Qualcomm\\Documents\\Standards\\3GPP%20Standards\\Meeting%20Documents\\TSGR1_105\\Docs\\R1-2104559.zip))

till 5/24 with any follow-up TPs till 5/26 – Ricardo (Ericsson)

[105-e-NR-5G\_V2X-03] Email discussion/approval regarding

* Issue M1-2-1: Value of n\_CI

till 5/24 with any follow-up TPs till 5/26 – Ricardo (Ericsson)

[105-e-NR-5G\_V2X-04] Email discussion/approval regarding

* Issue M1-4: TPs corresponding to agreements in previous meetings (Agreement/LS from RAN1#104, reply LS received in [R1-2104160](file:///C:\\Users\\wanshic\\OneDrive%20-%20Qualcomm\\Documents\\Standards\\3GPP%20Standards\\Meeting%20Documents\\TSGR1_105\\Docs\\R1-2104160.zip), M1-2-2: DCI size alignment)

till 5/24 – Ricardo (Ericsson)

This document deals with issue M1-4. In addition, it includes some editorial corrections too.

# M1-4 TPs corresponding to agreements made in previous meetings

RAN1 has received the LS in R1-2104160 from RAN2 with the following information:

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| RAN2 would like to thank RAN1 for informing RAN2 of the issue 1 and issue 2 on SL HARQ-ACK reporting to the gNB.   * On Issue 1: RAN2 defines a new parameter *sl-N1PUCCH-AN-Type2-r16* to indicate the HARQ resource for PUCCH for PSCCH/PSSCH transmissions without a corresponding PDCCH on sidelink configured grant type 2.  | ***SL-ConfiguredGrantConfig* field descriptions** | | --- | | ***sl-N1PUCCH-AN-Type2***  This field indicates the HARQ resource for PUCCH for PSCCH/PSSCH transmissions without a corresponding PDCCH on sidelink configured grant type 2. The actual PUCCH-Resource is configured in *sl-PUCCH-Config* and referred to by its ID. |  * On Issue 2: RAN2 agrees to clarify in the field description of *pdsch-HARQ-ACK-Codebook* and *pdsch-HARQ-ACK-CodebookList* that the parameter *pdsch-HARQ-ACK-Codebook* is always used for reporting SL HARQ-ACK information. |

Several contributions include TPs for TS 38.213 for dealing with Issue 1. Based on them, the FL proposes to agree the following changes to the spec.

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| **-------------------------- Start of Text Proposal for TS 38.213 --------------------------**  16.5 UE procedure for reporting HARQ-ACK on uplink  **<Unchanged parts omitted>**  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-r16* 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 1 PSSCH transmission, a PUCCH resource can be provided by *sl-N1PUCCH-AN* and *sl-PSFCH-ToPUCCH-CG-Type1*. For a SL configured grant Type 2 PSSCH transmission without a corresponding PDCCH a PUCCH resource can be provided 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.  **<Unchanged parts omitted>**  **-------------------------- End of Text Proposal --------------------------** |

Please share your views on the above proposal using the table below.

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| **Company** | **View** |
| ASUSTeK | We support this TP. |
| vivo | Support in general.  we would like some further clarification on how to inform the UE that PUCCH is not provided for SL CG type2 transmissions without PDCCH. It is not clear whether the description ‘*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*’ is also applicable to an activated type2 CG transmission without PDCCH. There are two options.   * Option1. PUCCH is not provided for a SL CG type2 transmission without PDCCH if sl-N1PUCCH-AN-Type2 is absent in the RRC configuration. * Option2. PUCCH is not provided for a SL CG type2 transmission without PDCCH if the PUCCH resource indicator field and PSFCH-to-HARQ feedback timing indicator field (if present) in the DCI used to activate the SL CG type2 are set to zero. (similar to the SL CG type2 with PDCCH)   We prefer the first option as it is more straightforward and would like to have the following clarifications.  For a SL configured grant Type 2 PSSCH transmission without a corresponding PDCCH a PUCCH resource can be provided by *sl-N1PUCCH-AN-Type2*. If sl-N1PUCCH-AN-Type2 is absent, no PUCCH is provided for the SL configured grant Type 2 PSSCH transmission without a corresponding PDCCH. |
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# M1-3 Editorial corrections

## TS 38.213

The following editorial corrections related to Mode1 for TS 38.213 have been presented in different contributions, as listed above.

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| **-------------------------- Start of Text Proposal for TS 38.213 --------------------------**  **<Unchanged parts omitted>**  10.2A PDCCH validation for SL configured grant Type 2  A UE validates, for scheduling activation or scheduling release, a SL configured grant Type 2 PDCCH if  - the CRC of a corresponding DCI format 3\_0 is scrambled with a SL-CS-RNTI provided by *sl-CS-RNTI*, and  - the new data indicator field in the DCI format 3\_0 for the enabled transport block is set to '0'  Validation of the DCI format 3\_0 is achieved if all fields for the DCI format 3\_0 are set according to Table 10.2A-1 or Table 10.2A-2.  If validation is achieved, the UE considers the information in the DCI format 3\_0 as a valid activation or valid release only for SL configured grant Type 2 indicated by the configuration index field. If validation is not achieved, the UE discards all the information in the DCI format 3\_0.   * **Table 10.2A-1: Special fields for SL configured grant Type 2 scheduling activation PDCCH validation**  |  |  | | --- | --- | |  | **DCI format 3\_0** | | HARQ process number | set to all '0's |  * **Table 10.2A-2: Special fields for SL configured grant Type 2 scheduling release PDCCH validation**  |  |  | | --- | --- | |  | **DCI format 3\_0** | | HARQ process number | set to all '1's | | Frequency resource assignment (if present) | set to all '1's |   **<Unchanged parts omitted>**  **-------------------------- End of Text Proposal --------------------------** |

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| **-------------------------- Start of Text Proposal for TS 38.213 --------------------------**  16.5 UE procedure for reporting HARQ-ACK on uplink  **<Unchanged parts omitted>**  For SL configured grant Type 1 or Type 2 PSSCH transmissions by a UE within a time period provided by *sl-PeriodCG*, the UE generates HARQ-ACK information 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.  **<Unchanged parts omitted>**  **-------------------------- End of Text Proposal --------------------------** |

The FL’s impression is that the change to Clause 10.2A is not necessary. The clarification for 16.5 is worth discussing, so views from the different companies are appreciated. The FL notes that this was discussed in the past without consensus.

Please share your views on the above changes using the table below.

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| **Company** | **View** |
| ASUSTeK | 10.2A: The intention of this TP is to clarify DCI format 3\_0 for SL type-2 CG release is only for SL type-2 CG indicated by configuration index field. We think it’s a simple fix similar to LTE spec.  36.213: If the UE receives in subframe n DCI format 5A with the CRC scrambled by the SL-SPS-V-RNTI , the UE shall consider the received DCI information as a valid sidelink semi-persistent activation or release **only for the SPS configuration indicated by the SL SPS configuration index field.**  16.5: We are open to this TP. |
| vivo | For the change to 10.A  We are open to this change  For the change to 16.5  Our understanding is that RAN1 agreed to generate only one HARQ-ACK bit per CG period because only 1 TB can be transmitted in a CG cycle, so only 1 HARQ-ACK bit representing the final outcome of the multiple transmissions within a CG period is needed. With this logic and the pseudo code for type1 CB, the generated bit should repeat N times in a type1 CB, where N is the period of the PSFCH. Based on this understanding, for any candidate PSSCH transmission in a CG, the ‘HARQ-ACK information bit for candidate PSSCH transmission with index with corresponding PSFCH reception’ in 16.5.1.1 refers to the generated HARQ-ACK bit in 16.5, thus we prefer **not to** remove the "one bit". 16.5.1.1 Type-1 HARQ-ACK codebook in physical uplink control channel *A UE determines HARQ-ACK information bits, for a total number of HARQ-ACK information bits as = HARQ-ACK information bit for candidate PSSCH transmission with index with corresponding PSFCH reception, for , as described in Clause 16.5.* |
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## TS 38.214

The following editorial corrections related to Mode1 for TS 38.214 have been presented in different contributions, as listed above. Based on them the FL proposes to agree the following changes to the spec.

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| **-------------------------- Start of Text Proposal for TS 38.214 --------------------------**  **<Unchanged parts omitted>**  8.1.2 Resource allocation  In sidelink resource allocation mode 1:  - for PSSCH and PSCCH transmission, dynamic grant, configured grant type 1 and configured grant type 2 are supported. The configured grant Type 2 sidelink transmission is semi-persistently scheduled by a SL grant in a valid activation DCI according to Clause 10.2A of [6, TS 38.213].  8.1.2.1 Resource allocation in time domain  The UE shall transmit the PSSCH in the same slot as the associated PSCCH.  The minimum resource allocation unit in the time domain is a slot.  The UE shall transmit the PSSCH in consecutive symbols within the slot, subject to the following restrictions:  - The UE shall not transmit PSSCH in symbols which are not configured for sidelink. A symbol is configured for sidelink, according to higher layer parameters *startSLsymbols* and *lengthSLsymbols*, where *startSLsymbols* is the symbol index of the first symbol of *lengthSLsymbols* consecutive symbols configured for sidelink.  - Within the slot, PSSCH resource allocation starts at symbol *startSLsymbols+1.*  - The UE shall not transmit PSSCH in symbols which are configured for use by PSFCH, if PSFCH is configured in this slot.  - The UE shall not transmit PSSCH in the last symbol configured for sidelink.  - The UE shall not transmit PSSCH in the symbol immediately preceding the symbols which are configured for use by PSFCH, if PSFCH is configured in this slot.  In sidelink resource allocation mode 1:  - For sidelink dynamic grant, the PSSCH transmission is scheduled by a DCI format 3\_0.  - For sidelink configured grant type 2, the configured grant is activated by a DCI format 3\_0.  - For sidelink dynamic grant and sidelink configured grant type 2:  - The "Time gap" field value *m* of the DCI format 3\_0 provides an index *m* + 1 into a slot offset table. That table is given by higher layer parameter *sl-DCI-ToSL-Trans* and the table value at index *m* + 1 will be referred to as slot offset .  - The slot of the first sidelink transmission scheduled by the DCI is the first SL slot of the corresponding resource pool that starts not earlier than where is starting time of the downlink slot carrying the corresponding DCI, is the timing advance value corresponding to the TAG of the serving cell on which the DCI is received and is the slot offset between the slot DCI and the first sidelink transmission scheduled by DCI and t is the SL slot duration.  - The "Configuration index" field of the DCI format 3\_0, if provided, indicates the index of the sidelink configured type 2.  - For sidelink configured grant type 1:  - The slot of the first sidelink transmissions follows the higher layer configuration according to [10, TS 38.321].  **<Unchanged parts omitted>**  **-------------------------- End of Text Proposal --------------------------** |

Please share your views on the above proposal using the table below.

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| **Company** | **View** |
| ASUSTeK | We supports all TPs.  We would like to clarify “if provided” in the last TP. Is “if provided” cover the case that DCI format 3\_0 with 3 bits "Configuration index" but with reserved. If no, we would like to propose add following highlight for the last TP.  - The "Configuration index" field of the DCI format 3\_0, if provided and not reserved, indicates the index of the sidelink configured type 2.  Following is Text specifying case for “reserved” according to 38.212  - Configuration index – 0 bit if the UE is not configured to monitor DCI format 3\_0 with CRC scrambled by SL-CS-RNTI; otherwise 3 bits as defined in clause 8.1.2 of [6, TS 38.214]. If the UE is configured to monitor DCI format 3\_0 with CRC scrambled by SL-CS-RNTI, **this field is reserved for DCI format 3\_0 with CRC scrambled by SL-RNTI**. |
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# M1-2-2: DCI size alignment

The following clarification for TS 38.212 is proposed in R1-2105462

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| **-------------------------- Start of Text Proposal for TS 38.212 --------------------------**  **<Unchanged parts omitted>** 7.3.1.0.1 DCI size alignment for DCI formats for scheduling of sidelink If DCI format 3\_0 or DCI format 3\_1 is monitored on a cell, DCI size alignment for DCI format 3\_0 and DCI format 3\_1 is performed as described in this clause after performing the DCI size alignment described in Clause 7.3.1.0. The size(s) of the DCI formats configured to monitor for a cell and DCI formats for other purposes as described in 7.3.1.3 on the same cell if configured in this clause refers to that after performing the DCI size alignment described in Clause 7.3.1.0.  If DCI format 3\_0 or DCI format 3\_1 is monitored on a cell and the total number of DCI sizes of the DCI formats configured to monitor for the cell, DCI formats for other purposes as described in 7.3.1.3 on the same cell if configured and DCI format 3\_0 or DCI format 3\_1 is more than 4, zeros shall be appended to DCI format 3\_0 if configured and DCI format 3\_1 if configured, until the payload size of DCI format 3\_0 or DCI format 3\_1 equals that of the smallest DCI format among the DCI formats configured to monitor for the cell and DCI formats for other purposes as described in 7.3.1.3 on the same cell if configured that is larger than DCI format 3\_0 or DCI format 3\_1.  The UE is not expected to handle a configuration that results in:  - the total number of different DCI sizes configured to monitor for the cell, DCI formats for other purposes as described in 7.3.1.3 on the same cell if configured and DCI format 3\_0 or DCI format 3\_1 is more than 4; and  - the payload size of DCI format 3\_0 or DCI format 3\_1 is larger than the payload size of all other DCI formats configured to monitor for the cell and DCI formats for other purposes as described in 7.3.1.3 on the same cell if configured.  **<Unchanged parts omitted>**  **-------------------------- End of Text Proposal --------------------------** |

Please share your views on the above proposal using the table below.

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# Other

Please use the table below to share your views on other topics

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| **Company** | **View** |
| Vivo | During the preparation of the discussion, the topic M1-2-2 was agreed to be discussed in this thread [V2X-04], but it is not included in this summary and we would like to know how FL intended to treat this topic?  [105-e-NR-5G\_V2X-04] Email discussion/approval regarding  Issue M1-4: TPs corresponding to agreements in previous meetings (Agreement/LS from RAN1#104, reply LS received in [R1-2104160](file:///C:\\Users\\wanshic\\OneDrive%20-%20Qualcomm\\Documents\\Standards\\3GPP%20Standards\\Meeting%20Documents\\TSGR1_105\\Docs\\R1-2104160.zip), M1-2-2: DCI size alignment)  FL reply 19/5/21:  I have added it now. Sorry for missing it. |
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# List of identified contributions

R1-2104477 Discussion and TP on Mode1 resource allocation CATT, GOHIGH

R1-2104750 Remaining open issues and corrections for mode 1 RA OPPO

R1-2105056 Maintenance for mode-1 resource allocation for NR sidelink Fujitsu

R1-2105202 Discussion on essential corrections in resource allocation procedure LG Electronics

R1-2105462 Maintenance on NR sidelink mode-1 resource allocation mechanism vivo

R1-2105611 Remaining issues on mode 1 ZTE, Sanechips

R1-2105627 Remaining issues on resource allocation for NR sidelink Sharp

R1-2105680 Maintenance for resource allocation mechanism mode 1 NTT DOCOMO, INC.

R1-2105740 Remaining issues on resource allocation mode-1 and sidelink procedure ASUSTeK

R1-2105896 Corrections to Mode 1 Ericsson

R1-2105943 Maintenance for Resource allocation for sidelink - Mode 1 Nokia, Nokia Shanghai Bell