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RAN1

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3GPP TSG RAN WG1 #110bis-e R1-2210481

e-Meeting, October 10th – 19th, 2022

Agenda Item: 8.11

Source: Moderator (Apple)

Title: Moderator Summary for Reply LS to R1-2205728 (LS on IUC with non-preferred resource set, RAN2)

Document for: Discussion and Decision

1 Introduction

RAN2 sent an LS [1] on IUC with non-referred resource set with the following contents:

In RAN2#118-e meeting, RAN2 discussed the inter-UE coordination scenario in which UE B receives IUC Scheme 1 non-preferred resource set from UE A, but UE B does not perform sensing in the resource pool associated with the non-preferred resource set, e.g. UE B performs mode 2 random resource selection, etc. For this case, RAN2 has the following questions:

Question 1: Is the scenario described above a valid scenario or not?

Question 2: If the answer to Q1 is yes, does resource exclusion based on non-preferred resource set needs to be performed by UE B or not?

Question 3:If the answer to Q2 is yes, then, in RAN1's view, which specification (PHY or MAC) should capture the resource exclusion behavior?

In this contribution, we discuss the IUC with non-preferred resource set for the LS from RAN2.

2 Discussions

2.1 Contribution summary

There are contributions from 9 companies, discussing the topic of IUC with non-preferred resource set [2] - [14]. Companies' views are summarized in the following table.

Table 1:

	Q1	Q2	Q3
Futurewei [2]	Yes	Yes	MAC layer
Vivo [3]	Possible scenario	Up to UE implementation	N/A
ZTE [4]	Yes	No	N/A
OPPO [5], [6]	Yes	No	N/A
CATT [7], [8]	Yes	Yes	PHY layer
Apple [9], [10]	Possible scenario	No RAN1 consensus	N/A
Ericsson [11], [12]	Yes	Yes (for UE-B capable of sensing and resource selection)	PHY layer
Huawei [13]	Possible scenario	No	N/A
Qualcomm [14]	Yes	Yes	MAC layer

2.2 Round 1 Discussion

The RAN2 LS was extensively discussed in RAN1 #110 meeting, which was summarized in [15], and further updated in [16].

Regarding the response to RAN2 LS Question 1, in moderator's view, it is possible that the situation occurs where UE-B does not perform sensing but receives IUC scheme 1 with non-preferred resource set. For example, a condition triggered IUC containing a non-preferred resource set can be sent via unicast, groupcast or broadcast. If the IUC is sent in a resource pool supporting multiple resource allocation mechanisms (e.g., full sensing, partial sensing and random resource selection), then it is possible that a random resource selection UE-B receives this IUC.

The different responses to Question 1 depend on the definition of "valid scenario". Some companies think it is "valid scenario" because this scenario may occur, while other companies think it is not a "valid scenario" since there is no RAN1 agreement to support/handle this scenario.

From the last round discussions [16], RAN1 response to the first question seems to be converged. Companies please check if you can accept the following proposal.

Proposal 1: Regarding the first question in R1-2205728, RAN1's response is "The scenario described above is a possible scenario."

Feedback Form 1:

1 – Ericsson GmbH

Yes, it is a possible scenario

2 – Beijing Xiaomi Mobile Software

We accept moderator proposal.

3 – NTT DOCOMO INC.

OK

4 – Intel Ireland

Yes this scenario is possible.

5 – Classon Consulting

[for FUTUREWEI] OK

6 – Samsung Research America

We agree that this is a valid and possible scenario. The RAN2 question is: ”*Is the scenario described above a **valid scenario** or not?*”. Therefore, it is better to say in the reply that this is a ”valid” scenario to answer the RAN2 question.

7 – GOHIGH DATA NETWORKS TECH.

Agree moderator’s proposal.

8 – OPPO Beijing

Yes

9 – vivo Communication Technology

Yes, it is a possible scenario, if the UE-B supports the related capabilitis, e.g., receiving IUC Scheme 1 non-preferred resource set.

10 – ZTE Wistron Telecom AB

Yes, it is a possible scenario.

11 – NEC Corporation

Yes.

12 – Nokia Germany

Yes, it is a possible scenario.

13 – Qualcomm Incorporated

We agree with Samsung’s view that this is a ”valid” scenario

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14 – Motorola Mobility España SA

Yes, it is a possible scenario

Regarding the response to RAN2 LS Question 2, the following RAN1 agreement was made on UE-B's behavior when receiving the IUC information from UE-A.

Companies' views on RAN2 LS Question 2 were quite divergent, which depend on opposite understandings of the above agreement.

On one hand, from the blue highlighted text in the agreement, one camp of companies think if UE-B's sensing result is unavailable, then only the received non-preferred resource set information is used in UE-B's resource selection procedure. Additionally, the usage of the received non-preferred resource set information could enhance the performance of UE-B's resource selection. Hence, the specification needs to be updated to reflect this RAN1 agreement.

On the other hand, from the yellow highlighted text in the agreement, the other camp of companies think for preferred resource set, two options are defined where Option A has the same descriptions as that for non-preferred resource set. However, only a single option is defined for the case of non-preferred resource set. This implies the similar case as Option B for preferred resource set is not defined for the non-preferred resource set case in this agreement. In the maintenance phase of Rel-17 NR sidelink, it is unnecessary to define UE-B's behavior to handle this scenario. The straightforward approach to address this issue is that UE-B does not perform resource exclusion based on non-preferred resource set. UE-B can continue using random resource selection and simply ignore the received IUC information.

It seems no consensus can be achieved on whether UE-B performs resource exclusion based on non-preferred resource set. Hence, we have the following proposed response. Although it is not the preferred response from each camp of companies, it reflects the situation of RAN1 discussions. The moderator encourages companies to be more flexible on the response.

Companies please provide the comments whether you can accept the following proposal.

Proposal 2: Regarding the second question in R1-2205728, RAN1's response is "there is no consensus in RAN1 that UE-B performs resource exclusion based on non-preferred resource set."

Feedback Form 2:

1 – Ericsson GmbH

In our view, a UE capable of performing sensing shall perform sensing and using its own information together with the information included in the IUC from UE-A (non-preferred resources) perform the resource selection procedure.

Regarding the proposed reply from FL (even though it reflects the actual situation in RAN1), if we reply to RAN2 with "no consensus in RAN1", we are wondering about the UE behavior in this case. RAN2 sent an LS to RAN1 because the UE behavior is not clear/completed from their point of view, and we are not

providing any solution. In our view, based on RAN1 reply, the UE behavior in this valid scenario is not determined.

2 – Beijing Xiaomi Mobile Software

We accept moderator proposal.

3 – NTT DOCOMO INC.

The proposal would be OK. If RAN2 do not update their spec, then UE behavior is clear; non-preferred resources are not used for random selection.

4 – Intel Ireland

We are fine with the moderator's proposal, and believe that in this case the UE should fall back to default case, which is random resource selection without considering the non-preferred set.

5 – Classon Consulting

[for FUTUREWEI] not our preference but can accept

6 – Samsung Research America

If a UE receives non-preferred resources, whether or not it has sensing results, it seems natural to exclude the non-preferred resources. We can't find a good rationale not to do so. Furthermore, in our view, this (i.e., resource exclusion) seems to follow the agreement RAN1 made and that was cited by the moderator for the non-preferred resource set.

Despite all of this, it is true that there is no consensus in RAN1 on whether or not the UE performs resource exclusion. Therefore, we are fine to reflect this in the RAN1's reply to the RAN2 LS. But we would like to like update the moderator's reply as follows:

Proposal 2: Regarding the second question in R1-2205728, RAN1's response is "there is no consensus in RAN1 ***on whether or not*** *UE-B performs resource exclusion based on non-preferred resource set."*

7 – Huawei Tech.(UK) Co.. Ltd

This was discussed in August with the chair's notes recording "No consensus for a reply LS", so really this does not need to be discussed again. For the sake of closing the discussion, we can accept the moderator's draft reply.

8 – GOHIGH DATA NETWORKS TECH.

Even this propsoal really reflect the current situaiton of RAN1, but we still want to emphasize that resource exclusion for non-preferred resource set for random selection is necessary and aligned with the rationale of the agreement, and really reflects the motivation of introducing non-preferred resource set. Technically, we don't see any harm of introducing resource exclusion of non-preferred resource set for random selection.

9 – OPPO Beijing

Our preference is to reply "*UE-B does NOT perform resource exclusion based on non-preferred resource set*", to close the discussion sooner, we can accept FL's proposal.

10 – ZTE Wistron Telecom AB

We are fine with FL's proposal.

11 – vivo Communication Technology

We are basically fine with the proposal 2, but we think the wording should be revised a little:

Regarding the second question in R1-2205728, RAN1's response is "there is no consensus in RAN1 that ***whether or not*** *UE-B* ***should*** *perform~~s~~ resource exclusion based on non-preferred resource set."*

In our view this means how to handle this case is up to UE implementation. So if someone has concern that the UE behaviour is not clear, a alternative response can be:

*Regarding the second question in R1-2205728, RAN1's response is "****~~there is no consensus in RAN1 that UB-B~~it is up to UE-B's implementation whether to*** *perform~~s~~ resource exclusion based on non-preferred resource set."*

12 – NEC Corporation

Our preferred answer to RAN2's question is "Yes", while we can accept current response.

13 – Nokia Germany

The FL's current proposal contradicts the Agreement. The specification needs to be updated in order to reflect the Agreement: resource exclusion shall be performed by a UE when receiving a non-preferred resource set, regardless of whether or not the UE has a sensing result available. Otherwise, the feature is broken.

14 – Qualcomm Incorporated

We share the view of companies that excluding non-preferred resources regardless of sensing is necessary and aligned with the agreement in RAN1.

15 – Motorola Mobility España SA

We can reply - RAN1 does not have consensus in supporting resource

exclusion for non-preferred resource set for random selection

Agreement:

In scheme 1, at least following UE-B's behavior in its resource (re-)selection is supported when it receives inter-UE coordination information from UE-A:

- For preferred resource set, the following two options are supported:
  - Option A): 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
    - UE-B uses in its resource (re-)selection, resource(s) belonging to the preferred resource set in combination with its own sensing result
      - ✓ UE-B uses in its resource (re-)selection, resource(s) not belonging to the preferred resource set when condition(s) are met
        - › FFS: Details of condition(s)
      - ✓ This option is supported when UE-B performs sensing/resource exclusion
      - ✓ FFS: Other details (if any)
  - Option B): UE-B's resource(s) to be used for its transmission resource (re-)selection is based only on the received coordination information
    - UE-B uses in its resource (re-)selection, resource(s) belonging to the preferred resource set
      - ✓ This option is supported at least when UE-B does not support sensing/resource exclusion
        - › FFS: Whether the support is conditional or UE capability
      - ✓ FFS: Other details (if any)
  - FFS: Other option(s), and other details (if any)
- For non-preferred resource set,
  - 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
    - UE-B excludes in its resource (re-)selection, resource(s) overlapping with the non-preferred resource set
      - ✓ FFS: Details including
        - › Whether/how UE-B can use in its resource (re-)selection, resource(s) overlapping with the non-preferred resource set, definition of the overlap, and other details (if any)
        - › When UE-B excludes in its resource (re-)selection, resource(s) overlapping with the non-preferred resource set
    - FFS: UE-B reselects in its resource (re-)selection, resource(s) to be used for its transmission when the resource(s) are fully/partially overlapping with the non-preferred resource set
  - FFS: Other option(s), and other details (if any)

Figure 1:

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2.3 Round 2 Discussion

Regarding the first question, 12 out of 14 companies support the draft response.

@ Samsung, Qualcomm: As we already discussed in RAN1 #110 meeting, companies have different understanding of "valid scenario". Some companies think a valid scenario meaning the scenario may occur, while other companies think a valid scenario meaning the scenario may occur and specification supports/handles this scenario. To avoid the misalignment, we use the wording "possible scenario" to focus on whether or not the scenario will occur. Regarding whether specification supports/handles this scenario, it is discussed in Question 2.

With this explanation, FL suggests keeping Proposal 1 unchanged. Hope Samsung and Qualcomm can live with it. **Please comment only if you have concern on the proposal.**

Proposal 1-a:Regarding the first question in R1-2205728, RAN1's response is "The scenario described above is a possible scenario."

Feedback Form 3:

1 – OPPO Beijing Support.
2 – vivo Communication Technology We are OK with this proposal. Nevertheless, we can understand the point that this answer may mislead RAN2 as we say "possible" while RAN2 asking "valid" or not. Maybe we can add one sentence according to the moderator's observation to make it clearer like this: *The scenario described above is a possible scenario, however, RAN1 has no consensus on whether this is a scenario that should be handled by specification.*
3 – Ericsson GmbH We are OK with the FL proposal or with the suggestion from vivo with one modification. In our view is more precise to have the following reply (based on our read of FL's response to the previous comments): *The scenario described above is a ~~possible~~ **valid** scenario, however, RAN1 has no consensus on whether this is a scenario that should be handled by specification.*
4 – Huawei Tech.(UK) Co.. Ltd The moderator proposal is ok. We don't see a risk of RAN2 confusion - they are expert to handle the information given.
5 – Samsung Research America By saying this is a possible scenario, we are not answering the RAN2 question (Is the scenario described above a **valid scenario** or not?). We are fine with the proposed reply from Ericsson.

6 – Qualcomm Incorporated
We are ok with the proposed reply from Ericsson

Regarding the second question, 10 out of 15 companies support or be fine with Proposal 2. Additionally, Samsung is willing to compromise with modified wording.

@Ericsson: In FL's understanding, if there is no consensus in RAN1 whether UE-B needs to perform resource exclusion based on non-preferred resource set, then RAN2 may decide whether they want to update RAN2 spec.

@Samsung: Thank you for your compromise. Let us try the wording you proposed to see if the group can accept it.

@GOHIGH: I understand the non-preferred resource set could be used to enhance the resource selection reliability. However, it may be considered as an optimization since the system is not broken without it. In the late stage of Rel-17 NR sidelink maintenance, it is probably too late to work on the optimization. Anyhow, please check the modified proposal which is more neutral between the two camps.

@vivo: Let us try the wording from Samsung to see if the group can accept it.

@Nokia, Qualcomm: As discussed in RAN1 #110 meeting, companies' understandings of the agreement are different. It seems very hard to achieve the consensus among the companies on the understanding of the agreement after last RAN1 meeting and even in this RAN1 meeting. Hence, FL's proposal 2 is the compromised solution. Anyhow, please check the modified proposal which is more neutral between the two camps. Hope that you could be more flexible to the response.

@Motorola: Since the question from RAN2 does not explicitly mention random resource selection, we do not need to mention random selection in our response.

With this explanation, FL suggests the modified Proposal 2-a. **Please comment only if you have strong concern on the proposal.**

Proposal 2-a: Regarding the second question in R1-2205728, RAN1's response is "there is no consensus in RAN1 ***on whether or not*** *UE-B performs resource exclusion based on non-preferred resource set."*

Feedback Form 4:

1 – OPPO Beijing
OK
2 – vivo Communication Technology
We can accept this proposal.

3 – NTT DOCOMO INC.

Not preference but we accept the version.

4 – Ericsson GmbH

Our preference as commented in previous round is to follow the RAN1 agreements and specify that the UE should use the non-preferred resource set.

However, based on the current situation, we can compromise to have the following reply to RAN2 (also based on the FL's reply to our previous comment) with the new additions marked in bold:

Proposal 2-a: Regarding the second question in R1-2205728, RAN1's response is "there is no consensus in RAN1 ***on whether or not*** *UE-B performs resource exclusion based on non-preferred resource set.* ***It is up to RAN2 to decide on any update to the specification****."*

5 – Motorola Mobility España SA

The question in the LS specifically mentions whether to capture the resource exclusion in the PHY or MAC specs. We can write no consensus to capture it in RAN1 spec and it is upto RAN2 to capture it in the MAC spec. Modified proposal from Ericsson suggested wording.. 'There is no consensus in RAN1 to capture UE-B performs resource exclusion based on non-preferred resource set procedure in the PHY specification. It is upto RAN2 to decide on any update to the MAC specification'...

6 – GOHIGH DATA NETWORKS TECH.

We share similar views as Ericsson, and can also accept the update version from Ericsson, i.e. it is up to RAN2 to decide on any update to the MAC specification.

7 – Classon Consulting

[for FUTUREWEI] Not our preference, but we can accept. Ericsson's update makes it very clear this is in RAN2's court.

8 – Apple GmbH

As a moderator:

The new sentence proposed by Ericsson is not really needed. It is already mentioned in the proposal that RAN1 has no consensus on this topic, and it is nothing to do with RAN2's decision. Once RAN2 receives this reply LS, they will autonomously discuss on any specification update if they think it is necessary. We, as RAN1, does not need to mention this to RAN2.

9 – Huawei Tech.(UK) Co.. Ltd

As RAN1 (and RAN2) specs stand, this exclusion is not performed. It is not correct then to say there is no consensus, since the specs have been agreed and approved by consensus. The original moderator version is accurate.

10 – Huawei Tech.(UK) Co.. Ltd Clarified response: As RAN1 (and RAN2) specs stand, this exclusion is not performed. It is not correct then to say there is no consensus whether or not, since the specs have been agreed and approved by consensus. The original moderator version is accurate.
11 – Samsung Research America While our preference is to follow the RAN1 agreements, and exclude non-preferred resources in case of random resource selection (when no sensing results are available), we are fine with the latest moderator proposal. We are also fine with the update from Ericsson. It is a fact that there is no consensus in RAN1 on whether or not to perform resource exclusion for this case in UE-B. So the current proposed reply accurately reflects the RAN1 status.
12 – Qualcomm Incorporated We accept Ericsson's or the FL's proposal as a compromise

2.4 Round 3 Discussion

In the second round regarding Proposal 1-a, although vivo and Ericsson proposed alternative wording, both companies are also fine with Proposal 1-a.

@Samsung, Qualcomm: This proposal has been stable even in last RAN1 meeting. It is expected that RAN2 delegate will not mis-interpret the wording. I think the main arguable point should be at Proposal 2.

FL suggests keeping Proposal 1-a unchanged.

Proposal 1-a:Regarding the first question in R1-2205728, RAN1's response is "The scenario described above is a possible scenario."

Feedback Form 5:

1 – ZTE Wistron Telecom AB OK
2 – Classon Consulting (for Futurewei) ok
3 – Intel Ireland Ok
4 – Beijing Xiaomi Mobile Software support

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5 – Huawei Tech.(UK) Co.. Ltd
Still ok

In the second round regarding Proposal 2-a, Ericsson proposed to add a new sentence "It is up to RAN2 to decide on any update to the specification." However, according to FL, the new sentence proposed by Ericsson is not really needed. The proposal only says RAN1 has no consensus on this topic, which is not RAN2's decision/consensus. If RAN2 receives this reply LS, they will autonomously discuss on any specification update if they think it is necessary. We, as RAN1, does not need to mention this to RAN2.

While Proposal 2-a can be accepted by most of the companies, Huawei has a comment that the current RAN1 and RAN2 specification does not support UE-B performs resource exclusion in this case. By considering specification as a baseline, the arguable point is whether specification should be updated by UE-B performing resource exclusion. Hence, they persist to use "that" to replace "on whether or not".

On the other hand, Samsung and other companies think the RAN1 agreement should be considered as a baseline, and the non- consensus is based on the understanding of that RAN1 agreement.

In FL's view, there is no big difference between the wording "that" and "on whether or not". Hence, it is suggested to remain the same proposal. Companies are encouraged to be more flexible.

Proposal 2-a: Regarding the second question in R1-2205728, RAN1's response is "There is no consensus in RAN1 on whether or not UE-B performs resource exclusion based on non-preferred resource set."

Feedback Form 6:

1 – ZTE Wistron Telecom AB
OK
2 – Classon Consulting
(for Futurewei) ok
3 – Intel Ireland
OK
4 – Beijing Xiaomi Mobile Software
support
5 – Nokia Germany
Saying "there is no consensus" is not very informative (e.g., RAN2 might wonder: is it just one company opposing?). The following wording is suggested instead: "*Proposal 2-a: Regarding the second question in R1-2205728, RAN1's response is "RAN1 is* ***evenly divided*** *on whether or not UE-B performs resource exclusion based on non-preferred resource set.*""

6 – Samsung Research America We are fine with the moderator's proposal.
7 – Ericsson GmbH Even though it is not our preference, and we think that our previous proposal is aligned with the intention of the reply, we can accept the moderator's proposal for the sake of progress and the provide and answer to RAN2 for this topic.

2.5 Round 3 Summary

In the third round regarding Proposal 1-a, it seems no company objects it.

In the third round regarding Proposal 2-a, Nokia had a comment to change ”no consensus” to ”evenly divided”. However, FL does not think this change is necessary: 1). We do not need to let RAN2 know the details in RAN1 discussions via reply LS; 2). Companies' positions may change with time and conditions, and it is unnecessary to capture companies' positions at a certain time point; 3). The number of companies in each camp may not be close to half-half. With the above considerations, FL hopes Nokia could live with the current proposal 2-a. [After some offline discussion, Nokia kindly accepts the proposal.]

Other than that, there is no objection to Proposal 2-a. Hence, FL thinks the following two proposals are stable.

Proposal 1-a: Regarding the first question in R1-2205728, RAN1's response is “The scenario described above is a possible scenario.”

Proposal 2-a: Regarding the second question in R1-2205728, RAN1's response is “There is no consensus in RAN1 on whether or not UE-B performs resource exclusion based on non-preferred resource set.”

FL would like to thank all the companies participating in the discussions, and especially appreciate the flexibility of the companies in the process.

3 Conclusion

The proposal 1-a and proposal 2-a are agreed.

The draft LS reply in R1-2210482 is endorsed and the final LS is in R1-2210582.

4 References

1. R1-2205728, “LS on IUC with non-preferred resource set,” RAN2 (Apple), May 2022.
2. R1-2208384, On the incoming RAN2 LS R1-2205728 on IUC and non-preferred resources FUTUREWEI
3. R1-2208586 Draft reply LS on IUC with non-preferred resource set vivo
4. R1-2208715 Draft reply LS on IUC with non-preferred resource set ZTE, Sanechips

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5. R1-2208807 Discussion on the LS on IUC with non-preferred resource set OPPO
6. R1-2208808 Draft reply LS on IUC with non-preferred resource set OPPO
7. R1-2208911 Draft Reply LS on IUC with non-preferred resource set CATT, GOHIGH
8. R1-2208912 Discussion on Reply LS on IUC with non-preferred resource set CATT, GOHIGH
9. R1-2209552 Discussion on RAN2 LS on IUC with Non-preferred Resource Set Apple
10. R1-2209553 Draft Reply LS to RNA2 on IUC with Non-preferred Resource Set Apple
11. R1-2210116 [Draft] Reply LS on IUC with non-preferred resource set Ericsson
12. R1-2210117 Discussion on LS on IUC with non-preferred resource set Ericsson
13. R1-2210206 Discussion on LS on IUC with non-preferred resource set Huawei, HiSilicon
14. R1-2210234 Draft Reply to RAN2 LS on IUC with non-preferred resource set Qualcomm Incorporated
15. R1-2208080, "Moderator Summary of Reply LS to R1-2205728 (LS on IUC with non-preferred resource set, RAN2)," Moderator (Apple), Aug. 2022.
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