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

**e-Meeting, May 19th – 27th, 2021**

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**Source:** Moderator (LG Electronics)

**Title:** Feature lead summary for AI 8.11.1.2 Inter-UE coordination for Mode 2 enhancements

**Document for:** Discussion and information

1. **Contents to be discussed in Wednesday’s GTW (May 19th)**

After reviewing contributions submitted in this meeting, I observed that it is difficult to down-select one of information types (listed in the last meeting) for each inter-UE coordination scheme. So, it is proposed to support all the information types for each scheme. In order to clarify the reason why both types of information are needed in each scheme, the UE-B’s resource selection behaviour based on each information type was added in the proposals. When going in this direction, one concern from FL’s point of view is whether it is possible to complete all required details within the remaining meetings. Considering this aspect, it would be desirable for RAN1 to strive for common design for both information types in each scheme, and the relevant sentence was added in the proposals.

***FL’s proposal****:*

* *For scheme 1, the following inter-UE coordination information signaling from UE-A and resource selection behavior in UE-B is supported:*
  + *Set of resources preferred for UE-B’s transmission*
    - *UE-B prioritizes all or a subset of the preferred resources in the resource selection for its transmission, not precluding the possibility of selecting a resource not indicated as the preferred resources*
  + *Set of resources non-preferred for UE-B’s transmission*
    - *UE-B excludes a resource indicated as the non-preferred resource in the resource selection for its transmission*
  + *RAN1 to strive for common design for both information types in the scheme 1*
* *For scheme 2, the following inter-UE coordination information signaling from UE-A and resource selection behavior in UE-B is supported:*
  + *Presence of expected/potential resource conflict on the resources indicated by UE-B’s SCI*
    - *UE-B does not use the resources indicated as the expected/potential resource conflict and triggers resource reselection*
  + *Presence of detected resource conflict on the resources indicated by UE-B’s SCI*
    - *UE-B performs retransmission of the TB that has been transmitted on the resources indicated as the detected resource conflict*
      * *FFS whether/when UE-B does not perform the retransmission of TB*
  + *RAN1 to strive for common design for both information types in the scheme 2*
* *FFS under which condition each of the inter-UE coordination information signaling and resource selection behavior is operated*

According to my review of contributions submitted in this meeting, the majority of companies supported the scenario where UE(s) among the intended receiver(s) of UE-B can be a UE-A. In this case, the intended receiver(s) includes at least the destination UE(s) of a TB transmitted by UE-B.

***FL’s proposal****:*

* *At least the following condition is supported for UEs to be UE-A(s)/UE-B(s) in the inter-UE coordination in Mode 2:*
  + *For both scheme 1 and 2,*
    - *UE(s) among the intended receiver(s) of UE-B can be a UE-A*
      * *At least the intended receiver(s) is the destination UE(s) of a TB transmitted by UE-B*
        + *FFS additional condition(s) of being the intended receiver(s) of UE-B*

The majority view is that at least the information listed in the proposal below could be used to generate the inter-UE coordination information.

***FL’s proposal****:*

* *At least the following information is used for UE-A to generate the inter-UE coordination information:*
  + *For scheme 1,* 
    - *Other UEs’ reserved resources based on UE-A’s sensing result*
    - *UE-A’s NR SL resources selected for its transmission(s) of TB(s)*
    - *UE-A’s scheduled/configured resources for UL*
  + *For scheme 2,* 
    - *Other UEs’ reserved resources and/or existing transmission (i.e. used resources) based on UE-A’s sensing result*
    - *UE-A’s NR SL resources selected for its transmission(s) of TB(s)*
    - *UE-A’s scheduled/configured resources for UL*

1. **Summary of contributions**

* Types of inter-UE coordination information
  + In scheme 1,
    - Preferred resource set only: [Huawei,3] [vivo,4] [InterDigital,32]
    - Non-preferred resource set only: [Kyocera,6] [Qualcomm,10] [OPPO,13] [Xiaomi,26] [Ericsson,36]
    - Preferred and non-preferred resource set: [Spreadtrum,5] [CATT,7] [Fraunhofer,8] [CMCC,9] [Zhejiang Lab,11] [Lenovo,14] [Fujitsu,16] [Apple,17] [ZTE,19] [LG,20] [ETRI,21] [NEC,22] [Mitsubishi,23] [MediaTeK,25] [Sharp,29] [Panasonic,30]
  + In scheme 2,
    - Presence of expected/potential resource conflict only: [vivo,4] [OPPO,13] [ZTE,19] [LG,20] [Panasonic,30]
    - Presence of expected/potential resource conflict and detected resource conflict: [Spreadtrum,5] [Fraunhofer,8] [Qualcomm,10] [Lenovo,14] [Intel,15] [Fujitsu,16] [ETRI,21] [NEC,22] [Xiaomi,26] [Ericsson,36]
* Details of inter-UE coordination signaling
  + In scheme 1,
    - Signaling form of a set of resources
      * Lowest sub-channel index and slot index [Nokia,1]
      * Sub-channel(s) and slot location [Nokia,1]
    - Maximum number of resources
      * 3
      * More than 3
    - Other information
      * Sensing-related information [Fujitsu,16] [Apple,17] [InterDigital,32] [ASUSTeK,34]
      * Cause of non-preferred resources [Apple,17]
    - Further consideration on the resource domain of the set of resources indicated by the coordination information [Zhejiang Lab,11] [LG,20]
  + In scheme 2,
    - Indication of whether resource conflict is due to either half-duplex or resource collision [Intel,15] [LG,20] [InterDigital,32]
    - Indication of whether the resource conflict occurs at UE-A or not[LG,20]
    - Time location of the resource conflict [Zhejiang Lab,11] [Intel,15]
* Conditions for UEs to be UE-A(s)/UE-B(s) for inter-UE coordination
  + In scheme 1,
    - UE-A’s coordination information is used for UE-B’s resource (re)selection procedure for its PSCCH/PSSCH transmission to the intended receiver(s) including the UE-A
      * [Futurewei,2] [Spreadtrum,5] [CATT,7] [CMCC,9] [Qualcomm,10] [OPPO,13] [Lenovo,14] [Intel,15] [Fujitsu,16] [Sony,18] [ZTE,19] [LG,20] [ETRI,21] [Mitsubishi,23] [Samsung,24] [MediaTeK,25] [InterDigital,32] [DCM,33] [Ericsson,36]
    - UE-A’s coordination information is used for UE-B’s resource (re)selection procedure for its PSCCH/PSSCH transmission to the intended receiver(s) other than the UE-A
      * [Futurewei,2] [Spreadtrum,5] [CMCC,9] [Intel,15] [MediaTeK,25]
    - UE’s V2X layer decision
      * [Huawei,3] [vivo,4] [Fraunhofer,8] [CMCC,9] [Sony,18] [LG,20] [Samsung,24]
    - UE’s power saving mode
      * [Samsung,24]
    - Pre-configuration and UE-capability
      * [Panasonic,30]
    - Cast type of UE-B’s PSCCH/PSSCH transmission based on coordination information
      * Unicast [Huawei,3] [Spreadtrum,5] [Kyocera,6] [CATT,7] [Qualcomm,10] [OPPO,13] [Fujitsu,16] [Mitsubishi,23] [Samsung,24] [InterDigital,32] [Ericsson,36]
      * Groupcast [Spreadtrum,5] [Kyocera,6] [Qualcomm,10] [OPPO,13] [Fujitsu,16] [Mitsubishi,23] [Samsung,24]
        + With SL HARQ-ACK feedback Option 2 enabled only [Huawei,3] [CATT,7]
      * Broadcast [Spreadtrum,5] [Qualcomm,10] [Fujitsu,16] [Mitsubishi,23]
  + In scheme 2,
    - UE-A’s coordination information is used for UE-B’s resource (re)selection procedure for its PSCCH/PSSCH transmission to the intended receiver(s) including the UE-A
      * [Futurewei,2] [vivo,4] [CATT,7] [OPPO,13] [Intel,15] [Fujitsu,16] [Apple,17] [Sony,18] [LG,20] [ETRI,21] [Mitsubishi,23] [Samsung,24] [MediaTeK,25] [InterDigital,32] [DCM,33] [Ericsson,36]
    - UE-A’s coordination information is used for UE-B’s resource (re)selection procedure for its PSCCH/PSSCH transmission to the intended receiver(s) other than the UE-A
      * [Futurewei,2] [Intel,15] [Fujitsu,16] [MediaTeK,25] [DCM,33] [Ericsson,36]
      * Conditions
        + UE-A is RX UE of the PSSCH of which resource(s) is conflicted with UE-B’s resource [Fujitsu,16]
        + Radio or geometric distance between UEs are close [Ericsson,36]
    - UE’s V2X layer decision
      * [Huawei,3] [Fraunhofer,8] [Apple,17] [Sony,18] [LG,20] [Samsung,24]
    - UE’s power saving mode
      * [Samsung,24]
    - Cast type of UE-B’s PSCCH/PSSCH transmission based on coordination information
      * Unicast [vivo,4] [Spreadtrum,5] [CATT,7] [Qualcomm,10] [OPPO,13] [Fujitsu,16] [InterDigital,32] [Ericsson,36]
      * Groupcast [vivo,4] [Spreadtrum,5] [CATT,7] [Qualcomm,10] [OPPO,13] [Fujitsu,16] [InterDigital,32] [Ericsson,36]
        + With SL HARQ-ACK feedback Option 1 enabled only [Fujitsu,16] [Apple,17] [Xiaomi,26]
      * Broadcast [Spreadtrum,5] [CATT,7] [Qualcomm,10] [Fujitsu,16] [Ericsson,36]
* Information to generate inter-UE coordination information
  + In scheme 1,
    - Other UEs’ reserved resources based on UE-A’s sensing result
      * [Nokia,1] [Futurewei,2] [Huawei,3] [vivo,4] [Kyocera,6] [CATT,7] [Fraunhofer,8] [CMCC,9] [Qualcomm,10] [Intel,15] [Apple,17] [LG,20] [DCM,33]
    - Coordination information received from other UEs
      * [Nokia,1] [Futurewei,2] [Intel,15] [Apple,17] [LG,20]
    - Information on UE-B’s traffic requirements (e.g., conveyed via triggering information from UE-B, if any)
      * [Nokia,1] [Futurewei,2] [Huawei,3] [DCM,33]
    - Location information on UE-B and other UEs
    - UE-A’s NR SL resources selected for its transmission(s) of TB(s)
      * [Nokia,1] [Futurewei,2] [Huawei,3] [vivo,4] [Kyocera,6] [CATT,7] [CMCC,9] [Qualcomm,10] [Intel,15] [Apple,17] [LG,20] [DCM,33]
    - UE-A’s scheduled resources for UL
      * [Nokia,1] [Futurewei,2] [vivo,4] [Kyocera,6] [CATT,7] [Qualcomm,10] [Intel,15] [Apple,17] [DCM,33]
    - UE-A’s configured resources for UL
      * [Nokia,1] [Futurewei,2] [vivo,4] [Kyocera,6] [CATT,7] [Qualcomm,10] [Intel,15] [Apple,17] [LG,20] [DCM,33]
    - LTE SL transmission and/or reception of UE-A
      * [Futurewei,2] [vivo,4] [Kyocera,6] [CATT,7] [Qualcomm,10] [LG,20] [DCM,33]
    - Resource set selected by UE-A for other UE-Bs’ transmissions
      * [Huawei,3] [DCM,33]
    - PSFCH transmission and/or reception of UE-A
      * [vivo,4] [Apple,17] [DCM,33]
    - UE-A’s candidate resource set based on UE-A’s sensing
      * [Nokia,1] [Huawei,3] [CATT,7] [Fraunhofer,8] [Intel,15]
    - UE-B’s ability to use coordination information
      * [DCM,33]
  + In scheme 2,
    - Other UEs’ reserved resources based on UE-A’s sensing result
      * [Nokia,1] [Futurewei,2] [Huawei,3] [vivo,4] [Fraunhofer,8] [Intel,15] [Apple,17] [LG,20] [DCM,33]
    - Other UEs’ existing transmission (i.e. used resources) based on UE-A’s sensing result
      * [Nokia,1] [Fraunhofer,8] [Intel,15] [Apple,17] [DCM,33]
    - Coordination information received from other UEs
      * [Futurewei,2] [Fraunhofer,8] [Apple,17] [LG,20]
    - Information on UE-B’s traffic requirements
      * [Intel,15] [DCM,33]
    - Location information on UE-B and other UEs
      * [Intel,15]
    - UE-A’s NR SL resources selected for its transmission(s) of TB(s)
      * [Nokia,1] [Futurewei,2] [vivo,4] [Intel,15] [Apple,17] [LG,20] [DCM,33]
    - UE-A’s scheduled/configured resources for UL
      * [Nokia,1] [Futurewei,2] [vivo,4] [Intel,15] [Apple,17] [LG,20] [DCM,33]
    - LTE SL transmission and/or reception of UE-A
      * [Futurewei,2] [vivo,4] [LG,20] [DCM,33]
    - PSFCH transmission and/or reception of UE-A
      * [vivo,4] [Intel,15] [Apple,17] [DCM,33]
    - UE-B’s ability to use coordination information
      * [DCM,33]
  + Further consideration on the processing time budget for generating and transmitting inter-UE coordination information from UE-A [Futurewei,2] [vivo,4] [Fraunhofer,8] [Lenovo,14] [Apple,17] [LG,20] [DCM,33]
* Conditions for UE-A to send inter-UE coordination information to UE-B
  + In scheme 1,
    - UE-A receives the request from UE-B [Nokia,1] [Futurewei,2] [Huawei,3] [vivo,4] [Spreadtrum,5] [Kyocera,6] [CATT,7] [Fraunhofer,8] [CMCC,9] [OPPO,13] [Lenovo,14] [Fujitsu,16] [Apple,17] [Sony,18] [ZTE,19] [LG,20] [ETRI,21] [NEC,22] [Samsung,24] [Xiaomi,26] [Sharp,29] [Panasonic,30] [ITL,31] [InterDigital,32]
      * Details of the request signaling
        + Information

A set of preferred or non-preferred resources determined at UE-B [Nokia,1] [CATT,7] [OPPO,13]

UE-B’s resource (re)selection procedure-related parameters [Huawei,3] [vivo,4] [Spreadtrum,5] [CATT,7] [OPPO,13] [Lenovo,14] [Fujitsu,16] [ZTE,19] [NEC,22] [Samsung,24] [Xiaomi,26] [InterDigital,32]

Type of coordination information to be requested [Fraunhofer,8] [ZTE,19]

* + - * + Container

PSFCH-like format [Kyocera,6] [ETRI,21]

SCI [Futurewei,2] [vivo,4] [Kyocera,6] [Fujitsu,16]

MAC CE [vivo,4] [OPPO,13] [Fujitsu,16] [LG,20]

* + - * + Further consideration on the condition for UE-B to transmit the request [Xiaomi,26]
    - UE-A’s higher layer decision [Futurewei,2] [LG,20]
    - Based on (pre)configured periodicity [Huawei,3] [vivo,4] [LG,20]
    - Based on presence of resource conflict [Spreadtrum,5] [Fraunhofer,8] [OPPO,13] [Sony,18] [LG,20] [ETRI,21] [ITL,31] [InterDigital,32]
    - Based on RSRP measurement and/or distance at UE-A side [CMCC,9] [Mitsubishi,23] [Xiaomi,26] [ITL,31]
    - Based on the SL HARQ-ACK states [Lenovo,14] [ITL,31]
  + In scheme 2,
    - UE-A receives the request from UE-B [CATT,7] [Intel,15] [Panasonic,30]
      * Details of the request signaling
        + Container

SCI [CATT,7] [Intel,15]

* + - Based on presence of resource conflict [vivo,4] [Spreadtrum,5] [Qualcomm,10] [OPPO,13] [Intel,15] [Apple,17] [Sony,18] [LG,20] [Xiaomi,26] [Sharp,29] [Panasonic,30] [InterDigital,32] [Bosch,35]
      * Further consideration on checking condition to decide resource conflict [OPPO,13] [Lenovo,14] [Intel,15] [Apple,17] [LG,20] [Xiaomi,26] [Bosch,35]
        + Portion of overlapping [Lenovo,14] [LG,20] [Bosch,35]
        + RSRP measurement [Lenovo,14] [LG,20] [Bosch,35]
        + Location of UE-B and other UEs [Intel,15] [LG,20] [Xiaomi,26] [Bosch,35]
        + Whether this transmission is UE-B’s last retransmission or not [Apple,17]
        + Whether or not L2-IDs are achieved [LG,20]
        + Priority of UE-B’s transmission [Bosch,35]
        + CBR [Bosch,35]
    - Based on the SL HARQ-ACK states [Lenovo,14]
* Container used for carrying coordination information
  + In scheme 1,
    - 1st SCI format
      * [Futurewei,2] [Spreadtrum,5] [CMCC,9] [Lenovo,14] [Fujitsu,16] [Hyundai,28] [Sharp,29] [Bosch,35]
    - 2nd SCI format
      * [Futurewei,2] [Huawei,3] [vivo,4] [Spreadtrum,5] [Fraunhofer,8] [CMCC,9] [CAICT,12] [OPPO,13] [Lenovo,14] [Fujitsu,16] [Sony,18] [Samsung,24] [Xiaomi,26] [Hyundai,28] [Bosch,35]
    - MAC CE
      * [vivo,4] [Spreadtrum,5] [Lenovo,14] [Intel,15] [Fujitsu,16] [ZTE,19] [LG,20] [NEC,22] [Panasonic,30] [DCM,33] [Bosch,35]
    - PC5-RRC signaling
      * [OPPO,13] [ZTE,19] [NEC,22] [Ericsson,36]
    - Further consideration on how to set PSCCH/PSSCH parameters (e.g. source ID, destination ID, cast type, SL HARQ-ACK feedback enabled/disabled, priority value) [LG,20]
  + In scheme 2,
    - PSFCH-like format
      * [Nokia,1] [vivo,4] [Fraunhofer,8] [Qualcomm,10] [Zhejiang Lab,11] [CAICT,12] [OPPO,13] [Lenovo,14] [Intel,15] [Fujitsu,16] [Apple,17] [Sony,18] [LG,20] [NEC,22] [Xiaomi,26] [Hyundai,28] [Panasonic,30] [InterDigital,32] [DCM,33] [Bosch,35] [Ericsson,36]
      * Timing of the PSFCH-like channel
        + With respect to the time location of the potential conflicted PSSCH resource

[vivo,4] [Fraunhofer,8] [LG,20] [DCM,33]

* + - * + With respect to the time location of a SCI indicating PSSCH resource with potential resource conflict
      * Further consideration prioritization rule for PSFCHs for SL HARQ-ACK feedback and inter-UE coordination [Intel,15] [Fujitsu,16]
    - 1st SCI format
      * [Sharp,29]
    - 2nd SCI format
      * [Samsung,24]
  + Further consideration on whether shared or dedicated resource is used for inter-UE coordination signaling [Nokia,1] [Kyocera,6] [Qualcomm,10]
* UE-B’s behavior upon receiving inter-UE coordination information from UE-A
  + In scheme 1,
    - Option 1-1: UE-B’s resource(s) to be used for its transmission resource (re)-selection is based on both UE-B’s sensing result (if available) and the received coordination information
      * [Futurewei,2] [Huawei,3] [vivo,4] [Kyocera,6] [CATT,7] [Fraunhofer,8] [CMCC,9] [Qualcomm,10] [OPPO,13] [Lenovo,14] [Intel,15] [Fujitsu,16] [Apple,17] [ZTE,19] [LG,20] [ETRI,21] [NEC,22] [Mitsubishi,23] [Samsung,24] [MediaTeK,25] [Xiaomi,26] [Convida,27] [Hyundai,28] [InterDigital,32] [DCM,33] [Ericsson,36]
    - Option 1-2: UE-B’s resource(s) to be used for its transmission resource (re)-selection is based only on the received coordination information
      * [Futurewei,2] [Huawei,3] [vivo,4] [CATT,7] [Fraunhofer,8] [CMCC,9] [Apple,17] [ETRI,21] [NEC,22] [MediaTeK,25] [Convida,27] [Hyundai,28] [InterDigital,32]
      * Condition
        + When UE-A is a leading UE of a UE group of UE-B [Huawei,3] [vivo,4]
        + When UE-B has no PSCCH/PSSCH RX capability [CATT,7]
        + When UE-B has no sensing results [CMCC,9] [ETRI,21] [InterDigial,32]
        + When UE-A is the intended receiver of the UE-B’s transmission [MediaTeK,25]
    - Option 1-3: UE-B’s resource(s) to be re-selected based on the received coordination information
      * [OPPO,13] [Lenovo,14] [InterDigital,32]
    - Option 1-4: UE-B’s resource(s) to be used for its transmission resource (re)-selection is based on the received coordination information
  + In scheme 2,
    - Option 2-1: UE-B can determine resource(s) to be re-selected based on the received coordination information
      * [vivo,4] [Qualcomm,10] [OPPO,13] [Lenovo,14] [Intel,15] [Fujitsu,16] [Apple,17] [ZTE,19] [LG,20] [ETRI,21] [NEC,22] [Samsung,24] [MediaTeK,25] [Xiaomi,26] [Convida,27] [InterDigital,32] [DCM,33] [Ericsson,36]
    - Option 2-2: UE-B can determine a necessity of retransmission based on the received coordination information
      * [Qualcomm,10] [Lenovo,14] [Intel,15] [Fujitsu,16] [Apple,17] [ETRI,21] [NEC,22] [Xiaomi,26] [Convida,27] [Ericsson,36]
      * Condition
        + Groupcast with SL HARQ-ACK feedback option 1 is enabled [Fujitsu,16] [Apple,17] [Xiaomi,26]
* Validity check for the inter-UE coordination information received by UE-B
  + In scheme 1,
    - Based on whether the indicated resource set is inside UE-B’s selection window [Fraunhofer,8] [LG,20]
    - Based on RSRP values conveyed by coordination information [Fraunhofer,8]
    - Based on distance between UE-A and UE-B [Fraunhofer,8] [Samsung,24]
    - Based on RSRP measured by coordination information signaling [Fraunhofer,8] [Fujitsu,16] [LG,20] [Samsung,24]
    - Based on the target of the coordination information and/or the parameters of PSCCH/PSSCH to be transmitted by UE-B [Fraunhofer,8] [Lenovo,14] [LG,20] [Samsung,24]
    - Based on the candidate resource ratio [LG,20]
    - Based on PDB [Samsung,24]
  + In scheme 2,
    - Based on distance between UE-A and UE-B [Fraunhofer,8] [Samsung,24]
    - Based on the target of the coordination information and/or the parameters of PSCCH/PSSCH to be transmitted by UE-B [Fraunhofer,8] [LG,20] [Samsung,24]
    - Based on PDB [Samsung,24]
* Others
  + Further consideration of indication to UE-A of ID(s) used by UE-B and the intended receiver(s) of UE-B’s transmission [Nokia,1]
  + Further consideration on relaying the received SCI [Nokia,1]
  + Further consideration on the unmonitored slot at UE-B side [Fujitsu,16] [ITL,31]
  + Further consideration on the possibility that UE-B changes PSCCH/PSSCH parameters (e.g. source ID, destination ID, whether SL HARQ-ACK feedback enabled or disabled) period-to-period [LG,20]
  + Further consideration on the impact on Rel-16 UE sharing the same resource pool with UEs using inter-UE coordination operation [Panasonic,30] [Bosch,35]
  + Further consideration on SL DRX to determine “A set of resources” at UE-A side [ASUSTeK,34]

1. **Reference**
2. R1-2104177 Inter-UE coordination in mode 2 sidelink resource allocation Nokia, Nokia Shanghai Bell
3. R1-2104193 Discussion on techniques for inter-UE coordination FUTUREWEI
4. R1-2104237 Inter-UE coordination in sidelink resource allocation Huawei, HiSilicon
5. R1-2104386 Discussion on mode-2 enhancements vivo
6. R1-2104441 Discussion on inter-UE coordination in sidelink resource allocation Spreadtrum Communications
7. R1-2104457 Inter-UE Coordination for Mode 2 Enhancements Kyocera Corporation
8. R1-2104490 Discussion on inter-UE coordination in mode 2 enhancement CATT, GOHIGH
9. R1-2104561 Resource Allocation Enhancements for Mode 2 Fraunhofer HHI, Fraunhofer IIS
10. R1-2104631 Discussoin on reliability and latency enhancements for mode-2 resource allocation CMCC
11. R1-2104694 Reliability and Latency Enhancements for Mode 2 Qualcomm Incorporated
12. R1-2104707 Inter-UE coordination schemes in mode 2 Zhejiang Lab
13. R1-2104725 Considerations on mode 2 enhancements CAICT
14. R1-2104756 Inter-UE coordination in mode 2 of NR sidelink OPPO
15. R1-2104870 Discussion on inter-UE coordination for Mode 2 enhancements Lenovo, Motorola Mobility
16. R1-2104927 Inter-UE Coordination Schemes for Sidelink Communication Intel Corporation
17. R1-2105067 Considerations on inter-UE coordination for mode 2 enhancements Fujitsu
18. R1-2105127 On Inter-UE Coordination Apple
19. R1-2105178 Discussion on inter-UE coordination for Mode 2 enhancements Sony
20. R1-2105200 Discussion on the inter-UE coordination ZTE
21. R1-2105205 Discussion on inter-UE coordination for Mode 2 enhancements LG Electronics
22. R1-2105229 Discussion on inter-UE coordination for Mode 2 enhancements ETRI
23. R1-2105254 Discussion on mode 2 enhancements NEC
24. R1-2105270 Inter-UE coordination for enhanced resource allocation Mitsubishi Electric RCE
25. R1-2105335 On Inter-UE Coordination for Mode2 Enhancements Samsung
26. R1-2105393 Discussion on Mode 2 enhancements MediaTek Inc.
27. R1-2105545 Discussion on inter-UE coordination Xiaomi
28. R1-2105599 NR SL Inter-UE Coordination for Mode 2 Enhancements Convida Wireless
29. R1-2105616 Discussion on inter-UE coordination for Mode 2 enhancements Hyundai Motors
30. R1-2105646 Discussion on inter-UE coordination for Mode 2 enhancements Sharp
31. R1-2105650 Inter-UE coordination for Mode 2 enhancements Panasonic Corporation
32. R1-2105659 Inter-UE coordination for mode 2 enhancements ITL
33. R1-2105675 On inter-UE coordination for Mode 2 enhancement InterDigital, Inc.
34. R1-2105719 Resource allocation for reliability and latency enhancements NTT DOCOMO, INC.
35. R1-2105848 Discussion on V2X mode 2 enhancements ASUSTeK
36. R1-2105881 Discussion on inter-UE coordination for sidelink mode-2 ROBERT BOSCH GmbH
37. R1-2105894 Feasibility and benefits of mode 2 enhancements for inter-UE coordination Ericsson
38. **Appendix**

**4.1 Conclusions made in RAN1#103-e meeting**

* ***Conclusion****:*
  + *The schemes of inter-UE coordination in Mode 2 are categorized as being based on the following types of “A set of resources” sent by UE-A to UE-B:*
    - *UE-A sends to UE-B the set of resources preferred for UE-B’s transmission*
      * + *e.g., based on its sensing result*
    - *UE-A sends to UE-B the set of resources not preferred for UE-B’s transmission*
      * + *e.g., based on its sensing result and/or expected/potential resource conflict*
    - *UE-A sends to UE-B the set of resource where the resource conflict is detected*
    - *FFS: details of resource conflict, e.g., including type of resource conflict*
    - *FFS: details of sensing operation at UE-A side*
    - *FFS: which type(s) of resource set information is(are) beneficial/feasible to which cast type(s)*
    - *Note: these different types may be used in combination with each other*
  + *From RAN1 perspective, further study on the feasibility/benefit of inter-UE coordination is required*
  + *Send an LS to RAN plenary*
    - *Final LS in* [*R1-2009841*](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_103\Docs\R1-2009841.zip)
* ***Conclusion****:*
  + *For the schemes of inter-UE coordination identified as feasible/beneficial, at least the following aspects are further discussed.*
    - *How/when UE-A determines the contents of ”A set of resources”, including consideration of UL scheduling*
    - *When UE-A sends ”A set of resources” to UE-B, including which UE(s) sends it*
    - *How UE-A and UE-B are determined*
    - *How UE-A sends ”A set of resources” to UE-B, including container used for carrying it, implicitly or explicitly or both*
    - *How/when/whether UE-B receives “A set of resources” and takes it into account in the resource selection for its own transmission*
    - *How/whether to define the relationship between support/signaling of inter-UE coordination and cast type*

**4.2 Conclusions made in RAN1#104-e meeting**

* ***Conclusion****:*
  + *RAN1 concludes that the inter-UE coordination in Mode 2 is feasible, and is beneficial (e.g., reliability, etc.) compared to Rel-16 Mode 2 RA, and thus recommends specification of the feature.*
    - *The detailed observations can be found in the attachment of the LS*
* *Draft LS in* [*R1-2102165*](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_104\Docs\R1-2102165.zip)*, along with the attachment* [*R1-2102166*](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_104\Docs\R1-2102166.zip)*, is approved (with a typo fix)* 
  + *Final LS in R1-2102168*

**4.3 Agreements made in RAN1#104bis-e meeting**

* *Agreement:*
  + *Support the following schemes of inter-UE coordination in Mode 2:*
    - *Inter-UE Coordination Scheme 1:* 
      * *The coordination information sent from UE-A to UE-B is the set of resources preferred and/or non-preferred for UE-B’s transmission*
        + *FFS details including a possibility of down-selection between the preferred resource set and the non-preferred resource set, whether or not to include any additional information other than indicating time/frequency of the resources within the set in the coordination information*
      * *FFS condition(s) in which Scheme 1 is used*
    - *Inter-UE Coordination Scheme 2:* 
      * *The coordination information sent from UE-A to UE-B is the presence of expected/potential and/or detected resource conflict on the resources indicated by UE-B’s SCI*
        + *FFS details including a possibility of down-selection between the expected/potential conflict and the detected resource conflict*
      * *FFS condition(s) in which Scheme 2 is used*
* *Agreement:*
  + *Study further to determine the conditions for UEs to be UE-A(s)/UE-B(s) for inter-UE coordination:*
    - *Details include applicable scenario(s)/inter-UE coordination scheme(s)*
    - *E.g., only UE(s) among the intended receiver(s) of UE-B can be a UE-A, any UE can be a UE-A, high-layer configured, etc.*
      * *Including the possibility of being subject to certain conditions and/or capability*
* *Agreement:*
  + *When UE-B receives the inter-UE coordination information from UE-A, consider at least one of the following options (with details FFS including possibly down-selecting/merging one or more of the options below, applicable scenario(s)/condition(s) for each option, UE behavior) for UE-B’s to take it into account in the resource (re)-selection for its own transmission*
    - *For scheme 1:*
      * *Option 1-1: UE-B’s resource(s) to be used for its transmission resource (re)-selection is based on both UE-B’s sensing result (if available) and the received coordination information*
      * *Option 1-2: UE-B’s resource(s) to be used for its transmission resource (re)-selection is based only on the received coordination information*
      * *Option 1-3: UE-B’s resource(s) to be re-selected based on the received coordination information*
      * *Option 1-4: UE-B’s resource(s) to be used for its transmission resource (re)-selection is based on the received coordination information*
    - *For scheme 2:*
      * *Option 2-1: UE-B can determine resource(s) to be re-selected based on the received coordination information*
      * *Option 2-2: UE-B can determine a necessity of retransmission based on the received coordination information*