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

**e-Meeting, May 10th – 27th, 2021**

**Source: Moderator (Intel Corporation)**

**Title: Discussion [105-e-NR-5G\_V2X-05]**

**Agenda item: 7.2.4**

**Document for:** **Discussion and Decision**

Introduction

This document provides discussion on the following approved email thread as part of RAN1#105-e Release 16 NR V2X maintenance discussion:

[105-e-NR-5G\_V2X-05] Email discussion/approval regarding

* Issue M2-1: TP to implement the agreement from [104b-e-NR-5G\_V2X-03]

till 5/24 – Sergey (Intel)

Outcome

Discussion on Draft CR

## Round 1

In RAN1#104bis-e the following agreement was made:

Agreement

* Update the specification of identification of candidate resources for Mode-2 resource allocation in section 8.1.4 of TS 38.214 to handle the case when X·M\_total number of identified resources could not be reached after any number of loop iterations
	+ If the number of the excluded resources in step 5 is larger than (1-X)·M\_total, a UE skips step 5

There was no sufficient time to implement the above agreement as a CR. In this meeting, the discussion on CR is initiated separately.

From the review of contributions [1]-[7], the following two different interpretations have been identified:

**Interpretation 1 [1][2][3][5][6][7]**

* The step 5 is performed, and after its completion the condition on (1-X)·M\_total is checked. If the excluded number of resources is greater, then the result of step 5 is ignored, i.e. S\_A is re-initialized as in step 4.

**Interpretation 2 [4]**

* The step 5 is interpreted as a loop over periodicities and/or non-monitored slots. In this assumption, once a UE excludes a slot / period leading to the number of excluded resources greater than (1-X)·M\_total, it breaks the loop of step 5 and continues with step 6; S\_A is not re-initialized.

Note, in [1] it is proposed to further introduce additional functionality beyond the agreement proposed in P2 and P3, therefore these considerations are not taken into account – only P1 is assumed relevant.

It should be noted that Interpretation 1 was also FL understanding in RAN1#104bis-e, and this could be tracked from the beginning of the discussion in [104b-e-NR-5G\_V2X-03]. Nevertheless, the first question would be to confirm this interpretation (or interpretation 2), and then go to the detailed implementation discussion.

**Q1: Which of the interpretations 1 and 2 above or any other interpretation/combination is correct in your view and should be further pursued as a CR?**

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| **Source** | **Answer** | **Comment** |
| OPPO | Interpretation 1 | In our view, interpretation 2 was never intended and discussed as a solution from the beginning. It has several technical issues and these are discussed in [2]. |
| vivo | Comment | Firstly, we would like to confirm that the question is on interpretation on the agreement, but not a specific solution preferred by companies.If yes, our understanding is that the agreement does not preclude either of the interpretations. Secondly, we are not sure whether this question is really relevant to the CR. The CR should follow RAN1’s agreement, not for a specific interpretation. Different interpretations are allowed for implementation as long as there is no interoperation issue. In this specific case, regardless of which interpretation is implemented, there is no interoperation issue between TX and RX UEs. Thus, the interoperation can be up to UE implementation. |
| ZTESane | Interpretation 1 |  |

References

1. **R1-2104194 TP to address infinite loop due to excessive resource exclusion for Rel. 16 V2X FUTUREWEI**

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| -------------------------------- Start of Text Proposal for 38.214 (Based on Proposal 1) -----------------------------------<Unchanged parts omitted>8.1.4 UE procedure for determining the subset of resources to be reported to higher layers in PSSCH resource selection in sidelink resource allocation mode 2<Unchanged parts omitted>5) The UE shall exclude any candidate single-slot resource $R\_{x,y}$ from the set $S\_{A}$ if it meets all the following conditions:- the UE has not monitored slot $t'\_{m}^{SL}$ in Step 2.- for any periodicity value allowed by the higher layer parameter *sl-ResourceReservePeriodList* and a hypothetical SCI format 1-A received in slot $t'\_{m}^{SL}$ with '*Resource reservation period*' field set to that periodicity value and indicating all subchannels of the resource pool in this slot, condition c in step 6 would be met.5-1) If the number of candidate single-slot resources $R\_{x,y}$ excluded from the set $S\_{A}$in step 5 is greater than (1-$ $X)⋅$ M\_{total}$, the set $S\_{A}$ is initialized to the set of all the candidate single-slot resources as in step 4).<Unchanged parts omitted>-------------------------------- End of Text Proposal for 38.214 (Based on Proposal 1) ----------------------------------- |

1. **R1-2104751 Discussion on TPs for skipping step 5 in mode 2 RA OPPO**

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| 4)  The set $S\_{A}$ is initialized to the set of all the candidate single-slot resources. 5)  The UE shall exclude any candidate single-slot resource $R\_{x,y}$ from the set $S\_{A}$ if it meets all the following conditions:-     the UE has not monitored slot $t'\_{m}^{SL}$ in Step 2.-     for any periodicity value allowed by the higher layer parameter *sl-ResourceReservePeriodList* and a hypothetical SCI format 1-A received in slot $t'\_{m}^{SL}$ with '*Resource reservation period*' field set to that periodicity value and indicating all subchannels of the resource pool in this slot, condition c in step 6 would be met.5-1) If the number of candidate single-slot resources excluded from the set $S\_{A}$ in step 5 is greater than $(1-X)⋅M\_{total}$, the set $S\_{A}$ is initialized to the set of all the candidate single-slot resources.6)  The UE shall exclude any candidate single-slot resource $R\_{x,y}$ from the set $S\_{A}$ if it meets all the following conditions: |

1. **R1-2104887 Correction to sidelink resource identification procedure to prevent infinite loop issue – implementation of the agreement from [104b-e-NR-5G\_V2X-03] Intel Corporation**

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| << UNCHANGED PARTS OMITTED >>4) The set $S\_{A}$ is initialized to the set of all the candidate single-slot resources. 5) The UE shall exclude any candidate single-slot resource $R\_{x,y}$ from the set $S\_{A}$ if it meets all the following conditions:- the UE has not monitored slot $t'\_{m}^{SL}$ in Step 2.- for any periodicity value allowed by the higher layer parameter *sl-ResourceReservePeriodList* and a hypothetical SCI format 1-A received in slot $t'\_{m}^{SL}$ with '*Resource reservation period*' field set to that periodicity value and indicating all subchannels of the resource pool in this slot, condition c in step 6 would be met.If the number of candidate single-slot resources $\_{}$ excluded from the set $S\_{A}$ in step 5 is greater than $\_{}$, the set $S\_{A}$ is initialized to the set of all the candidate single-slot resources.6) The UE shall exclude any candidate single-slot resource $R\_{x,y}$ from the set $S\_{A}$ if it meets all the following conditions:<< UNCHANGED PARTS OMITTED >> |

1. **R1-2105463 Maintenance on NR sidelink mode-2 resource allocation mechanism vivo**

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| ------------------------------------------------ Start of Draft TP of TS 38.214 --------------------------------------------8.1.4 UE procedure for determining the subset of resources to be reported to higher layers in PSSCH resource selection in sidelink resource allocation mode 2<Unchanged parts omitted>4) The set $S\_{A}$ is initialized to the set of all the candidate single-slot resources. 5)  The UE shall exclude any candidate single-slot resource $R\_{x,y}$ from the set $S\_{A}$ if it meets all the following conditions:-     the UE has not monitored slot $t'\_{m}^{SL}$ in Step 2.-     for any periodicity value allowed by the higher layer parameter *sl-ResourceReservePeriodList* and a hypothetical SCI format 1-A received in slot $t'\_{m}^{SL}$ with '*Resource reservation period*' field set to that periodicity value and indicating all subchannels of the resource pool in this slot, condition c in step 6 would be met.-     the number of candidate single-slot resources excluded from the set $S\_{A}$ is not greater than $(1-X)⋅M\_{total}$---------------------------------------------------------- End of Draft TP ---------------------------------------------------- |

1. **R1-2105612 Remaining issues on mode 2 ZTE, Sanechips**

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| 8.1.4 UE procedure for determining the subset of resources to be reported to higher layers in PSSCH resource selection in sidelink resource allocation mode 2<Unchanged parts omitted>4) The set $S\_{A}$ is initialized to the set of all the candidate single-slot resources. 5) The UE shall exclude any candidate single-slot resource $R\_{x,y}$ from the set $S\_{A}$ if it meets all the following conditions:- the UE has not monitored slot $t'\_{m}^{SL}$ in Step 2.- for any periodicity value allowed by the higher layer parameter *sl-ResourceReservePeriodList* and a hypothetical SCI format 1-A received in slot $t'\_{m}^{SL}$ with '*Resource reservation period*' field set to that periodicity value and indicating all subchannels of the resource pool in this slot, condition c in step 6 would be met.5-1) If the number of candidate single-slot resources remaining in the set $S\_{A}$ is smaller than $X⋅M\_{total}$, the set $S\_{A}$ is initialized to the set of all the candidate single-slot resources.6) The UE shall exclude any candidate single-slot resource $R\_{x,y}$ from the set $S\_{A}$ if it meets all the following conditions:a) the UE receives an SCI format 1-A in slot $t'\_{m}^{SL}$, and '*Resource reservation period'* field, if present, and '*Priority*' field in the received SCI format 1-A indicate the values $P\_{rsvp\\_RX}$ and $prio\_{RX}$, respectively according to Clause 16.4 in [6, TS 38.213];b) the RSRP measurement performed, according to clause 8.4.2.1 for the received SCI format 1-A, is higher than $Th\left(prio\_{RX},prio\_{TX}\right);$c) the SCI format received in slot $t'\_{m}^{SL} $or the same SCI format which, if and only if the '*Resource reservation period*' field is present in the received SCI format 1-A, is assumed to be received in slot(s) $t'\_{m+q×P\_{rsvp\\_RX}^{'}}^{SL}$ determines according to clause 8.1.5 the set of resource blocks and slots which overlaps with $R\_{x,y+j×P\_{rsvp\\_TX}^{'}}$ for *q*=1, 2, …, *Q* and *j=*0, 1, …, $C\_{resel}-1$. Here, $P\_{rsvp\\_RX}^{'}$ is $P\_{rsvp\\_RX}$ converted to units of logical slots according to clause 8.1.7, $Q=\left⌈\frac{T\_{scal}}{P\_{rsvp\\_RX}}\right⌉ $ if $P\_{rsvp\\_RX}< T\_{scal}$ and $ n^{'}-m\leq P\_{rsvp\\_RX}^{'}$, where $t'\_{n^{'}}^{SL} = n$ if slot *n* belongs to the set $\left(t'\_{0}^{SL},t'\_{1}^{SL},...,t'\_{T'\_{max}-1}^{SL}\right)$, otherwise slot $t'\_{n^{'}}^{SL}$ is the first slot after slot *n* belonging to the set $\left(t'\_{0}^{SL},t'\_{1}^{SL},...,t'\_{T'\_{max}-1}^{SL}\right)$; otherwise $Q=1$. $T\_{scal}$ is set to selection window size *T2* converted to units of msec.7) If the number of candidate single-slot resources remaining in the set $S\_{A}$ is smaller than $X⋅M\_{total}$, then $Th(p\_{i},p\_{j})$ is increased by 3 dB for each priority value $Th(p\_{i},p\_{j})$ and the procedure continues with step 4.<Unchanged parts omitted> |

1. **R1-2105897 Condition to stop the infinite loop for Mode 2 RA Ericsson**

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| 8.1.4 UE procedure for determining the subset of resources to be reported to higher layers in PSSCH resource selection in sidelink resource allocation mode 2<Unchanged parts omitted>4) The set $S\_{A}$ is initialized to the set of all the candidate single-slot resources. 5) The UE shall exclude any candidate single-slot resource $R\_{x,y}$ from the set $S\_{A}$ if it meets all the following conditions:- the UE has not monitored slot $t'\_{m}^{SL}$ in Step 2.- for any periodicity value allowed by the higher layer parameter *sl-ResourceReservePeriodList* and a hypothetical SCI format 1-A received in slot $t'\_{m}^{SL}$ with '*Resource reservation period*' field set to that periodicity value and indicating all subchannels of the resource pool in this slot, condition c in step 6 would be met.5-1) If the number of candidate single-slot resources $R\_{x,y} $excluded from the set $S\_{A}$ in step 5 is greater than $(1-X)⋅M\_{total}$, the set $S\_{A}$ is initialized to the set of all the candidate single-slot resources as indicated in Step 4. |

1. **R1-2105944 Maintenance for Resource allocation for sidelink - Mode 2 Nokia, Nokia Shanghai Bell**

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| -------------------------- Start of Text Proposal for TS 38.214 --------------------------8.1.4 UE procedure for determining the subset of resources to be reported to higher layers in PSSCH resource selection in sidelink resource allocation mode 2------------------- < Unchanged parts are omitted > --------------------------5a) If the number of candidate single-slot resources remaining in the set $S\_{A}$ is smaller than $X⋅M\_{total}$, then the set $S\_{A}$ is initialized to the set of all the candidate single-slot resources.-------------------------- End of Text Proposal for TS 38.214 -------------------------- |