**3GPP TSG RAN WG1 Meeting #104-e R1-210xxxx**

**e-Meeting, January 25th – February 5th, 2021**

**Agenda Item:** 8.11.1.2

**Source:** Moderator (LG Electronics)

**Title:** Detailed observations from evaluation results

**Document for:** Information

# **Introduction**

This contribution includes the detailed observations from evaluation results.

# **Observations from evaluation results for inter-UE coordination**

RAN1 has studied and evaluated schemes of inter-UE coordination in the following categories:

* *Type A: UE-A sends to UE-B the set of resources preferred for UE-B’s transmission*
  + *e.g., based on its sensing result*
* *Type B: 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*
* *Type C: UE-A sends to UE-B the set of resources where the resource conflict is detected*

Observations from evaluation results are summarized below. Note that the detailed evaluations for coordination schemes may not be fully aligned among companies. The details of the above schemes may also be different among companies in the evaluation. As a result, the observations drawn may be specific to the corresponding evaluated schemes with the assumed evaluation assumptions.

* ***Observations from evaluation results w/ signaling overhead and latency for the inter-UE coordination scheme:***
* *Type A* 
  + *Periodic traffic*
    - *When UE-A sends to UE-B the set of resources used for UE-B’s transmission,*
      * + *Source 1 (R1-2101941) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*
    - *When UE-A sends to UE-B the set of resources preferred for UE-B’s transmission,*
      * + *Source 1 (R1-2101941) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*
        + *Source 5 (R1-2100925) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for broadcast*
        + *Source 6 (R1-2101911) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast under the scenario where UL transmission can overlap with SL transmission/reception*
        + *Source 2 (R1-2100673) observed that their coordination scheme using the Type A-like resource is not beneficial compared to Rel-16 Mode 2 RA for unicast*
        + *Source 3 (R1-2100746) observed that their coordination scheme using the Type A-like resource is not beneficial compared to Rel-16 Mode 2 RA for groupcast with SL HARQ-ACK feedback Option 1*
  + *Aperiodic traffic*
    - *When UE-A sends to UE-B the set of resources used for UE-B’s transmission,*
      * + *Source 1 (R1-2101941) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*
        + *Source 2 (R1-2100673) observed that PRR loss of their coordination scheme using the Type A-like resource is shown compared to Rel-16 Mode 2 RA for unicast*
    - *When UE-A sends to UE-B the set of resources preferred for UE-B’s transmission,*
      * + *Source 1 (R1-2101941) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*
        + *Source 6 (R1-2101911) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast under the scenario where UL transmission can overlap with SL transmission/reception*
* *Type B*
  + *Periodic traffic*
    - *Source 9 (R1-2101926) observed that their coordination scheme using the Type B-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*
  + *Aperiodic traffic*
    - *Source 12 (R1-2101804) observed that their coordination scheme using the Type B-like resource is beneficial compared to Rel-16 Mode 2 RA for groupcast*
* *Type C*
  + *Periodic traffic*
    - *Source 3 (R1-2100746) and Source 13 (R1-2101910) observed that their coordination scheme using the Type C-like resource is beneficial compared to Rel-16 Mode 2 RA for groupcast with SL HARQ-ACK feedback Option 1*
  + *Aperiodic traffic*
    - *Source 2 (R1-2100673), Source 3 (R1-2100746), Source 12 (R1-2101804), and Source 13 (R1-2101910) observed that their coordination scheme using the Type C-like resource is beneficial compared to Rel-16 Mode 2 RA for groupcast with SL HARQ-ACK feedback Option 1*
* *Combination of Type B and C*
  + *Aperiodic traffic*
    - *Source 12 (R1-2101804) observed that their coordination scheme using a combination of Type B-like and C-like resources is beneficial compared to Rel-16 Mode 2 RA, Type B-like resource, and Type C-like resource, respectively for groupcast*
    - *Source 13 (R1-2101910) observed that their coordination scheme using a combination of Type B-like and C-like resources is beneficial compared to Rel-16 Mode 2 RA, Type B-like resource, and Type C-like resource, respectively for groupcast with SL HARQ-ACK feedback Option 1*
      * *Both signaling overhead and latency are considered for Type C-like resource, but only latency is considered for Type B-like resource*
* ***Observations from evaluation results w/o signaling overhead and/or latency for the inter-UE coordination scheme:***
* *W/o signaling overhead, w/ latency*
  + *Type A* 
    - *Periodic traffic*
      * + *When UE-A sends to UE-B the set of resources preferred for UE-B’s transmission,*

*Source 7 (R1-2100352) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*

* + - *Aperiodic traffic*
      * + *When UE-A sends to UE-B the set of resources preferred for UE-B’s transmission,*

*Source 7 (R1-2100352) observed that their coordination scheme using the Type A-like resource is not beneficial compared to Rel-16 Mode 2 RA for unicast*

* + *Type B*
    - *Periodic traffic*
      * + *Source 7 (R1-2100352) and Source 10 (R1-2100142) observed that their coordination scheme using the Type B-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*

*Source 10 (R1-2100142) observed that PIR gain of their coordination scheme using the Type B-like resource is shown for unicast*

* + - * + *Source 11 (R1-2100828) observed that their coordination scheme using the Type B-like resource is beneficial compared to Rel-16 Mode 2 RA for groupcast*
    - *Aperiodic traffic*
      * + *Source 13 (R1-2101910) observed that their coordination scheme using the Type B-like resource is beneficial compared to Rel-16 Mode 2 RA for groupcast with SL HARQ-ACK feedback Option 1*
        + *Source 7 (R1-2100352) observed that their coordination scheme using the Type B-like resource is not beneficial compared to Rel-16 Mode 2 RA for unicast*
  + *Combination of Type A and B*
    - *Periodic traffic*
      * + *Source 7 (R1-2100352) observed that their coordination scheme using a combination of Type A-like and B-like resources is beneficial compared to Rel-16 Mode 2 RA, Type A-like resource, and Type B-like resource, respectively for unicast*
    - *Aperiodic traffic*
      * + *Source 7 (R1-2100352) observed that their coordination scheme using a combination of Type A-like and B-like resources is not beneficial compared to Rel-16 Mode 2 RA for unicast*
* *W/ signaling overhead, w/o latency*
  + *Type A* 
    - *Periodic traffic*
      * + *When UE-A sends to UE-B the set of resources preferred for UE-B’s transmission,*

*Source 6 (R1-2101911) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*

* + - *Aperiodic traffic*
      * + *When UE-A sends to UE-B the set of resources preferred for UE-B’s transmission,*

*Source 6 (R1-2101911) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*

* + *Type B*
    - *Periodic traffic*
      * + *Source 6 (R1-2101911) observed that their coordination scheme using the Type B-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*
        + *Source 6 (R1-2101911) observed that the gain of their coordination scheme using Type B-like resource becomes larger under the scenario where UL transmission can overlap with SL transmission/reception for unicast*
        + *Source 11 (R1-2100828) observed that their coordination scheme using the Type B-like resource with enhanced mechanism of UE-A selection is beneficial for groupcast*
    - *Aperiodic traffic*
      * + *Source 6 (R1-2101911) observed that their coordination scheme using the Type B-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*
        + *Source 6 (R1-2101911) observed that their coordination scheme using the gain of Type B-like resource becomes larger under the scenario where UL transmission can overlap with SL transmission/reception for unicast*
* *W/o signaling overhead, w/o latency*
  + *Type A* 
    - *Periodic traffic*
      * + *When UE-A sends to UE-B the set of resources preferred for UE-B’s transmission,*

*Source 8 (R1-2101232) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*

*Source 3 (R1-2100746) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for groupcast with SL HARQ-ACK feedback Option 1*

*Source 4 (R1-2101786) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for broadcast*

* + - *Aperiodic traffic*
      * + *When UE-A sends to UE-B the set of resources used for UE-B’s transmission,*

*Source 2 (R1-2100673) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*

* + - * + *When UE-A sends to UE-B the set of resources preferred for UE-B’s transmission,*

*Source 8 (R1-2101232) observed that their coordination scheme using the Type A-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*

*Source 2 (R1-2100673) observed that their coordination scheme using Type A-like resource is not beneficial compared to Rel-16 Mode 2 RA for unicast*

* + *Type B*
    - *Periodic traffic*
      * *Source 11 (R1-2100828) observed that their coordination scheme using the Type B-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*
      * *Source 11 (R1-2100828) observed that their coordination scheme using the Type B-like resource is beneficial compared to Rel-16 Mode 2 RA for groupcast*
      * *Source 9 (R1-2101926) observed that their coordination scheme using the Type B-like resource is beneficial compared to Rel-16 Mode 2 RA for unicast*

# **Observations from evaluation results for Rel-16 Mode 2 enhancements**

This section provides observations for Rel-16 Mode 2 enhancements other than the inter-UE coordination schemes categorized in Section 2.

* *Source 2 (R1-2100673) and Source 13 (R1-2101910) observed PRR gains over Rel-16 Mode 2 RA if the minimum number of retransmission is ensured by UE for the case of Option 1 HARQ feedback. It is also observed that this scheme is compatible with inter-UE coordination schemes requiring additional signaling between UEs.*
* *Source 2 (R1-2100673) and Source 13 (R1-2101910) observed reduced latency over Rel-16 Mode 2 RA if resource selection procedure is adjusted to prioritize selection of early in time resources. It is also observed that this scheme does not have noticeable impact on reliability and is compatible with inter-UE coordination schemes requiring additional signaling between UEs.*