

3GPP TSG RAN Meeting #94-e RP-21XXXX

Electronic Meeting, December 6 - 17, 2021

Source: RAN1 Chair (Samsung)

Title: Moderator's summary for discussion [RAN94e-R17-Sidelink-WI]: Intermediate Round

Document for: Discussion and Decision

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## 1 Introduction

As part of Rel-17 NR, there is an ongoing work item on *NR sidelink enhancement (NR\_SL\_enh)*. The work item was due for stage-3 completion by Q4 of 2021 in RAN1 and Q1 of 2022 in other working groups. From RAN1 point of view, the work item was declared incomplete [1], [2] after the last RAN1 meeting (RAN1#107-e). According to the work item status report [2], the **completion level of RAN1 work is 85%**. RAN plenary guidance on how to handle this work item is needed.

There are two RAN1 objectives for NR sidelink enhancement: resource allocation to reduce UE power consumption and inter-UE coordination. Both RAN1 objectives are incomplete.

A number of companies have submitted contributions [3] - [10] to discuss how the situation should be handled.

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## 2 Initial Round

### 2.1 Discussion Point 1

Incomplete work/study item can be handled by either downscoping the objectives, extending the target completion deadline, or doing both. For this issue, company views in [3] - [10] can be summarized as follows:

- No company has proposed a downscoping of Rel-17 NR sidelink enhancement objectives. A few companies have explicitly indicated that downscoping is not preferred.
- All the companies have indicated that extending the RAN1 target completion date to Q1 of 2022 is necessary. No company has indicated that a RAN1 extension beyond Q1 of 2022 is necessary.
- A number of companies have also indicated that extending the RAN1 completion date should not impact the target completion date in other WGs (stage-3 completion by Q1 of 2022).

Based on the above observations, the following proposal is made.

**Proposal 1: RAN1 is tasked to complete the remaining normative work for Rel-17 NR sidelink enhancement by Q1 of 2022.**

- All RAN1 decisions that impact other WGs should be finalized in RAN1#107bis-e
- Any RAN1 feature not completed by Q1 of 2022 will be automatically dropped from Rel-17

Note that the above proposal does not impact the target completion date in other WGs. Also, it is implied that there is no downscoping of any kind in RAN#94-e. Companies are invited to provide their views on Proposal 1 using the feedback form located below.

**Feedback Form 1:**

<p><b>1 – MediaTek Inc.</b></p> <p>The proposals are fine.</p>
<p><b>2 – Huawei Tech.(UK) Co.. Ltd</b></p> <p>The main bullet and first sub-bullet are fine.</p> <p>Although we don't think they will be needed, RAN already has procedures for handling WIs that are not complete at the end of a Release, by considering whether to approve an exception sheet and, if so, its content. Once again (as in several previous RAN meetings) having automated decision-making in this meeting before the reality of the facts are known in the next meeting isn't necessary. Each RAN should have its own decision power, rather than being pre-empted before it meets. It is our expectation that such decisions will not be needed anyway.</p>
<p><b>3 – ZTE Corporation</b></p> <p>We support this proposal. RAN1 should focus on only essential topics among the leftovers, and should complete the normative work by Q1 of 2022. Features with cross-WG impacts should be closed in the first meeting, alternatively dropped.</p> <p><b>All RAN1 decisions that impact other WGs should be finalized in RAN1#107bis-e</b> , <u>alternatively the relevant features will not be supported in Rel-17</u></p> <p>Clear guidance from RAN plenary is anticipated to finalize Rel-17 NR sidelink enhancement in time.</p>
<p><b>4 – TELECOM ITALIA S.p.A.</b></p> <p>As usual RAN1 is not able to complete in time and companies (as usual) are proposing to extend the discussion.</p> <p>We believe a clear decision should be made at RAN#94.</p> <p>In particular topics with cross WG impact should be discarded now, not in February, since it would be too late for other WGs to take into account the conclusion.</p> <p>As a general principle, since RAN1 did not meet the deadline, we would propose to either remove the activity from Rel17 or move it to Rel 18.</p>
<p><b>5 – DOCOMO Communications Lab.</b></p> <p>Support proposal 1.</p>
<p><b>6 – vivo Communication Technology</b></p> <p>The main bullet and the the first sub-bullet are fine.</p>

The second sub-bullet is not clear. For example, does it mean to drop the whole objective (e.g., inter-UE coordination) when some parts of one or more sub-schemes are not completed, or only dropping some sub-schemes/procedures? If it is the later case, do we have to decide a list of which one (sub-scheme, signaling, procedure, etc.) should be dropped? In this case it would be appropriate to discuss in RAN#95-e based on a lists of incomplete issues available at that time.

**7 – GOHIGH DATA NETWORKS TECH.**

We are fine with the proposal.

**8 – Ericsson LM**

We are supportive of this proposal

**9 – Guangdong OPPO Mobile Telecom.**

Agree and support Proposal 1 from the moderator. It is crucial to finish R17 eSL WI on time, especially RAN1 part, and not to have any overlap between R17 and R18 SL work items. Hence, any RAN1 feature does not completed by March 2022, it shall be automatically dropped from Rel-17

**10 – Samsung Electronics Co.**

(Moderator - RAN1 Chair)

For the second sub-bullet, vivo asked whether the suggestion is to drop the entire objective if not completed. My intention was not to suggest that the entire objective be dropped but just the part that is not completed. This is why used the term "feature" instead of "objective". For example, RAN1 is working on scheme 1 and scheme 2 for inter-UE coordination. If scheme 1 is completed but scheme 2 is not completed after the February RAN1 meeting, scheme 2 is dropped for Rel-17.

**11 – AT&T GNS Belgium SPRL**

We are fine with proposal 1. However, for the core part objectives for other RAN WGs (RAN2, RAN4) that have dependencies on RAN1 completion, we have concerns of the impacts that could jeopardize the target completion dates.

**12 – VODAFONE Group Plc**

Tend to agree with Telecom Italia.

**13 – Futurewei**

We are fine for the main proposal. However, we have concerns on the sub-bullets.

No WI should have to give up beforehand the normal working procedure of exceptions at the end of the release. We should discuss at next RAN if there is any component (RAN1 or other WG-led) that is not complete but the sunk cost and value of the component warrant an exception. Further, we fear that the two subbullets may lead to counter-productive behavior rather than encouraging companies to work together and in "live with" certain decisions.

**14 – InterDigital**

We support the main proposal and the first bullet. We are ok with the second bullet in principle but we are not sure if we need to make that statement as an agreement since it could be a natural consequence if that is the case. Also, it is unclear the definition of the competition of the feature. If there is some remaining issues which can be handled during maintenance phase, it will be considered as competition or not completed yet?

**15 – Qualcomm Incorporated**

We support the main bullet and are ok with the first sub-bullet with the clarification that it applies to RAN2 and the core part of RAN4 only.

While we agree with the intention of the second bullet, we do not support including it. If there are any incomplete items at the end of Q1, RAN can discuss and make the decision to remove them as appropriate in RAN #95 per existing procedure. Our primary concern with automatic removal is that it could remove items with trivial open issues that would normally be resolved in the maintenance phase.

**16 – Apple GmbH**

We are generally fine with the main bullet and the first sub-bullet. For the second sub-bullet, although it is clarified the drop is at RAN1 feature level, we think it might be hard to justify whether a feature is completed or not. For example, some of the open issues might be addressed in the maintenance phase. We suggest examining the status and make the corresponding decision at RAN #95 meeting.

**17 – Sony Group Corporation**

We are fine with the proposal 1.

**18 – Spreadtrum Communications**

We are fine with the proposal.

**19 – LG Electronics Inc.**

We are fine with the main proposal and first sub-bullet. For the second sub-bullet, although we think it is a proper RAN procedure to discuss how to treat an uncompleted WI at RAN#95e, we are okay with it as a general principle.

**20 – Beijing Xiaomi Mobile Software**

We are fine with the proposal.

**21 – Panasonic Corporation**

We support the proposal.

**22 – Samsung R&D Institute UK**

We support the proposal.

**23 – SHARP Corporation**

We support the proposal from the moderator.

<p><b>24 – Fujitsu Limited</b></p> <p>We support the proposal.</p>
<p><b>25 – Motorola Mobility España SA</b></p> <p><b>Lenovo/Motorola Mobility</b> – We support first proposal, we should prioritize essential items to ensure completion of all feature within RAN#95e before considering optimization items</p>
<p><b>26 – Intel Corporation (UK) Ltd</b></p> <p>Support main bullet and the first sub-bullet. Regarding the 2nd sub-bullet, we prefer to make decisions step-by-step with the understanding that WI is to be completed by RAN#95.</p>
<p><b>27 – NEC Corporation</b></p> <p>We support the proposal.</p>
<p><b>28 – Philips International B.V.</b></p> <p>We support the proposal</p>
<p><b>29 – Fraunhofer HHI</b></p> <p>We are fine with the main bullet and the first sub-bullet. Although we support the general gist of the 2nd sub-bullet, we don't think that it is required since RAN has procedures in place on how to handle incomplete items, which can be taken care of at RAN#95e.</p>

## 2.2 Discussion Point 2

A follow up discussion point once RAN endorses Proposal 1 is how to better focus the discussions in RAN1. A number of companies have proposals in their tdocs which can be summarized as follows:

- **LG Electronics [3] and Samsung [6]** have each provided a list of essential open issues that need to be closed in order to complete the work item. Both companies propose to focus RAN1 work on these issues without spending effort on non-essential issues.
- **Huawei, HiSilicon [7]** have provided a list of open issues which are considered essential for the work item completion and indicate that there is good understanding in RAN1 with regards to what are the essential open issues.
- **CATT [9]** has provided a list of essential remaining issues that need to be addressed complete the work item. In particular, CATT has proposed the deprioritization of scheme 1-2 (condition-based inter-UE coordination with preferred/non-preferred resource set) for inter-UE coordination.
- **ZTE, Sanechips [10]** have proposals to deprioritize/prioritize certain areas to expedite the completion of the work item. For example,
  - No further discussion is needed for the interaction between sensing and DRX
  - Deprioritize 2<sup>nd</sup> SCI as the container of the inter-UE coordination information
  - Prioritize discussion on how to apply inter-UE coordination information for UE-B's resource (re-)selection

- **Work item status report [2]** has a list of remaining open issues. Note that no consensus has been reached in RAN1 on whether each issue in the list is essential to the completion of the WI and whether the list is complete.

While the company views on what issues need to be resolved to complete the work item have some commonality, there are still differences. As a matter of fact, RAN1 spent some time on this aspect after RAN#107-e but failed to converge due to such differences. While it might be difficult for RAN to agree on a complete list of essential RAN1 issues, it is expected that such a list would help RAN1 to better focus its work.

**Companies are invited to provide their views on what should be included in the list of essential open issues for RAN1. Intention is to have RAN1 focus on these issues over the next quarter in case the completion deadline for RAN1 is extended (i.e. Proposal 1 is agreed).**

### Feedback Form 2:

#### 1 – ZTE Corporation

We think the following list of essential issues for RAN1 should be focused on in next quarter:

##### **Essential issues for power saving feature:**

- *Resource selection window interaction with SL DRX*
- *CPS sensing window, resource selection window leftover*
- *Re-evaluation/pre-emption check triggering due to inter-UE coordination information.*

##### **Essential issues for inter-UE coordination feature:**

###### • *For inter-UE coordination scheme 1:*

- *How to apply inter-UE coordination information for UE-B's resource (re-)selection.*
- *Contents and signalling container (e.g. MAC-CE) of UE-B's explicit request to UE-A.*

###### • *For inter-UE coordination scheme 2:*

- *How to set  $m\_CS$  to determine the index of a PSFCH resource for inter-UE coordination information transmission.*
- *Leftover on the Condition for UE to be UE-A/UE-B.*

#### 2 – Ericsson LM

##### **Resource allocation enhancements for power saving:**

- CPS monitoring window for aperiodic transmission when UE performs at least CPS in a Tx pool
- T1 of RSW when UE performs only CPS in a Tx pool with periodic reservation for another TB disabled
- Finalization of SL CBR measurement in partial sensing
- Sensing and SL CBR measurement during its SL DRX inactive time
- Re-evaluation and pre-emption checking after random selection
- Rules for UEs in a shared resource pool with different sensing operation, i.e., partial sensing, full sensing, random resource selection.
- Conditions in which CPS can be disabled in resource (re)selection

### **Resource allocation enhancements for inter-UE coordination:**

#### **- Scheme 1**

- Finalization of contents and containers of UE-A's inter-UE coordination information
- Contents and containers of UE-B's explicit request message
- Determination of UE-B's behavior when preferred and/or non-preferred resource sets are received from multiple UE-As
- Finalization of behaviour of UE-B receiving a preferred resource set from UE-A
- Finalization of when and with which information UE-A generates an inter-UE coordination information
- Determination of destination UE-B(s) for UE-A's inter-UE coordination feedback for the case of request and/or condition-based feedback(s)
- Specification of when UE-B generates and transmits a request
- Determination of destination UE-A(s) for UE-B's request
- Prioritization of inter-UE coordination information and request and sidelink transmissions
- Resource selection and multiplexing with sidelink transmissions for request and inter-UE coordination information
- Combination of preferred/non-preferred resources with request/condition triggers.

#### **- Scheme 2**

- Finalization of determination of PSFCH resource/index for conflict indication
- Finalization of behaviour of UE-B receiving a conflict indication from UE-A
- Finalization of prioritization of conflict indication
- Finalization of the time gap (X value) between PSFCH and SCI(s) scheduling conflicting TBs for Scheme 2 (with Option 2)
- Value of m\_CS

### **3 – Guangdong OPPO Mobile Telecom.**

- For the power saving RA objective, in our view the completion level is 90% in RAN1. There is no concern on complete the remaining work within 1Q 2022. In our view, there are only 3 remaining essential open issues/topics at their final stage (which are the first 3 listed open issue in the status report RP-212880):

- Details of partial sensing for re-evaluation and pre-emption checking in case of aperiodic transmission
- Details of L1 candidate resources selection and reporting that contains a subset of resources within DRX active time of RX UE to MAC layer
- Remaining details of SL CBR measurement in partial sensing

- For the inter-UE coordination objective, in our view the progress/completion level is only at 70% in RAN1 with many essential open issues remaining, including:

- Details of container for preferred and non-preferred resources in Scheme 1 (the work is doubled if both container types are supported). If 2nd stage SCI is supported, additional work is needed in terms of transmitter and receiver behavior
- Details of UE-B behavior after receiving IUC information in Scheme 1
- Details and process of UE-B generating/transmitting a request
- Details of prioritization of request and IUC information in Scheme 1
- Details of conditions other than explicit request in Scheme 1

- o Finalization of
  - § timing and information of IUC information in Scheme 1,
  - § PSFCH resources for conflict indication in Scheme 2,
  - § UE-B behavior and prioritization of conflict information
- Due to these two objectives are at different completion levels, we should handle them slightly differently.
- o For the power saving RA, RAN1 should handle the remaining 3 essential objective plus some remaining FFS items that are deemed important by the feature lead in RAN1.
- o For the inter-UE coordination objective, we are in favor to adopt the following approaches:
  - § RANP to agree on a set of essential open issues and RAN1 is to focus on completion of these issues without spending effort on non-essential ones.
  - § Deprioritize the following topics:
    - condition-based inter-UE coordination with preferred/non-preferred resource set
    - Using 2nd stage SCI as a container

#### 4 – CATT

Scheme 1: Resource set based inter-UE coordination

- Scheme 1-1: Request-based inter-UE coordination

Generic remaining details on both preferred resource set and non-preferred resource set

Details on how to determine the resource coordination window

Details on contents/containers/transmission of request information from UE-B.

Details on contents/transmission of coordination information from UE-A

Details on how to determine UE-A, and corresponding cast type for both request information and coordination information.

Preferred resource set specific remaining details

UE-B's behavior on receiving preferred resource set from UE-A

- Scheme 1-2: Condition-based inter-UE coordination

Generic remaining issues on both preferred resource set and non-preferred resource set

Trigger conditions for condition-based inter-UE coordination,

How to construct the single-slot resource(s) in condition-based inter-UE coordination

How to determine UE-A, and corresponding cast type for both request information and coordination information.

UE-B's behaviors on receiving the coordination information from UE-A

Scheme 2: Resource conflict indicator based inter-UE coordination

Trigger event(s) for scheme 2

Details on determine PSFCH resource index when PSFCH occasion is derived by a slot where expected/potential resource conflict occurs, and whether support to indicate different resource conflict type.

UE-B's behaviour(s) on receiving a conflict indication from UE-A

Remaining details on determining UE-A

Resource selection impacts between two consecutive PSSCH resources

## **5 – Huawei Tech.(UK) Co.. Ltd**

We itemized in our paper, RP-213156. In summary, they are as follows.

A number of items mentioned in other companies' contributions are possible to achieve by UE implementation, and do not require RAN1 to discuss them again. We are not sure how to conduct that part of the discussion. It seems inefficient to write a lengthy NWM response for it - a table in a Word doc may be best?

### **Inter-UE coordination open issues**

#### **#1 Remaining details of contents, signaling design of coordination information, container and signaling design of request information**

- In both scheme 1 and scheme 2, the container for inter-UE coordination information is decided, i.e. MAC and/or 2nd-stage SCI for scheme 1, and PSFCH for scheme 2. The framework of signaling on indication of resource set is settled. However, the contents of scheme 1 inter-UE coordination information including signaling design is incomplete, and sequence used for transmission inter-UE coordination information on PSFCH in scheme 2 is not yet decided, e.g.  $m_{cs}$ ,  $m_0$ , and mapping to different causes, etc.

#### **#2 UE-B behavior upon reception of inter-UE coordination information**

- In both schemes, the condition on UE-A/UE-B sends/receives coordination information are already agreed. In addition, the UE-A behavior on determination of coordination information is agreed. However, UE-B behavior in both scheme 1 (includes both option A and option B) and scheme 2 upon reception of inter-UE coordination information is not yet finalized.

#### **#3 UE-A and UE-B determination/set-up including cast type supported for inter-UE coordination between UE-A and UE-B**

- The discussion on UE-A and UE-B determination or set up is not yet clear, this can include how UE-A and UE-B communicate, via what cast type link.

#### **#4 Resources to transmit coordination and request information, as well as timeline.**

- In both scheme 1 and 2, the resource to transmit inter-UE coordination information and request is not complete, e.g. how to determine these resources, as well as timeline.

### **Power saving open issues**

#### **#1 Partial sensing resource allocation**

- For contiguous partial sensing only case, the selection window is not yet defined.

#### **#2 Random resource selection**

- The RAN1#103-e agreement allows a Rel-17 NR resource pool to be configured with mixed type of resource allocation schemes, which is different to baseline LTE-V design. The issue has been identified, as shown in evaluation results, that random resource selection has impact on full sensing resource allocation.

#### **#3 Congestion control**

- RAN1 agrees to define CR (channel occupancy ratio) for both partial sensing and random resource selection, and CBR for random resource selection. The only remaining issue is CBR for partial sensing. In RAN#107-e, 2 groups of possible design options were identified, which aims at down-selection to one option.

#### **#4 SL-DRX impact on physical layer design, including UE sensing and measurement behavior during SL-DRX inactive time, and resource selection.**

- According to an LS from RAN2 on specifying their agreements related to candidate resource determination and resource selection taking into account the SL-DRX configuration of RX UE, RAN1 decided to implement in PHY specification. In RAN1#107-e, RAN1 made agreement: PHY layer selects and reports candidate resources in which at least a subset of the candidate resources is within the indicated active time of the RX UE. However, there are few FSS to be addressed under this design.
- Another issue is that RAN1 already agrees that a UE can perform SL reception of PSCCH and RSRP measurement for partial sensing on slots in SL DRX inactive time. However, it is not yet decided whether this can be based on UE implementation or specified conditions.

#### **6 – Futurewei**

We think that the status report of the WI (R1-212880) has already provided a good list. The list is formed based on the extensive discussions through email right before RAN meeting. We think the list is sufficient. A few items could possibly be removed but we are OK to work within the list in RAN1. For the list of power saving topics, it can be better organized as follows.

Physical layer aspects on resource allocation to reduce UE's power consumption including

- Finalization of pre-emption/re-evaluation checking:
  - o Pre-emption/re-evaluation checking for aperiodic transmission
  - o Pre-emption/re-evaluation checking after random resource selection
- Finalization of SL DRX
  - o Selection/report of candidate resources in which at least its subset is within RX UE's active time
  - o Sensing during its SL DRX inactive time
- Finalization of CPS
  - o CPS monitoring window for aperiodic transmission when UE performs at least CPS in a Tx pool
  - o T1 of RSW when UE performs only CPS in a Tx pool with periodic reservation for another TB disabled
  - o Conditions in which CPS can be disabled in resource (re)selection
- Finalization of SL CBR measurement in partial sensing
- Random resource selection in pools with mixed RA schemes
- Resource pool segregation for periodically occurring resources

#### **7 – Qualcomm Incorporated**

We support reusing the list of open issues from the status report (RP-212880).

## 8 – DOCOMO Communications Lab.

We think at least the following are essential. Alternatively, we are fine with the list in the SR, with understanding that FLs will handle them accordingly (i.e. essential or not is to be decided at RAN1).

- Power saving
  - o Finalization of pre-emption/re-evaluation checking for aperiodic transmission
  - o Finalization of selection/report of candidate resources in which at least its subset is within RX UE's active time
  - o Finalization of SL CBR measurement in partial sensing
  - o CPS monitoring window for aperiodic transmission when UE performs at least CPS in a Tx pool
  - o Sensing and SL CBR measurement during its SL DRX inactive time
  - o Re-evaluation and pre-emption checking after random selection
  - o Random resource selection in pools with mixed RA schemes
- IUC
  - o Scheme 1
    - Finalization of contents and containers of UE-A's inter-UE coordination information and UE-B's explicit request, including determination of destination UE(s) for UE-A's inter-UE coordination information and UE-B's explicit request
    - Finalization of behaviour of UE-B receiving resource set(s) from UE-A(s)
    - Finalization of when and with which information UE-A generates and/or transmits an inter-UE coordination information, including triggering based on condition(s) other than an explicit request
    - Finalization of when UE-B generates and/or transmits an explicit request
    - Finalization of resource selection and/or multiplexing with sidelink transmissions for UE-A's inter-UE coordination information and UE-B's explicit request
    - Combination of preferred/non-preferred resources with explicit request/condition triggers
  - o Scheme 2
    - Finalization of determination of PSFCH resource/index for conflict indication
    - Finalization of behaviour of UE-B receiving a conflict indication from UE-A
    - Finalization of prioritization of conflict indication
    - Finalization of how to determine UE-B among UEs scheduling conflicting TBs, including whether/how to handle, or differently handle, the case when at least one of UEs scheduling conflicting TBs doesn't support Scheme 2

## 9 – Apple GmbH

Our views on the list of essential open issues for RAN1 are as follows:

For power saving resource allocation:

- Partial sensing for re-evaluation/pre-emption checking for aperiodic transmission
- Selection of candidate resources in which at least its subset is within RX UE's active time
- Sidelink CBR measurement in partial sensing
- Sensing and sidelink CBR measurement in sidelink DRX inactive time
- Re-evaluation and pre-emption checking after random selection

- CPS monitoring window for aperiodic transmission when UE performs at least CPS in a Tx pool
- Conditions in which CPS can be disabled in resource (re)selection

For inter-UE coordination scheme 1:

- Triggering conditions of UE-B's explicit request
- Contents and containers of UE-B's explicit request
- Transmission of UE-B's explicit request, including prioritization
- Finalization of UE-A's determination of preferred/non-preferred resource set
- Contents and containers of UE-A's inter-UE coordination information
- Transmission of UE-A's inter-UE coordination, including prioritization
- Behaviour of UE-B receiving resource set(s) from UE-A(s)

For inter-UE coordination scheme 2:

- Determination of PSFCH resource and sequence for conflict indication
- Prioritization of conflict indication
- Behaviour of UE-B receiving a conflict indication from UE-A
- Finalization of how to determine UE-B among UEs scheduling conflicting TBs

## **10 – Spreadtrum Communications**

The following essential issues should be prioritized.

### **Resource allocation to reduce UE's power consumption**

- Finalization of pre-emption/re-evaluation checking for aperiodic transmission
- Finalization of selection/report of candidate resources in which at least its subset is within RX UE's active time
- Finalization of SL CBR measurement in partial sensing
- CPS monitoring window for aperiodic transmission when UE performs at least CPS in a Tx pool
- Random resource selection in pools with mixed RA schemes

### **Enhancement(s) in mode 2 for enhanced reliability and reduced latency**

- Scheme 1
  - o Finalization of contents and containers of UE-A's inter-UE coordination information and UE-B's explicit request, including determination of destination UE(s) for UE-A's inter-UE coordination information and UE-B's explicit request
  - o Finalization of behaviour of UE-B receiving resource set(s) from UE-A(s)
  - o Finalization of when UE-B generates and/or transmits an explicit request
- Scheme 2
  - o Finalization of determination of PSFCH resource/index for conflict indication
  - o Finalization of behaviour of UE-B receiving a conflict indication from UE-A
  - o Finalization of time gap between the PSFCH and SCI(s) scheduling conflicting TBs

## 11 – LG Electronics Inc.

From the list of the status report, we think the following subset corresponds to the essential component for the WI completion:

Physical layer aspects on resource allocation to reduce UE's power consumption including;

- Finalization of pre-emption/re-evaluation checking for aperiodic transmission
- Finalization of selection/report of candidate resources in which at least its subset is within RX UE's active time
- Finalization of SL CBR measurement in partial sensing

Physical layer aspects on solution(s) on enhancement(s) in mode 2 for enhanced reliability and reduced latency including

Scheme 1

- Finalization of contents and containers of UE-A's inter-UE coordination information and UE-B's explicit request, including determination of destination UE(s) for UE-A's inter-UE coordination information and UE-B's explicit request
- Finalization of behaviour of UE-B receiving resource set(s) from UE-A(s)
- Finalization of when and with which information UE-A generates and/or transmits an inter-UE coordination information, including triggering based on condition(s) other than an explicit request
- Finalization of when UE-B generates and/or transmits an explicit request
- Finalization of resource selection and/or multiplexing with sidelink transmissions for UE-A's inter-UE coordination information and UE-B's explicit request
- Finalization of prioritization of inter-UE coordination information and explicit request

Scheme 2

- Finalization of determination of PSFCH resource/index for conflict indication
- Finalization of behaviour of UE-B receiving a conflict indication from UE-A
- Finalization of prioritization of conflict indication
- Finalization of how to determine UE-B among UEs scheduling conflicting TBs, including whether/how to handle, or differently handle, the case when at least one of UEs scheduling conflicting TBs doesn't support Scheme 2

Finalization of higher-layer parameters used in the physical layer

In our view, the others in the status report are for optimization and the system can work without them. For example, sensing in SL DRX inactive time does not need to be separately specified because the current RAN1 CR structure implies that a UE should follow the configuration and procedure related to the full sensing, partial sensing or random selection regardless of its reception behavior. We think RAN1 in the next quarter should skip these issues or at least deprioritize them.

## 12 – Panasonic Corporation

Although the status report can be starting point, to discuss what is not the scope of Rel.17 can be more explicit discussion than to list what topics to be kept as FFS. In this sense, we support the proposal 4 from Samsung RP-213012 as following.

Proposal 4: Rel-17 inter-UE coordination does not support the following:

- Scheme 1 with other than explicit request-based approach
- The other option than using MAC-CE as the container to deliver inter-UE coordination information from UE-A to UE-B in Scheme 1

## 13 – Samsung R&D Institute UK

We think that essential issues should be UE behavior is necessary (not for optimization) but it is unclear yet and there is potential RAN2 impact. In this aspect, we suggest essential issues in the below (the marked with **bold** indicates that unclear UE behavior and/or potential RAN2 impact)

For power saving

- Finalization of pre-emption/re-evaluation checking for aperiodic transmission [**Unclear UE behaviour/ Potential RAN2 impact**]
- Finalization of selection/report of candidate resources in which at least its subset is within RX UE's active time [**Unclear UE behaviour/ Potential RAN2 impact**]
- Finalization of SL CBR measurement in partial sensing Unclear UE behaviour/Possible RAN2 impact
- CPS monitoring window for aperiodic transmission when UE performs at least CPS in a Tx pool [**Unclear UE behaviour/ Potential RAN2 impact**]
- T1 of RSW when UE performs only CPS in a Tx pool with periodic reservation for another TB disabled [**Unclear UE behaviour**]
- Sensing and SL CBR measurement during its SL DRX inactive time [**Unclear UE behaviour**]
- Rules for UEs in a shared resource pool with different sensing operation, i.e., partial sensing, full sensing, random resource selection. [**Unclear UE behaviour/ Potential RAN2 impact**]

For inter-UE coordination (Scheme 1)

- Finalization of contents and containers of UE-A's inter-UE coordination information and UE-B's explicit request, including determination of destination UE(s) for UE-A's inter-UE coordination information and UE-B's explicit request [**Unclear UE behaviour/ Potential RAN2 impact**]
- Finalization of behaviour of UE-B receiving resource set(s) from UE-A(s) [**Unclear UE behaviour/ Potential RAN2 impact**]
- Finalization of resource selection and/or multiplexing with sidelink transmissions for UE-A's inter-UE coordination information and UE-B's explicit request [**Unclear UE behaviour**]
- Finalization of prioritization of inter-UE coordination information and explicit request [**Unclear UE behaviour**]
- For explicit request based approach in Scheme 1, how does UE-B provide a parameter on resource selection window for UE-A [**Unclear UE behaviour**]

For inter-UE coordination (Scheme 2)

- Finalization of determination of PSFCH resource/index for conflict indication [**Unclear UE behaviour**]
- Finalization of prioritization of conflict indication [**Unclear UE behaviour**]

In addition, we suggest to de-prioritize the following issues in order to complete other essential issues.

- Scheme 1 with other than explicit request-based approach
- The other option than using MAC-CE as the container to deliver inter-UE coordination information from UE-A to UE-B in Scheme 1

#### **14 – Beijing Xiaomi Mobile Software**

Although we think it would be difficult to achieve consensus, we would like to share our view on essential issues:

For power saving:

- Finalization of SL CBR measurement in partial sensing
- Details of partial sensing for re-evaluation and pre-emption checking in case of aperiodic transmission
- DRX impact on UE resource (re-)selection
- Sensing during its SL DRX inactive time
- T1 of RSW when UE performs only CPS

For inter-UE coordination

- Scheme 1
  - o Finalization of contents/containers of UE-A's inter-UE coordination information and UE-B's request
  - o Finalization of behaviour of UE-B receiving a preferred resource set from UE-A
  - o Finalization of when and with which information UE-A generates an inter-UE coordination information
  - o Finalization of when UE-B generates a request
  - o Combination of preferred/non-preferred resources with request/condition triggers.
  - o Resources to transmit coordination and request information
- Scheme 2
  - o Finalization of determination of PSFCH resource/index for conflict indication
  - o Finalization of behaviour of UE-B receiving a conflict indication from UE-A
  - o Finalization of prioritization of conflict indication

#### **15 – vivo Communication Technology**

We think the following issues, based on the that in the status report of the WI (R1-212880) with some refinements, should be addressed:

Physical layer aspects on resource allocation to reduce UE's power consumption including:

- Finalization of pre-emption/re-evaluation checking
- Finalization of selection/report of candidate resources in which at least its subset is within RX UE's active time
- Finalization of SL congestion control in partial sensing
- Finalization of reusing existing sensing results for another sensing procedure
- CPS monitoring window for aperiodic transmission when UE performs at least CPS in a Tx pool

- T1 of RSW when UE performs only CPS in a Tx pool with periodic reservation for another TB disabled
- Sensing and SL CBR measurement during its SL DRX inactive time
- Conditions to apply random resource selection
- Random resource selection in pools with mixed RA schemes
- Conditions in which CPS can be disabled in resource (re)selection

Physical layer aspects on solution(s) on enhancement(s) in mode 2 for enhanced reliability and reduced latency including

– Scheme 1

- Finalization of contents and containers of UE-A's inter-UE coordination information and UE-B's explicit request
- Finalization of behaviour of UE-B receiving resource set(s) from UE-A(s)
- Finalization of when and with which information UE-A generates and/or transmits an inter-UE coordination information
- Finalization of when UE-B generates and/or transmits an explicit request
- Finalization of resource selection and/or multiplexing with sidelink transmissions for UE-A's inter-UE coordination information and UE-B's explicit request
- Finalization of prioritization of inter-UE coordination information and explicit request
- Combination of preferred/non-preferred resources with explicit request/condition triggers

– Scheme 2

- Finalization of determination of PSFCH resource/index for conflict indication
- Finalization of behaviour of UE-B receiving a conflict indication from UE-A
- Finalization of prioritization/power control of conflict indication
- Finalization of how to determine UE-B among UEs scheduling conflicting TBs

Finalization of higher-layer parameters used in the physical layer

## 16 – Intel Corporation (UK) Ltd

In our view, the list captured in the status report should be the baseline. We propose a few changes to this list for inter-UE coordination scheme-2. We are fine with the remaining items in the list and suggest to capture complete/full list in SR revision.

Scheme 2

- Finalization of determination of PSFCH resource/index for conflict indication
- UE-A and UE-B behavior for the case of detected conflict
- Finalization of behavior of UE-B receiving a conflict indication from UE-A
- Finalization of prioritization and differentiation of conflict indication
- Finalization of how to determine UE-B among UEs scheduling conflicting TBs, including whether/how to handle, or differently handle, the case when at least one of UEs scheduling conflicting TBs doesn't support Scheme 2
- Finalization of higher-layer parameters used in the physical layer

**17 – NEC Corporation**

We share same view with QC to reuse the issue list in SR.

**18 – Fraunhofer HHI**

We also support reusing the list of open issues from the status report in RP-212880.

**19 – Motorola Mobility España SA**

We prefer downscoping optimization items such as 2nd SCI container for IUC so that other essential items can be finished with RAN #95e to prevent dropping of feature

## 2.3 Any Other Issues to Discuss

Companies are invited to provide their views on any other issues not covered by subsection 2.1 and 2.2 using the feedback form located below.

### Feedback Form 3:

**1 – LG Electronics Inc.**

We think the current status report in RP-212881 is not in a appropriate shape as it states that there is no consensus on the RAN1 open issue list and it should be revised to include an exact issue list.

We think clear RAN guidance is necessary to task RAN1 in the next quarter to focus only on the essential part and drop discussions for better performance (more power saving, less latency, more reliability, etc.). We note that discussion took place in previous RAN meetings (e.g., RP-211272, RP-212034) but no RAN action was agreed. Our concern in this meeting is that, if no strict RAN guidance is given like before and thus companies begin to discuss any issues including those non-essential in the current status report, this WI may not become completed even after Q1 next year.

**2 – Samsung R&D Institute UK**

The FL has indicated in the SR a completion level of 80% (assuming 85% completion level in RAN1) for this WI. In our view this can only assume that only the essential open points, for making the feature work, are to be addressed by RAN1. Otherwise, if all the remaining open points in the RAN1 agreements are to be considered, the completion level will be much lower, and it would take more than 2 meetings for RAN1 to complete the remaining work.

Therefore, we implore RAN plenary to provide guidance to RAN1 to only work on the essential remaining open issues as indicated in our answer to question 2, so that RAN1 can complete the WI by RAN1#108-e.

**3 – AT&T GNS Belgium SPRL**

This comment is concerning the flag on the SR requesting an update to clarify that PC1 is in scope for band n14 sidelink operation. AT&T appreciates the rapporteur's email reply on the flag which indicated that PC1 is in scope for n14 sidelink operation by noting this in the list of open issues.

PC1 applicability was not clear in RAN4 #101e since there is no PC1 agenda item. There were also comments received on the RAN4 email thread “[101-e][127] NRSLenhPart\_3” concerning the “Topic #1: Power class capability enhancements” which noted the following:

“LGE: Based on work plan for NR SL enhancement WI, the PC2 is only scope as leftover issue. **PC1 is**

**not scope in WI.** The capability signaling perspective, LGE support to define PC2/PC3 capability for NR V2X UE as same LTE V2X PC2 UE.”

This was my concern and why the flag was raised. Perhaps, this can be clarified with RAN4 so that the additional work associated with PC1 can conclude.

## 2.4 Summary of Initial Round

### <Discussion Point 1>

Companies were generally positive towards Proposal 1. The only major difference in opinions was on the 2<sup>nd</sup> sub-bullet of the proposal (“**Any RAN1 feature not completed by Q1 of 2022 will be automatically dropped from Rel-17**”). Multiple companies noted that while they agree to the 2<sup>nd</sup> sub-bullet in principle, an preset decision making to drop all incomplete features 3 months later was not necessary. RAN has other procedures in place to handle these situations.

Telecom Italia and Vodafone indicated that all topics with cross WG impact should be discarded in RAN#94. From moderator point of view, this would mean that significant portion of Rel-17 sidelink features that companies have spent effort on for the last 18 months will be discarded.

Given the vast majority of companies with positive views on Proposal 1, moderator’s recommendation would be take Proposal 1 without the 2<sup>nd</sup> sub-bullet.

**Proposal 1: RAN1 is tasked to complete the remaining normative work for Rel-17 NR sidelink enhancement by Q1 of 2022**

- All RAN1 decisions that impact other WGs should be finalized in RAN1#107bis-e
- ~~Any RAN1 feature not completed by Q1 of 2022 will be automatically dropped from Rel-17~~

### <Discussion Point 2>

For the list of essential open issues, 19 companies have provided their views in the initial round. Based on these company views, a list is provided from the moderator in subsection 3.2. Note that the list was drafted using what was captured in Rel-17 sidelink enhancement status report (RP-212880). Moderator recommendation is to continue discussions in the intermediate round using the list provided in subsection 3.2.

### <Other Issues>

LG and Samsung stressed the importance of converging on a list of essential issues to make sure that RAN1 discussions are done in a more efficient manner and Rel-17 sidelink enhancement is completed in Q1 of 2022.

AT&T made a comment on to clarify whether PC1 is in scope for band n14 sidelink operation.

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## 3 Intermediate Round

### 3.1 Discussion Point 1

Based on the discussion in the initial round, moderator proposes to endorse the following proposal in the intermediate round:

**Proposal 1 (modified from initial round): RAN1 is tasked to complete the remaining normative work for Rel-17 NR sidelink enhancement by Q1 of 2022**

- **All RAN1 decisions that impact other WGs should be finalized in RAN1#107bis-e**

Note that the above proposal does not impact the target completion date in other WGs. Also, it is implied that there is no downscoping of any kind in RAN#94-e. If your company objects to the above proposal, please use the feedback form to indicate so.

#### Feedback Form 4:

##### 1 – Futurewei

As the subbullet is similar to the previous guidance to complete earlier decisions impacting other WGs, we can accept it. However, just like the previous guidance, it does not imply that we only work on aspects in RAN1#107bis that impact other WGs

##### 2 – Samsung Electronics Co.

(as moderator and RAN1 chair)

Futurewei, your understanding with regards to what RAN1 will work on in RAN1#107bis-e is correct.

##### 3 – DOCOMO Communications Lab.

OK with this proposal 1.

##### 4 – Samsung R&D Institute UK

Thank you for the discussion. Even though we prefer to have a more forceful statement by adding the previous second bullet in Proposal 1, as compromise, we suggest to add the following sub-bullet (Marked in **bold**). We think that this RAN guidance is necessary for completing this item by Q1 of 2022.

Proposal 1 (modified from initial round): RAN1 is tasked to complete the remaining normative work for Rel-17 NR sidelink enhancement by Q1 of 2022

- All RAN1 decisions that impact other WGs should be finalized in RAN1#107bis-e
- **RAN1 should focus only on essential open issues**

##### 5 – Samsung Electronics Co.

(as moderator and RAN1 chair)

Under the current circumstances, it seems obvious that RAN1 should only focus on the essential aspects of Rel-17 sidelink enhancement. Also, based on the comments so far, it is moderator opinion that no company

is suggesting that RAN1 spend time and effort on non-essential issues. Adding the extra bullet as suggested by Samsung seems fine.

**Proposal 1 (modified from initial round): RAN1 is tasked to complete the remaining normative work for Rel-17 NR sidelink**

- All RAN1 decisions that impact other WGs should be finalized in RAN1#107bis-e
- RAN1 should focus only on essential open issues

If there are any concerns on the above revision, please indicate so.

**6 – MediaTek Inc.**

Ok for the proposals from RAN1 Chair.

**7 – Intel Corporation (UK) Ltd**

We are supportive original proposal from moderator/RAN1 chair.

**8 – Guangdong OPPO Mobile Telecom.**

This guidance proposal in our understanding is related to the identification of list of essential open issues that is currently being discussed under the “Discussion Point 2” in Section 3.2. This list is intended to be updated for the status report and used as a guide for RAN1 to complete its work in 1Q-2022. As such, for Proposal 1, it is more accurate to modify as followed as there can be different interpretation of the term “normative work” which could include other non-essential issues / nice-to-have enhancements.

In addition, for the sub-bullet, as pointed out by Futurewei, essential issues other than those may have impact to other WGs could be also addressed. For example, for the power saving RA agenda, there are less remaining essential open issue. It should be possible for the FL to treat issues that does not impact to other WGs. Then in this case, the proposed sub-bullet could be updated according to the following.

Regarding the removed sub-bullet “Any RAN1 feature not completed by Q1 of 2022 ...” from the initial round, our preference is to include this such that it is a clear guidance to RAN1 to work constructively and efficiently during Q1 of 2022. Perhaps the wording can be a little softer and still leave room for RAN#95 to decide what to do with unfinished features (e.g., 95% completed Scheme 1).

Proposal 1 (modified from initial round): RAN1 is tasked to complete the remaining **normative work essential open issues** for Rel-17 NR sidelink enhancement by Q1 of 2022

- All RAN1 decisions that impact other WGs should be **prioritized and** finalized in RAN1#107bis-e
- Any RAN1 feature not completed by Q1 of 2022 ~~will be automatically~~ **should be** dropped from Rel-17

**9 – TELECOM ITALIA S.p.A.**

We have serious problems with the overall management of this activity. The decision to continue working in RAN1 on aspects impacting other WGs is de facto delaying Release 17.

We think the note

*Note that the above proposal does not impact the target completion date in other WGs.*

is not correct and does not reflect the reality of facts.

Avoiding any downscoping in RAN#94 clearly shows that companies are not able/willing to respect deadlines.

Finally this way forward goes against the decision to allow the first quarter to focus on maintenance, and again RAN1 is jeopardizing the overall workplan.

We believe RAN1 should take its responsibilities and since it appears not to be the case, RAN to step in and ensure the Rel 17 timeplan is met without any unnecessary delay.

It was already clear in September the work could not be completed in time!!

Therefore we re-state the need to downscope now the activity.

**10 – Ericsson LM**

We are OK with P1

**11 – ZTE Corporation**

ok for progress with the understanding that an issue list shall be endorsed in companion

**12 – NEC Corporation**

We support the updated proposal 1 from moderator/RAN1 chair.

**13 – Motorola Mobility España SA**

We support the proposal

**14 – Fraunhofer HHI**

We support this proposal

**15 – Classon Consulting**

for FUTUREWEI We do not support further modification of Proposal 1 from what the moderator proposed to conclude on at the beginning of this round. Obviously the sticking point is that companies cannot agree yet on whether a point is essential or not, and the additional point will just increase divisiveness in the WG rather than have us working together to knock down and complete the issues listed in the SR.

## 3.2 Discussion Point 2

Based on the input from 19 companies, the following list is provided for the intermediate round discussions. Note that the list was drafted using the list in Rel-17 sidelink enhancement status report (RP-212880). Based on the received company comments, a subset of issues listed in RP-212880 are provided below. This list will be the starting point for the intermediate round of discussions. Based on the inputs during the intermediate round, the list will be further refined for endorsement in the final round.

### **Physical layer aspects on resource allocation to reduce UE's power consumption including**

- **Finalization of pre-emption/re-evaluation checking for aperiodic transmission**
- **Finalization of selection/report of candidate resources in which at least its subset is within RX UE's active time**
- **Finalization of SL CBR measurement in partial sensing**
- **CPS monitoring window for aperiodic transmission when UE performs at least CPS in a Tx pool**

- **T1 of RSW when UE performs only CPS in a Tx pool with periodic reservation for another TB disabled**
- **Sensing and SL CBR measurement during its SL DRX inactive time**

**Physical layer aspects on solution(s) on enhancement(s) in mode 2 for enhanced reliability and reduced latency including**

- **Scheme 1**
  - o **Finalization of contents and containers of UE-A's inter-UE coordination information and UE-B's explicit request, including determination of destination UE(s) for UE-A's inter-UE coordination information and UE-B's explicit request**
  - o **Finalization of behaviour of UE-B receiving resource set(s) from UE-A(s)**
  - o **Finalization of when UE-B generates and/or transmits an explicit request**
  - o **Finalization of resource selection and/or multiplexing with sidelink transmissions for UE-A's inter-UE coordination information and UE-B's explicit request**
  - o **Finalization of prioritization of inter-UE coordination information and explicit request**
- **Scheme 2**
  - o **Finalization of determination of PSFCH resource/index for conflict indication**
  - o **Finalization of behaviour of UE-B receiving a conflict indication from UE-A**
  - o **Finalization of prioritization of conflict indication**

Alternative to the above list would be to take all the issues listed in RP-212880. Moderator's concern is that some of the issues are not considered essential by all interested companies. Opening up the discussion in RAN1 for those issues where essentiality has not been fully converged would result in an inefficient use of time and effort which could jeopardize the completion of Rel-17 sidelink by Q1 of 2022.

Companies are invited to share their views on the list of essential open issues provided above. Any suggestions for refinement of the list would be appreciated.

#### **Feedback Form 5:**

##### **1 – Qualcomm Incorporated**

We do not agree with the proposal.

In power savings, there are two open issues in the SR relating to FFSs in RAN1 agreements that we prefer to keep:

- Re-evaluation and pre-emption checking after random selection
- Resource pool segregation for periodically occurring resources

For inter-UE coordination, the proposal selects triggering by an explicit request and removes triggering by a condition, which we do not agree with.

Both methods have been agreed in RAN1. From a technical perspective, condition-based triggering is the more general approach that works with unicast and groupcast as well as the non-preferred resource set. Triggering by an explicit request work well only for unicast and the preferred resource set and even then only when the number of requests is low, otherwise, requests incur large system overhead and consume too many resources. Hence, triggering by a condition is the more general approach. From a workload perspective, condition-based triggering has significantly less work left compared to request-based triggering. In the SR (RP-212880), only *part of one* bullet was needed to capture the one open issue related to condition-based triggering. On the other hand, the explicit request is mentioned in *four* bullets here. The amount of remaining work is clearly different between the two.

Our first preference is to support both condition-based triggering and request-based triggering per the RAN1 agreements. However, if other companies insist on removing one of the two, then we propose to keep condition-based triggering and either remove request-based triggering or limit it to PC5-RRC-based request to preempt some of the issues that would need to be discussed in WGs. However, we cannot accept the removal of condition-based triggering, which is the more general approach and also requires less work to finish.

We propose the following change (adding the last bullet) to reflect the above:

- Physical layer aspects on solution(s) on enhancement(s) in mode 2 for enhanced reliability and reduced latency including
  - o Scheme 1
    - Finalization of contents and containers of UE-A's inter-UE coordination information and UE-B's explicit request, including determination of destination UE(s) for UE-A's inter-UE coordination information and UE-B's explicit request
    - Finalization of behaviour of UE-B receiving resource set(s) from UE-A(s)
    - Finalization of when UE-B generates and/or transmits an explicit request
    - Finalization of resource selection and/or multiplexing with sidelink transmissions for UE-A's inter-UE coordination information and UE-B's explicit request
    - Finalization of prioritization of inter-UE coordination information and explicit request
    - **Finalization of triggering based on condition(s) other than an explicit request**

## 2 – Futurewei

We prefer the alternative to the list above, i.e., taking all the issues in the status report.

Compared with the list in the updated proposal, the list in status report does not have many more items. For some issues or topics, if there is no agreement in the WG, it will be possible to conclude to leave it to UE implementation, for example, re-evaluation/pre-emption check after random resource selection.

However, for a couple of the items removed, the impact is large as the feature is not complete. For example, we either do not have a complete feature that have been discussed extensively before, e.g., inter-UE coordination scheme 1 triggered by a condition, or have a feature but not quite useful, e.g., inter-UE coordination scheme 2 that handles the case that one UE does not support scheme 2. Similarly for random resource selection in the mixed pool. Given the efforts spent on these features already we prefer that they be completed.

### **3 – Beijing Xiaomi Mobile Software**

We can accept moderator proposed list if it is majority companies' view.

However, since RAN1 has agreed that condition based triggering is supported for IUC scheme 1, and the moderator has clarified that the proposal 1 implies no downscoping of any kind in RAN#94-e, it would be better to include the remaining essential issues of condition based triggering into the list.

### **4 – Apple GmbH**

We think the full list in RP-212880 probably includes both essential RAN1 open issues and non-essential RAN1 open issues, and hence fine to refine that list in this meeting.

However, we think some items can be added into the above refined list. For power saving resource allocation, we prefer to add “re-evaluation and pre-emption checking after random selection”. This feature is important on power saving or enhancing reliability. However, we can follow the majority view.

For inter-UE coordination scheme 1, we should add “finalization of UE-A’s determination of preferred/non-preferred resource set”. The parameters used by UE-A in its determination of preferred/non-preferred resource set need to be specified. Without this, UE-A’s behaviour is unclear.

For inter-UE coordination scheme 2, we need to add “finalization of how to determine UE-B among UEs scheduling conflicting TBs”, at least to handle the case where some UE does not support inter-UE coordination scheme 2.

### **5 – DOCOMO Communications Lab.**

We also think that the current list proposed by moderator does not include some essential issues. Considering this situation (what is essential issue is divergent among companies), we doubt if this thread can make agreeable list other than that of the status report in this meeting. To avoid spending time, we suggest that FLs handle at RAN1 what should be discussed as essential issue.

### **6 – Samsung R&D Institute UK**

Thanks for the discussion. The suggested list by the moderator is fine but we prefer to have more compact list based on the RAN guidance such that duplicate schemes are not designed for the same functionality. Specifically, in inter-UE coordination scheme 1, only one type of container is enough for delivering coordination info or request message. There is no advantage for having two containers. With such RAN guidance, we can further reduce the remaining issues. In addition, we think that condition-based Scheme 1 should be de-prioritized and needs to be clearly excluded from the list since we already have explicit triggering-based Scheme 1 and the progress for the condition-based Scheme 1 is very poor.

However, if it is controversial to make the compact list, we can accept to reuse all the issues listed in SR (RP-212880). In this case, as we suggested in Discussion Point 1, we hope to add the following as sub-bullet in Proposal 1.

- **RAN1 should focus only on essential open issues**

### **7 – LG Electronics Inc.**

We support the direction of providing a list of essential issues as discussed during GTW. We think trying to cover the whole list in the status report would be problematic in RAN1 because it is already clear that

there is no consensus in RAN1 on the essentiality of each issue and thus RAN1 is likely to spend a long time on whether each issue is essential or not.

We think the list from the moderator is a good starting point. In our view the following two points need to be reflected:

- We think "Sensing and SL CBR measurement during its SL DRX inactive time" is not essential but an optimization issue. The proposals on this issue were to allow a bit more power saving for a UE configured with SL DRX. However, from technical viewpoint, there is no reason to couple RX operation (SL DRX) with TX operation (sensing and CBR measurement). In fact, it is difficult to justify an operation where a UE is exempt from the configured sensing operation and allowed to make more harmful interference just because it is receiving something which can be a service other than the service triggered the UE's transmission thus have very different characteristics (packet generation period, duration, etc.).
- We think at least "Finalization of how to determine UE-B among UEs scheduling conflicting TBs" needs to be added because RAN1 agreed the use of priority information in determining UE-B but its details was not finalized yet.

We think the other issues are mostly for the optimization. For example, "Re-evaluation and pre-emption checking after random selection" is to make a middle ground between the pure random selection and the sensing operation for the initial selection and re-evaluation. While we understand this may have some merit in the sense, we don't think making a third resource allocation is essential at this exceptional situation.

While our preference is to make an exhaustive list of the essential issues, if it is difficult to endorse a concrete list, we can consider making a list of the prioritized issues by taking the common denominator from the company input and RAN1 can consider the other issues in the status report if time permits.

## **8 – CATT**

Thanks moderator for the effort of making the list. However, we still think some of the item is missing and some of item listed is not essential. For example, for power saving, the following should be resolved:

How to (pre-)configure the minimum monitoring window size(M) for both PBPS and CPS

How to determine the resource selection window in case of CPS only scenario

For inter-UE coordination, the list also needs some tuning. More importantly, we share the view that scheme 1-2 should be deprioritized.

If we cannot reach consensus for the list of issues, then this should be resolved in WG level via discussion. BTW, we don't agree that this is only decided by FL.

## **9 – MediaTek Inc.**

In general, we are OK for the principle. Besides, indication of the UE capability for support of Scheme 1/2 features may need to be added into the list for completion of the features.

## **10 – Intel Corporation (UK) Ltd**

We do not support selective and non-justified exclusion of open issues. We think that having RAN debate on details of technical issues may not be a very constructive approach at this stage and prefer RAN1 to work on it. Our proposal is to take the list in SR as a starting point, add other remaining open items, if any, and ask RAN1 to resolve those by RAN#95.

## 11 – vivo Communication Technology

In our view there are some essential issues are missing in this list, while some issues in the list may be less essential.

On the other hand, we understand companies have diverse views on which of the issues are essential. It is questionable whether we can achieve such a list by the NWM discussion. In this case we are fine to use the list of the status report as a starting point for RAN1 discussion. RAN1 is reminded to focus on the essential issues.

## 12 – Ericsson LM

For the list on PS, we think that resource pool sharing has to be addressed. It was agreed in RAN1 to configure a resource pool with several types of sensing operation. In our view, it is needed to have some agreements/conclusion on the UE procedure/behavior on this regard in order to achieve a proper operation.

We are generally fine with the list for inter-UE coordination, but it should be clear that timeline issues (e.g., processing/preparation times) need to be considered in Scheme 2. We think that it is preferable to capture it explicitly in the first bullet as "Finalization of determination of PSFCH resource/index for conflict indication, including timeline". We have the following agreement with the explicit FFS regarding this issue:

### - Agreement

For Scheme 2, when PSFCH occasion is derived by a slot where expected/potential resource conflict occurs on PSSCH resource indicated by UE-B's SCI,

- Time gap between the PSFCH and SCI(s) scheduling conflicting TBs is larger than or equal to X value.
  - FFS: Details of X

## 13 – Guangdong OPPO Mobile Telecom.

For identification of list of open issues for the power saving RA agenda, in our view only the first / top 3 bullets (Finalization of ...) are the really essential ones for completion. Maybe two more as identified in the following discussion.

- For the CPS monitoring window bullet, after checking all the associated agreements and open FFS items, the remaining open issues are related to RRC configuration values (default values and value range). In our understanding, this can be handled as part of discussion for the RRC list to send to RAN2. If this kind of details such as RRC values should be listed as an essential open issue, then the list could be very long. Not sure if it is possible to list all existing and potential RRC parameters and values for inter-UE coordination agenda. Hence, this bullet should not be listed here.
- On the issue of "T1 of RSW ...", this really should be treated as an enhancement topic which has been treated in the last two meeting, without a conclusion. In our understanding, in the case of no conclusion, the existing T1 definition from Rel-16 is reused just as other aperiodic and periodic transmissions.
- On the issue of "sensing and CBR measurement during its SL DRX inactive time", according to other companies' comments, if this issue is left unresolved, the default behavior could be undefined since there is no prior examples. Some interpret the behavior would be "up to UE implementation", while some interpret the UE shall follow the same behavior as in DRX active time. The cleanest approach is to list this item also as an essential open issue. No strong view either way from us.
  - Similar issue can be said for "Re-evaluation and pre-emption checking after random selection". This should be also added to the list of essential open issues.

#### **14 – ZTE Corporation**

We are supportive of the proposal and we think the assessment by moderator/RAN1 chair is appropriate for RAN1 next step of work.

Regarding the issues not listed above, we have the same understanding with moderator/RAN1 chair and some companies that there are not critical to be complete in this release or can be done by UE implementation. For example, the issue that “Re-evaluation and pre-emption checking after random selection”, it can be up to UE implementation by MAC layer whether a trigger for re-evaluation and pre-emption checking should be indicated to PHY based on a the resource selection scheme, CBR, or traffic priority, or any combinations. As well as the issue that “Finalization of when UE-B generates and/or transmits an explicit request”, it can also be up to UE implementation. For the case of condition based scheme 1, the condition of determination UE-A, the signal overhead(signal storm issue) as well as the benefit are not clear and far from a consensus, so it can be dropped from this release.

In the meantime, it may be sensible to endorse a certain rule from efficiency perspective e.g., one issue can be discussed no more than 1 meeting.

#### **15 – ZTE Corporation**

We are supportive of the proposal and we think the assessment by moderator/RAN1 chair is appropriate for RAN1 next step of work.

Regarding the issues not listed above, we have the same understanding with moderator/RAN1 chair and some companies that there are not critical to be complete in this release or can be done by UE implementation. For example, the issue that “Re-evaluation and pre-emption checking after random selection”, it can be up to UE implementation by MAC layer whether a trigger for re-evaluation and pre-emption checking should be indicated to PHY based on a the resource selection scheme, CBR, or traffic priority, or any combinations. As well as the issue that “Finalization of when UE-B generates and/or transmits an explicit request”, it can also be up to UE implementation. For the case of condition based scheme 1, the condition of determination UE-A, the signal overhead(signal storm issue) as well as the benefit are not clear and far from a consensus, so it can be dropped from this release.

In the meantime, it may be sensible to endorse rule for the discussion, i.e. an issue can not be discussed no more than 1 meeting.

#### **16 – NEC Corporation**

Regarding resource allocation to reduce UE’s power consumption, we think the following two bullets should be added back considering random resource selection is a very efficient way to reduce UE’s power consumption.

- Re-evaluation and pre-emption checking after random selection
- Random resource selection in pools with mixed RA schemes

#### **17 – Huawei Tech.(UK) Co.. Ltd**

It is important to discuss essential leftovers to address critical problems and essential feature completion. We are fine with many of the proposed items in the list, however, a number of comments:

- RA for power saving:
  - o For mixed type RA schemes in a resource pool, the issue has been identified that random selection UE without control poses great performance degradation on full-sensing UEs (incl. legacy Rel-16 UE), as shown in evaluation results. This problem shall be addressed

- We agree with others that there is no need to work on re-evaluation/pre-emption checking after random selection, at this stage of the WI. It can be left as an unoptimized case.
- Inter-UE coordination scheme 1:
  - On prioritization of inter-UE coordination information and explicit request. This is not a critical open issue needs to be discussed. It is assumed that Rel-16 prioritization rule can be reused when priority information is known, and otherwise, UE implementation.
- Inter-UE coordination scheme 2:
  - On prioritization of conflict indication, similarly, prioritization rule has been discussed intensively in Rel-16, and can be reused.

In addition, we have some views on several items proposed by other companies:

On segregation “resource pool segregation for periodically occurring resources”. This feature is not properly discussed before and is not a critical leftover which could result in serious performance degradation. Hence it is not appropriate at this late stage of Rel-17 to discuss this.

On how to (pre-)configure the minimum monitoring window size(M) for both PBPS and CPS. This is not a critical issue, and how to configure this can be entirely up to network, saving RAN1 time.

The completion of the open issue of defining an appropriate CBR needs RAN1 discussion (we respectfully disagree with LG). Congestion control in a distributed resource selection system is an essential part of mode 2 sidelink operation.

It may be necessary to rely on the SR instead, and FL, chair, and delegate expertise.

**18 – Motorola Mobility España SA**

We can take the open issues listed in the SR as the starting point to refine it further

**19 – Panasonic Corporation**

We are ok with the proposal.

**20 – Fraunhofer HHI**

We think that this list can be best handled by RAN1 FL as also noted by other companies. For example, for IUC, some points were removed from the list above, e.g., the triggering based on a condition, which we do not agree with, and which might leave incomplete features. Thus, we propose to take the original list from the status report and believe that these features can be best handled by RAN1.

**21 – Classon Consulting**

### 3.3 Any Other Issues to Discuss

Three companies provided inputs on “Any other issues to discuss” in the initial round. Companies are invited to provide follow-up discussions related to what was discussed on subsection 2.3 or raise any other issues on Rel-17 sidelink enhancement.

## Feedback Form 6:

### 1 – AT&T GNS Belgium SPRL

As noted in our initial round response, AT&T supports the the rapporteur’s email reply on the flag which indicated that PC1 is in scope for n14 sidelink operation by noting this in the list of open issues in the WI status report.

We ask RAN if any additional clarification text needs to be added to the revised WID to avoid any unnecessary confusion in RAN4 since PC1 applicability was not clear in the discussion concerning “Power class capability enhancements”. When we commented about PC1 for that topic in RAN4, it was specifically noted that PC1 was not part of the WID. However, we find no reference to power class in the WID so it is not clear to us why the RAN4 agenda is limited to PC2 items for this particular discussion.

We are also OK without a revision to the WID as noted by the rapporteur based on the understanding that PC1 is included and needs to be considered in the RAN4 meeting planning.

### 2 – FirstNet

FirstNet supports the rapporteur’s email reply on the flag which indicated that PC1 is in scope for n14 sidelink operation. PC1 is solely dedicated for use by First Responders in emergency situations.

Hence, PC1 operation for n14 sidelink is of utmost importance.

As long as it is clear that PC1 is included and is considered by RAN4, there is no need for revising the WID.

### 3 – LG Electronics Inc.

On top of the essential issue list discussed above, we think RAN guidance is necessary to make it sure that RAN1 shall focus on completing the specification in revolving the open issues. The guidance should be clear that RAN1 should avoid optimization in discussing these issues.

Regarding the power class in n14 mentioned by AT&T and FirstNet, our understanding the current RAN4 status is as follows:

RAN4 is discussing NR sidelink enhancement work using the following three email threads:

- Part1: NR SL general including PS and other SL operation
- Part2: NR V2X intra-band con-current operation
- Part3: high power NR V2X operation in n38/n47

The LGE comment quoted in AT&T’s email was about V2X in Part 3 (i.e. PC1 support “for V2X” is not in the WI scope), and the public safety operation is being treated in Part 1 as the title of each email thread implies. And for this public safety operation, a WF was agreed on the PC1 and PC3 support in n14 and this will be further progressed in the next quarter as captured in the RAN4 open issue list. So we think the point AT&T and FirstNet mentioned will be progressed in RAN4 without updating the WID or SR.

## 3.4 Summary of Intermediate Round

## 4 Final Round

TBD

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## 5 References

- [1] RP-212642, Status Report RAN WG1, RAN1 Chair
- [2] RP-212880, Status report of WI: NR Sidelink enhancement, RAN1
- [3] RP-212881, Discussion on the completion of Rel-17 NR sidelink enhancement WI, LG Electronics
- [4] RP-212930, Discussion on R17 NR sidelink enhancement WI progress and handling, OPPO
- [5] RP-212998, On Rel-17 NR Sidelink Enhancement, Apple
- [6] RP-213012, On the status of Rel-17 NR sidelink work in RAN WG1, Samsung
- [7] RP-213156, Views on the status of Rel-17 sidelink enhancements WI, Huawei, HiSilicon
- [8] RP-213196, Views on Rel-17 sidelink enhancements WI, Beijing Xiaomi Mobile Software
- [9] RP-213311, On Rel-17 Sidelink enhancement WI, CATT
- [10] RP-213415, Views on the guidance for NR sidelink enhancement, ZTE, Sanechips
- [11] RP-202846, WID revision: NR sidelink enhancement, LG Electronics