**3GPP TSG RAN WG1 Meeting #101-E R1-** **200xxxx**

**e-Meeting, May 25th – June 5th, 2020**

**Source: Moderator (Intel Corporation)**

**Title: TPs based on outcome of [101-e-NR-5G\_V2X\_NRSL-Mode-2-04]**

**Agenda item: 7.2.4.2.2**

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

Introduction

The following agreements to be captured in RAN1 specifications were made in [101-e-NR-5G\_V2X\_NRSL-Mode-2-04].

|  |
| --- |
| Agreements:* A UE is expected to be (pre-)configured with a set *sl-ResourceReservePeriod* containing value of 0 ms

Agreements:* For conversion of *Prsvp\_TX* and *Prsvp\_RX* measured in ms to *P’rsvp\_TX* and *P’rsvp\_RX* in logical slots, LTE principle is reused by the following formula:

* + *P’rsvp* = ceiling(N/20ms × *Prsvp*) where N is the number of slots that can be used for SL transmission within 20 ms of the configured UL-DL configuration

Agreements:* In 38.214, section 8.1.4, Tscal is set
	+ the selection window length in ms

Agreements:* Reuse LTE rule to calculate C\_resel from SL\_RESOURCE\_RESELECTION\_COUNTER:

* + C\_resel=10\*SL\_RESOURCE\_RESELECTION\_COUNTER

* Introduce the following scaling to SL\_RESOURCE\_RESELECTION\_COUNTER range and inform RAN2 about this decision:
	+ SL\_RESOURCE\_RESELECTION\_COUNTER is the value randomly selected from the range

 (the range as a working assumption)* Note: this intends to capture details of the RAN1#99 agreement which are still missing in specifications

Agreements:* A UE sets “Resource reservation period” in SCI 1-A to correspond to value of the period provided by higher layers from (pre-)configured set *sl-ResourceReservePeriod*
	+ RAN1 assumes that at least in cases if higher layer decides not to keep the resource for the transmission in the next period or there is no associated period, then higher layer provides 0 ms periodicity
		- Send LS to RAN2 to inform this decision
 |

TP to TS 38.213

|  |
| --- |
| 16.4 UE procedure for transmitting PSCCH A UE can be provided a number of symbols in a resource pool, by *timeResourcePSCCH*, starting from a second symbol that is available for SL transmissions in a slot, and a number of PRBs in the resource pool, by *frequencyResourcePSCCH*, for a PSCCH transmission with a SCI format 1-A.A UE that transmits a PSCCH with SCI format 1-A using sidelink resource allocation mode 1 [6, TS38.214] - sets a value of a HARQ process ID field as indicated by higher layers- for an initial transmission of a TB that is scheduled by a DCI format 3\_0 with CRC scrambled by SL-RNTI, the UE- toggles the NDI field value in SCI format 1-A, if the NDI field value in DCI format 3\_0 is toggled - does not toggle the NDI field value in SCI format 1-A, if the NDI field value in DCI format 3\_0 is not toggled - for subsequent transmissions of the TB that are scheduled by the DCI format 3\_0 with CRC scrambled by SL-RNTI, the UE does not toggle the NDI field value in SCI format 1-A.A UE that transmits a PSCCH with SCI format 1-A using sidelink resource allocation mode 2 [6, TS38.214] - if *sl-MultiReserveResource* is configured- sets “Resource reservation period” as an index in the set *sl-ResourceReservePeriod* provided by higher layer corresponding to the reservation period in units of *ms* provided by higher layer |

|  |  |
| --- | --- |
| Source | Comments |
| Nokia, NSB | Should “correspond to the value of the period…” be elaborated? E.g. “index of the period … in set sl-ResourceReservePeriod”FL: tried to address |
| OPPO | Following the new naming convention for SCI formats in R1-2003169, SCI format 0\_1 should be 1-A.FL: accepted, but the part related to Mode-1 is actually outdated and there is no need to correct it |
| Huawei/HiSilicon | There are two “provided by higher layer” in the last bullet. I assume the first “provided by higher layer” means “*sl-ResourceReservePeriod* is provided by higher layer”, and the second “provided by higher layer” means “the reservation period isprovided by higher layer”.To improve the reading, I think maybe it’s ok to remove the first one. Otherwise, the sentence is a little bit hard to understand.We suggest the following changes (marked in red). Either Alt1 or Alt2 is ok for us.Alt1:“- sets “Resource reservation period” as an index in the set *sl-ResourceReservePeriod* ~~provided by higher layer~~ corresponding to the reservation period in units of *ms* provided by higher layer”Alt2:“- sets “Resource reservation period” as an index in the set *sl-ResourceReservePeriod* ~~provided by higher layer~~ corresponding to the reservation period in units of *ms* provided by higher layer, where *sl-ResourceReservePeriod* is provided by higher layer” |

TP to 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 2In resource allocation mode 2, the higher layer can request the UE to determine a subset of resources from which the higher layer will select resources for PSSCH/PSCCH transmission. To trigger this procedure, in slot *n,* the higher layer provides the following parameters for this PSSCH/PSCCH transmission:- the resource pool from which the resources are to be reported;- L1 priority, ;- the remaining packet delay budget;- the number of sub-channels to be used for the PSSCH/PSCCH transmission in a slot, ;- optionally, the resource reservation interval, , in units of ms.The following higher layer parameters affect this procedure:*- t2min\_SelectionWindow:* internal parameter is set to the corresponding value from higher layer parameter *t2min\_SelectionWindow* for the given value of .*- SL-ThresRSRP\_pi\_pj*: this higher layer parameter provides an RSRP threshold for each combination , where is the value of the priority field in a received SCI format 1-A and is the priority of the transmission of the UE selecting resources; for a given invocation of this procedure, .*- RSforSensing* selects if the UE uses the PSSCH-RSRP or PSCCH-RSRP measurement, as defined in clause 8.4.2.1.*- reservationPeriodAllowed**- t0\_SensingWindow*: internal parameter is defined as the number of slots corresponding to *t0\_SensingWindow* ms.The resource reservation interval, , if provided, is converted from units of *ms* to units of logical slots, resulting in according to clause 8.1.7.Notation: denotes the set of slots which can belong to a sidelink resource pool and is defined in [TBD].The following steps are used:1) A candidate single-slot resource for transmission is defined as a set of contiguous sub-channels with sub-channel *x+j* in slot where . The UE shall assume that any set of contiguous sub-channels included in the corresponding resource pool within the time interval correspond to one candidate single-slot resource, where - selection of is up to UE implementation under , where is TBD; - if is shorter than the remaining packet delay budget (in slots) then is up to UE implementation subject to remaining packet budget (in slots); otherwise is set to the remaining packet delay budget (in slots).The total number of candidate single-slot resources is denoted by .2) The sensing window is defined by the range of slots [) where is defined above and is TBD. The UE shall monitor slots which can belong to a sidelink resource pool within the sensing window except for those in which its own transmissions occur. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.3) The internal parameter is set to the corresponding value from higher layer parameter *SL-ThresRSRP\_pi\_pj* for equal to the given value of and each priority value .4) The set is initialized to the set of all the candidate single-slot resources. 5) The UE shall exclude any candidate single-slot resource from the set if it meets all the following conditions:- the UE has not monitored slot in Step 2.- for any periodicity value allowed by the higher layer parameter *reservationPeriodAllowed* and a hypothetical SCI format 1-A received in slot 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.6) The UE shall exclude any candidate single-slot resource from the set if it meets all the following conditions:a) the UE receives an SCI format 1-A in slot , and "Resource reservation period" field, if present, and "Priority" field in the received SCI format 1-A indicate the values and , respectively according to Clause [TBD] 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 ;c) the SCI format received in slot 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) determines according to clause 8.1.5 the set of resource blocks and slots which overlaps with for *q*=1, 2, …, *Q* and *j=*0, 1, …, . Here, is converted to units of logical slots according to clause 8.1.7, if and , where if slot n belongs to the set , otherwise slot is the first slot after slot n belonging to the set ; otherwise . is set to selection window size converted to units of *ms*.7) If the number of candidate single-slot resources remaining in the set is smaller than , then is increased by 3 dB for each priority value and the procedure continues with step 4.The UE shall report set to higher layers.8.1.5 UE procedure for determining slots and resource blocks for PSSCH transmission associated with an SCI format 1-A The set of slots and resource blocks for PSSCH transmission is determined by the resource used for the PSCCH transmission containing the associated SCI format 1-A, and fields "Frequency resource assignment", "Time resource assignment" of the associated SCI format 1 as described below. "Time resource assignment" carries logical slot offset indication of N = 1 or 2 actual resources when *sl-MaxNumPerReserve* is 2, and N = 1 or 2 or 3 actual resources when *sl\_MaxNumPerReserve* is 3, in a form of time RIV (TRIV) field which is determined as follows:if elseif elseif elseend ifend ifwhere the first resource is in the slot where SCI format 1-A was received, and denotes i-th resource time offset in logical slots of a resource pool with respect to the first resource where for N = 2, ; and for N = 3, , .The starting sub-channel of the first resource is determined according to clause 8.1.2.2. The number of contiguously allocated sub-channels for each of the N resources and the starting sub-channel indexes of resources indicated by the received SCI format 1-A, except the resource in the slot where SCI format 1-A was received, are determined from "Frequency resource assignment" which is equal to a frequency RIV (FRIV) where.If *sl-MaxNumPerReserve* is 2 thenIf *sl-MaxNumPerReserve* is3 thenwhere- denotes the starting sub-channel index for the second resource- denotes the starting sub-channel index for the third resource- is the number of sub-channels in a resource pool provided according to the higher layer parameter *numSubchannel*If TRIV indicates *N* < *sl-MaxNumPerReserve*, the starting sub-channel indexes corresponding to *sl-MaxNumPerReserve* minus N last resources are not used.The number of slots in one set of the time and frequency resources for transmission opportunities of PSSCH is given by where = 10\*SL\_RESOURCE\_RESELECTION\_COUNTER [10, TS 38.321] if configured else is set to 1.If a set of sub-channels in slot is determined as the time and frequency resource for PSSCH transmission corresponding to the configured sidelink grant (described in [10, TS 38.321]), the same set of sub-channels in slots are also determined for PSSCH transmissions corresponding to the same sidelink grant where *j=*1, 2,*…,* , , if provided, is converted from units of *ms* to units of logical slots, resulting in according to clause 8.1.7, and is determined by [TBD, resource pool determination]. Here, is the resource reservation interval indicated by higher layers.**<< UNCHANGED PART OMITTED>>**8.1.7 UE procedure for determining number logical slots for a given reservation period A given resource reservation period in milliseconds is converted to a period in logical slots as:where N is the number of slots that can be used for SL transmission within 20 ms of the configured UL-DL configuration. |

|  |  |
| --- | --- |
| Source | Comments |
| Nokia, NSB | Typo “If a set of sub-channels in slots” should read “slot”.FL: fixed |
| QC |  is set to selection window size converted to units of *ms*. There can be case . If that happen, clause 6c) only count Q = 1 with FL’s wording. Then only one resource reserved at m, where is accounted for, but not the resource reserved at .Among m and is in selection window while m is not. The proposed change will fix this case.FL: I’m not sure if the agreement “resource selection window size” refers to T2 or T2-T1. But I tend to think T2 is more suitable here. |
| OPPO | * Following the new naming convention for SCI formats in R1-2003169, SCI format 0-1 should be 1-A.
* Regarding the issue brought up by QC above, in our understanding, needs to fall in between and , where the time gap is around 1ms. If we want to optimize this case, some further discussion may be needed between and .

FL: I’m not sure if the agreement “resource selection window size” refers to T2 or T2-T1. But I tend to think T2 is more suitable here. |
| Huawei/HiSilicon | We think T2 seems more accurate and reasonable.It seems in the submission to ITU, we cannot have [TBD]. So how to handle [TBD] then? Replace [TBD] with something else? |

References

1. [R1-2003310](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003310.zip) Remaining details of Resource Allocation Mode 2 Nokia, Nokia Shanghai Bell
2. [R1-2003379](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003379.zip) Remaining issues on mode 2 resource allocation mechanism vivo
3. [R1-2003495](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003495.zip) Remaining details of sidelink resource allocation mode 2 Huawei, HiSilicon
4. [R1-2003549](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003549.zip) Remaining issues in Mode-2 ZTE, Sanechips
5. [R1-2003559](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003559.zip) Remaining Issues on Sidelink Mode 2 Resource Allocation Panasonic Corporation
6. [R1-2003563](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003563.zip) Discussion on resource allocation for Mode 2 LG Electronics
7. [R1-2003613](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003613.zip) Remaining issues on Mode 2 resource allocation in NR V2X CATT
8. [R1-2003653](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003653.zip) Remaining Issues on Resource Allocation in NR Sidelink Mode 2 ITRI
9. [R1-2003671](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003671.zip) Sidelink mode-2 resource allocation MediaTek Inc.
10. [R1-2003703](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003703.zip) Remaining issues for Mode 2 resource allocation in NR V2X ASUSTeK
11. [R1-2003735](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003735.zip) Remaining details of Mode-2 NR V2X sidelink design Intel Corporation
12. [R1-2003807](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003807.zip) Remaining details on mode-2 resource allocation Futurewei
13. [R1-2003874](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003874.zip) On Mode 2 for NR Sidelink Samsung
14. [R1-2003991](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2003991.zip) Remaining issues in NR sidelink mode 2 resource allocation Spreadtrum Communications
15. [R1-2004043](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004043.zip) Remaining details on mode 2 resource allocation for NR V2X Fujitsu
16. [R1-2004074](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004074.zip) Discussion on remaining open issue for mode 2 OPPO
17. [R1-2004171](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004171.zip) Resource allocation for NR sidelink Mode 2 TCL Communication Ltd.
18. [R1-2004217](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004217.zip) Remaining Issues of Mode 2 Resource Allocation Apple
19. [R1-2004295](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004295.zip) Remaining Issues on NR Sidelink Mode 2 Resource Allocation InterDigital, Inc.
20. [R1-2004310](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004310.zip) Remaining issues on resource allocation Mode 2 NEC
21. [R1-2004328](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004328.zip) Remaining issues on resource allocation mode 2 for NR sidelink Sharp
22. [R1-2004385](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004385.zip) Remaining issues on resource allocation mechanism mode 2 NTT DOCOMO, INC.
23. [R1-2004452](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004452.zip) Sidelink Resource Allocation Mode 2 Qualcomm Incorporated
24. [R1-2004531](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004531.zip) Remain details on mode-2 resource allocation for NR V2X ITL
25. [R1-2004544](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004544.zip) Resource allocation Mode 2 for NR SL Ericsson