[94e-39-R17-RedCap-WI] - Version 0.0.6
RAN

3GPP TSG-RAN Meeting #94e **RP-213689**

Electronic, 6 – 17 December 2021

Agenda Item: 9.3.1.7

Source: Email discussion moderator (Intel)

Title: Email discussion summary for [94e-39-R17-RedCap-WI]

Document for: Discussion and decision

(This is a revision of RP-213616. The content of the pdf generated by NWM is unchanged. The slides in the zip file are updated on slide 2 to reflect feedback to RP-213616 made to the reflector.)

1 Introduction

This document reports on the following email discussion during 94e:

[94e-39-R17-RedCap-WI]

Input contributions covered:

RP-212802 Status report for WI: Support of reduced capability NR devices; rapporteur: Ericsson

RP-212914 Scope and progress on Rel-17 RedCap Intel Corporation

RP-213046 RedCap IDLE mode operation Qualcomm Incorporated

RP-213427 On scope of frequency bands for Redcap in Rel-17 Ericsson

2 Status Report (RP-212802) and RP-212914

The Status Report for the Rel-17 RedCap WI is flagged by MCC for being a late submission. The tdoc RP-212914 comments on the completion level of the work item and makes the following proposal:

Proposal on Completion level (RAN1):

- 95% completion in RAN1 (the ones identified above should be reflected in SR), with very limited RRC impact expected for the remaining work.
- Pending issues can be addressed at part of maintenance work, with most of the above expected to be addressed during 2022 Q1.

2.1 Initial Round

Companies are invited to comment on the status report and on the proposal from RP-212914

Feedback Form 1: RP-212802 and RP-212914 - Initial Round

1 – TELECOM ITALIA S.p.A.

I am very worried by the following sentence in the proposal above:

Pending issues can be addressed at part of maintenance work, **with most of the above expected** to be addressed during 2022 Q1

- First RAN1 should have already completed the work
- Second, as it is stated, it is clear that RAN1 will continue working on this topic even after RAN#95, with consequent impact on RAN2 and RAN4 workplan and workload.

We strongly suggest to decide at RAN#94 that objectives not completed at RAN#94 are left out of Rel 17

2 – Ericsson LM

The issues listed in RP-212914 are reflected in Section 2.1.2 of the WI SR in RP-212802. It is expected that these issues can be resolved during the CR phase in Q1, so there is no need for downscoping.

3 – Nordic Semiconductor ASA

For the below issues, legacy behavior for initial DL BWP can be re-used, and thus no additional spec change is expected, in our opinion.

Remaining details/clarifications on configuration of initial DL/UL BWPs, e.g., related to center frequency alignment between DL and UL and presence of (CD/NCD-)SSB

and/or CORESET#0 in some TDD scenarios, e.g.:

• Center frequency alignment between CORESET#0 and initial UL BWP

• BWP #0 configuration 1 when RedCap UE is provided with separate initial DL BWP

• UE behavior when initial DL BWP for non-RedCap UEs is larger than max RedCap UE BW but separate initial DL BWP is not configured

4 – VODAFONE Group Plc

We share the same view as Telecom Italia. Issues that can not be solved during maintenance phase should either be left out from Rel-17 or follow legacy behaviour when applicable

5 – Deutsche Telekom AG

Agree with Vodafone and TIM

6 – Intel Corporation (UK) Ltd

As the sourcing company for RP-212914, we would like to echo the response from Ericsson that the key technical points have already been reflected in the latest SR from the rapporteur, based on discussions in RAN1 before SR submission. Thus, further discussions on RP-212914 may not be necessary and we can focus on the SR.

7 – vivo Mobile Communication Co.

We assume current SR truly reflects the existing progress in RAN WGs, and the remaining issues listed in SR and RP-212914 could be resolved during CR phase in Q1 2022.

8 – Samsung Electronics Polska

We share similar view with Ericsson. Listed potential issues can be handled in CR phase and no need for downscoping. In our understanding, the potential issues may or may not have spec impact in the end.

9 – QUALCOMM JAPAN LLC.

We do not see the need of down scoping.

10 – LG Electronics Inc.

Focusing on the SR, we agree with Ericsson, vivo and Samsung in that those issues listed in the SR can be handled during the CR phase in RAN1. For those issues not resolved in time, following legacy behaviour when applicable should be the way to go as commented by VODAFONE.

11 – Huawei Technologies France

For second bullet in above proposal,"Pending issues can be addressed at part of maintenance work, with most of the above **expected** to be addressed during 2022 Q1" we prefer to change "**expected**" to "**should**", it is not expected to have further delay. The proposed changes are:

- Pending issues can be addressed at part of maintenance work, and the already identified issues should be addressed during 2022 Q1

12 – Xiaomi Communications

The remaining issues are not so essential. And can be discussed in CR phase, there is no need for down scoping

13 – ZTE Corporation

We are OK with the SR and agree that pending issues can be addressed **as** (a typo here in the proposal) part of maintenance work.

There are some remaining issues in Rel-17 scope, including PUCCH resource selection for disabling hopping, case5 for HD-FDD, center frequency alignment for CORESET0 and initial UL BWP.

However, if legacy behavior is followed, some unexpected impacts on remaining issues are observed. For example, CORESET#0 and initial UL BWP does not need to be aligned, and there is no need to limit the initial DL BWP and initial UL BWP in a 20M bandwidth in FR1, etc.

What's more, if these issues are left out or not addressed, some agreed functions can not be implemented, either, e.g., disabled PUCCH hopping. It also would cause the network scheduling problem, e.g., case 5 for HD-FDD.

Therefore, it is suggested to continue to deal with these remaining issues in maintenance stage and no need for down scoping.

2.2 Summary from Initial Round

The following remaining details are expected to be addressed during CR/maintenance phase in Q1 2022.

The proponent of RP-212914 (Intel) commented that their proposal no longer needs discussion as their technical points were addressed in SR from the rapporteur. Based on this the moderator's conclusion is that RP-212914 not longer needs to be discussed and can be noted.

Moderators proposal 1: RP-212914 is noted (No further discussion of this tdoc)

8 companies expressed the view that the SR correctly reflects the RAN1 open items and that the work can be completed in Q1 2022.

Nordic Semiconductor lists 3 RAN1 open issues to be discussed in next quarter although also comment that the discussion may not conclude that spec change it needed (e.g. is legacy behaviour can be re-used). The moderator's understanding is that bullets 2 and 3 of the list are already covered by bullets in the SR (bullets 2 and 1 respectively).

To the moderator, the most important aspect is to ensure that the SR correctly reflects the current situation. Although a number of companies commented that they consider the SR to be correct, it seems reasonable to check this and ,specifically, check is anything from the list provided by Nordic Semiconductor should be added.

Moderator's proposal 2: Check that the list of RAN1 open issues in the SR is complete (specifically, check is anything from the list provided by Nordic Semiconductor should be added)

3 operators expressed concern with the status and propose that objectives not completed at RAN#94 are left out of Rel 17. There was concern over the use of the phrase 'expected to be addressed' in the SR.

In the moderator's view, the phrase " The following remaining details are expected to be addressed during CR/maintenance phase in Q1 2022" could be reworded to make it clear that the open issues will be address in the next quarter. If any remains items outstanding in March, including items from RAN2/3/4, then these will be handled by the normal exception process.

Moderator's proposal 3: Reword the text in 2.1.2 of the SR to say, " The following details will be addressed in Q1 2022"

2.3 Intermediate Round

Companies are asked to comment on the 3 proposals from the moderator in the summary from the Initial Round.

Feedback Form 2: Status Report - Intermediate Round

1 – Nordic Semiconductor ASA

To clarify our comment, currently status report contains two bullets related to BWP

- Clarification of UE behavior when separate initial DL BWP is not configured
- Presence of SSB transmission in separate initial DL BWP in connected mode for BWP#0 configura-

tion option 1

Our intention was not to add more to SR, but actually remove above two bullets from SR and instead agree in RAN the following:

Proposal: Separate Initial DL BWP #0 for RedCap UEs may operate as R15/R16 Initial DL BWP #0 for non-RedCap UEs unless any technical issues are identified.

This because in legacy

- UE behavior when separate initial DL BWP is not configured exists already in R15 and R16
- initial DL BWP in configuration Option 1 is not an active BWP and thus based on current agreement does not need to contain SSB.

2 – Nordic Semiconductor ASA

One typo correction ”UE behavior when ~~separate~~ initial DL BWP is not configured exists already in R15 and R16”

3 – Futurewei Technologies

P1: ok

P2 & P3: No revisions to the SR are necessary

4 – NTT DOCOMO INC.

P1: OK

P2 & P3: No revision to the SR is necessary as the remaining details, including Nordic’s concerning ones, should be discussed/resolved in RAN1 in Q1 2022.

5 – CATT

P1: Fine.

P2: The the list of open issues has already been reviewed and sorted out during SR preparation phase in RAN1 reflector - not to repeat the relationship of different issues here - the current version of SR should be fine.

P3: We are fine with either the current version or the original version.

6 – Samsung Electronics Polska

P1:fine

p2&p3, no need to revise the SR.

7 – Huawei Technologies France

In our view it would be simpler and sufficient to just stop the discussion on the SR. But if we are going to discuss revising the text of the open issues list for RAN1, then the SR will have to be revised and not simply noted. In this case, we would suggest a different text than the one of proposal 3, and we see no need to attempt further debate on the list itself (proposal 2) since proposal 3 leaves this debate to RAN1 (including any other maintenance issue not even on this list). Our proposal would be to reword the text in 2.1.2 of the SR to say, ” The following details will be addressed in Q1 2022, including whether any of the

following issues would require an essential correction". We believe this clearly reflects the status of the discussion where companies expressed different understandings on whether all the listed issues are indeed necessary to address, and is consistent with entering the RAN1 maintenance phase for this WI.

8 – Intel Corporation (UK) Ltd

We are fine with the three moderator proposals and think that the SR accurately captures the outstanding details (thus, Proposal 2 can be answered in the affirmative). Similar to CATT, we are fine with keeping existing SR text or update it as per Proposal 3.

We do not agree with the suggestion from Nordic to remove the identified opens from the SR and the corresponding proposal since it is not immediately obvious that "Separate Initial DL BWP #0 for RedCap UEs may operate as R15/R16 Initial DL BWP #0" as there are significant differences between the two. In any case, this is subject for discussion at WG level, which is consistent with the identified open issues in the SR.

We also do not agree on the qualifier suggested by Huawei as this would be "business as usual" – whether an issue deserves resolution via updates to specs or not would be an outcome of the discussions.

In conclusion, in view of the comments so far, we think the best option would be to leave the SR as is.

9 – China Mobile Com. Corporation

P1: Fine;

P2: Center frequency alignement issue as listed by Nordic also needs to be solved in RAN1 in the following meetings.

P3: OK with the propoal. Considering the long debate in RAN1 discussion, we should be constructive to solve the remaining issues in the following meeting during Q1 2022.

10 – Nordic Semiconductor ASA

Intel says: "Separate Initial DL BWP #0 for RedCap UEs may operate as R15/R16 Initial DL BWP #0" ..... there are significant differences between the two.

It would be very welcome if Intel/Moderator could clarify what the significant differences are. So we can keep technical discussion here. ;)

And despite understanding that there is no consensus to update SR, for the separate Initial DL BWP hopefully we follow the RAN guidance "Rel-15 SSB bandwidth is reused and L1 changes minimized." when discussing CRs in RAN1.

11 – Ericsson LM

P1: Ok.

P2: The list in the SR seems to be complete.

P3: There does not seem to be a need to update the SR

12 – Nokia France

We are OK with P1 and P3.

As mentioned by CMCC, we do think that discussion needs to continue on "Center frequency alignment between CORESET#0 and initial UL BWP". We cannot agree here just to reuse legacy behaviour for that. RAN1 needs to continue its discussion from the last meeting.

13 – Guangdong OPPO Mobile Telecom.

P1: Understand the proposal action is just noting the 2914. We are fine. We did not think the contribution is to show there is big issues. They are all easily solvable.

P2/3, We are ok to just remove ”during CR/maintenance phase”. Other bullets may not need to be removed or added.

14 – VODAFONE Group Plc

We are fine with the three proposals. Regarding P2, the discussion was already held at RAN1 prior to this plenary, for P3 we agree with the rewording of the moderator

15 – ZTE Corporation

P1: fine with it.

P2:

we disagree to add “including whether any of the following issues would require an essential correction”, since the detailed solutions should be up to RAN1 discussion and it is hard to say which update is essential or not in RANP

Therefore, the current description for remaining issues in the SR is fine. If there is any other issue missed, we are open to discuss it and add it to the list.

P3: OK with the original version and the updated version.

16 – vivo Mobile Communication Co.

P1: agree.

P2: it is not necessary to spend more time to revise the open issues. Prefer to keep the current version and all the remaining issues will be discussed in RAN1 Q1 2022.

P3: we are fine with either this proposal or original one.

17 – LG Electronics Inc.

P1: Okay.

P2: Confirm that the list of RAN1 open issues in the SR is complete.

P3: We are okay with or without rewording.

2.4 Summary from Intermediate Round

Conclusion: RP-212914 is noted

Regarding proposals 2 and 3, the majority of companies think that the current SR is OK and no update it needed. Two companies (CMCC and Nordic Semiconductor) suggest some update to the list of open items, and 4 companies think that it would be beneficial to make some update to the text of the SR that introduces the list of items. 4 other companies could accept the changes to the introductory text.

In the moderator’s view, the list of open issues has been reviewed by RAN1 (as pointed out by some companies) and it is probably not constructive for RAN to repeat this process. Regarding text of the SR that introduces the list of items, while it would be possible to make further refinements, this is also not a very constructive process - it should be clear to all concerned that these items need to be resolved in Q1 22 and the

moderator encourages all companies to be constructive towards resolving them. Given this situation, the moderator's proposal is to stop further discussion of the SR and indicate it as noted.

Moderators proposal: Status Report in RP-212914 is noted (No further discussion of this tdoc)

2.5 Final Round

Companies may comment on the moderator proposal from the summary from the Intermediate Round

Feedback Form 3: Status Report - Final Round

1 – NTT DOCOMO INC. Support moderator proposal
2 – ZTE Corporation We support the proposal.
3 – Samsung Electronics Polska Support the proposal
4 – vivo Mobile Communication Co. We support the proposal
5 – Intel Corporation (UK) Ltd Support the moderator's proposal.
6 – China Mobile Com. Corporation We are OK with the proposal.
7 – CATT We support moderator's proposal.
8 – VODAFONE Group Plc We're fine with the moderator proposal
9 – Ericsson LM We support the proposal
10 – Nokia France We support the Moderator's proposal in principle, noting that the SR is actually in RP-212802 not RP-212914.

11 – LG Electronics Inc. We support the Moderator's proposal.

2.6 Summary from Final Round

No concerns raised with the proposal from the Intermediate Round so this can be taken as a conclusion (with tdoc number fixed).

Conclusion: Status Report in RP-212802 is noted

3 RedCap Idle mode operation (RP-213046)

RP-213046 discusses cell selection/reselection procedures in idle/inactive mode for RedCap UEs and makes the following proposal:

Proposal 1: RAN2 should work on the assumption that the cell reselection measurements and cell ranking is performed based on the "intra-frequency" cells on the frequency of CD-SSB, regardless of whether the UE is camping on a cell associated with CD-SSB (scheme 1) or a cell associated with NCD-SSB (scheme 2).

3.1 Initial Round

Companies are invited to comment on RP-2113046

Feedback Form 4: RP-2113046 - Initial Round

1 – Ericsson LM Proposal 1 sounds reasonable to us from technical point of view, but with the following change: "UE is camping on a cell" should be replaced with "UE monitoring paging in a cell". However, we think such technical details should be resolved by RAN2 rather than by RAN.
2 – Nordic Semiconductor ASA Agree, this would minimize work in RAN2 in R17 and thus RAN guidance would be welcome here.
3 – VODAFONE Group Plc Agree that the proposal should be taken into account during the RAN2 discussion for the RAN1 LS
4 – KT Corp. KT support proposal 1.
5 – DENSO CORPORATION Agree that Proposal 1 makes the idle mode specification simple as it can reuse the existing cell reselection mechanism. On the other hand, in scheme 2, RedCap UE is requires to retune to NCD-SSB for monitoring

paging in every PO, and then go back to CD-SSB for the cell reselection procedure. So, the UE is requred to retune back and forth between CD-SSB and NCD-SSB. As indicated in RP-213046, there might be some RAN4 specification impacts.

6 – MediaTek Inc.

From the GTW discussion, there are two aspects of this paper that need to be considered:

- Whether Scheme 2 is needed
- Whether we need to restrict the SSB that is used for Idle/Inactive procedures

We agree with Observations 1 and 2 in this paper that Scheme 1 has almost no impact to Idle/Inactive procedures, while Scheme 2 has significant impact to the Idle/Inactive procedures in RAN2 and RAN4. Given that Scheme 2 is only a working assumption pending RAN2 and RAN4 feedback on feasibility, it would be appropriate to **prune out Scheme 2 and avoid introducing additional RAN2 and RAN4 workload in the next year**.

With this approach, we would no longer need Proposal 1 (it is already true for Scheme 1 as explained in this paper) and the technical discussions on Scheme 1 can continue in the RAN working groups.

7 – Intel Corporation (UK) Ltd

Moderator's comment:

This topic was discussed during the Monday GTW but no progress was made. Therefore, please continue to provide your feedback to the proposal in RP-213046

8 – Deutsche Telekom AG

Proposal 1 as indicated in the GTW today. We do not see the benefits of Option 2 and are afrid of potential side impacts on legacy cell reselection (which is an absolute no-go) ... als the efforts for Option 2 have been confirmed to be higher and based on the workload and Rel-17 finalisation discussion this can not be done.

9 – Futurewei Technologies

The discussion of this proposal is best held in RAN2

10 – Ericsson LM

Update to our previous comment

As mentioned during GTW on Monday, we would also support going forward with Scheme 1 with the same concerns on workload and impact as MediaTek and Deutsche Telekom raise in the previous comments.

Regarding wording of the proposal we think it should be: "*RAN2 should work on the assumption that the cell reselection measurements and cell ranking is performed based on the "intra-frequency" cells on the frequency of CD-SSB, regardless of whether the UE monitoring paging in a cell associated with CD-SSB (scheme 1) or a cell associated with NCD-SSB (scheme 2).*" Especially for the NCD case, we don't think it would be correct to say that the UE would be camping on the cell associated with NCD-SSB if it would be actually performing cell re-election measurements and ranking on frequency of CD-SSB. The UE should be camping on the cell defined by the CD-SSB instead.

11 – Panasonic Corporation

As also said in GTW, we agree proposal 1. Whether to support scheme 2 in Rel.17 can be discussed considering workload especially in RAN2/4.

12 – Guangdong OPPO Mobile Telecom.

Indeed, scheme 1 can save a lot of RAN2 work and can be taken as baseline. Scheme 2 can be further discussed in RAN2.

13 – NTT DOCOMO INC.

We support Proposal 1 considering RAN2 workload.

14 – Intel Corporation (UK) Ltd

We tend to agree that the proposal can reduce the RAN2 work load on IDLE/INACTIVE. We would like to get the confirmation from proponents on whether the proposal on IDLE/INACTIVE will impact the discussion on RRC_CONNECTED or not? To our understanding, not same as IDLE/INACTIVE, the RedCap UE in RRCCONNECTED can still use NCD-SSB for measurements, RLM, etc, i.e. the proposal will not impact the discussion on RRC_CONNECTED.

15 – CATT

We support to go with scheme 1 only to reduce the work for RAN2 and RAN4.

16 – vivo Mobile Communication Co.

1. Considering the working assumption made in RAN1 (which is scheme 2 actually): "Working assumption: If it is configured for paging, RedCap UE expects it to contain NCD-SSB for serving cell but not CORESET#0/SIB from RAN1 perspective", the only specification impact is to define the RRM and cell (re-)selection based on NCD-SSB, which will be also determined in RRC connected mode. During the discussion in RAN2#106, RAN2 evaluated the corresponding work and confirmed it is feasible in Rel-17. We donot see much motivation to made the down selection on the schemes in RAN.

2. Once scheme 1 was adopted, it seems that NCD SSB is no longer be used for idle/inactive mode UEs, even it is deployed. In this case, we don't see much motivation for operator to deploy NCD SSB. It could restrict the usage of NCD SSB.

3. If companies' concern is the workload in RAN2 and RAN4, we think we could discuss all the objectives together and evaluate whether it is feasible to complete Rel-17 WI in the remaining time unit, but just excluding one possible solution is not a good idea. RAN1 has send LS to RAN2/4 to explicitly ask for the feedback on the above working assumption (scheme #2), and RAN2 and RAN4 will discuss and assess the work load in Jan meeting, there is no evidence that RAN2/4 cannot make the decision by their own. Therefore no need for RAN plenary intervention.

4. In summary, we think this detailed design on NCD SSB for cell (re-)selection in idle/inactive mode should be discussed in WG.

17 – Samsung Electronics Co.

We also support Proposal 1 and Scheme 1 considering the workload and timeline in WGs, as indicated during GTW session on Monday. Even though these are WG-level discussion, RAN guidance would be indeed helpful to narrow the discussion scope down.

18 – LG Electronics Inc.

As indicated during Monday GTW session, we support P1. Which scheme to support can be discussed in RAN1.

19 – QUALCOMM JAPAN LLC.

Note that the key point of our contribution was to point out that RAN2 does not have sufficient time to debate how the scheme should be realized, potentially in coordination with RAN4 (the RAN1 LS was sent to RAN2 and RAN4). So we do not agree to those comments that it can be left to WG discussion.

If no guidance from RAN, the scheme 2 should be out and we disgree to spending RAN2/4 time on it as they have other things they need to complete in the next quarter.

20 – HuaWei Technologies Co.

As we also commented in GTW, we think we can directly go with scheme 1. Scheme 2 has significant impacts on RAN2 procedures, criteria and RAN4 requirements definition. Scheme 1 can largely reuse the current framework which can be manageable within Rel-17 timeline. We also think the current proposal should be applied to both intra-frequency and inter-frequency cases for cell reselection in idle/inactive modes and L3 cell mobility in connected mode.

Regarding the comments from some companies on leaving this to WG discussion, we don't think this is desirable as this discussion would impact multiple RAN WGs, and we don't have enough time to discuss this back and forth among different WGs especially considering this NCD-SSB is already coming a bit late.

21 – Xiaomi Communications

Considering scheme 1 could minimize the RAN2's work load, we are OK to set scheme 1 as the baseline. While, on the other hand, as commented by vivo, considering the working assumption of the necessity of NCD-SSB during the paging transmission made in RAN1 and the LS sent to RAN2, we think we can leave scheme 2 to RAN2's decision

22 – ZTE Corporation

We support Proposal 1, for reducing the workload in RAN2 and RAN4. Regarding scheme 1 and scheme 2, as commented during the GTW session, we think we should go for scheme 1, as it is the only one that can realistically be included in Rel-17. Furthermore scheme 2 requires the UE to switch between CD-SSB and NCD-SSB every PO, which costs more UE power.

Regarding Intel's question, our understanding is that the decision made for *RRC IDLE/INACTIVE does not impact the discussion for RRC CONNECTED UEs*, so RAN2 can continue the discussion on NCD-SSB based RLM/RRM in RRC_CONNECTED mode.

23 – Nokia France

We support proposal 1.

3.2 Summary from Initial Round

There was very wide support to adopt proposal 1 from RP-2113046. Only one company (Vivo) expressed technical concerns with the proposal, commenting that scheme 2 is the current RAN1 working assumption. 2 companies (Vivo and Futurewei) expressed the view that the discussion is best handled in the WGs, while many other companies felt that guidance from RAN#94e could help streamline the WG discussions during Q1 2022.

Based on this feedback, the moderator proposes to agree proposal 1 with some slight rewarding as proposed by Ericsson.

Moderator's proposal 1: RAN2 should work on the assumption that the cell reselection measurements and cell ranking is performed based on the "intra-frequency" cells on the frequency of CD-SSB, regardless of whether the UE monitors paging in a cell associated with CD-SSB (scheme 1) or a cell associated with NCD-SSB (scheme 2)

Furthermore, a number of companies expressed the view that we could go a step further and already conclude to go with scheme 1 and drop scheme 2. It is not clear to the moderator whether it might be possible to take this agreement in RAN or whether further WG discussion would be needed. Consequently more feedback is requested.

Moderator's proposal 2: Companies are request to provide feedback whether we can agree to adopt scheme 1 (and drop scheme 2).

3.3 Intermediate Round

Companies are asked to comment on the 2 proposals from the moderator in the summary from the Initial Round.

Feedback Form 5: RP-2113046 - Intermediate Round

1 – Nordic Semiconductor ASA

We support P1. We have the same view as Vivo and Futurewei.

Moreover, based on previous LS from RAN2, there are no issues with listening to paging on BWP containing NCD-SSB. RAN2 had concern only about measurements, cell (re-)selection, those are addressed in P1?

From RAN2 LS to RAN1: *In idle/inactive mode it would be feasible to inform UEs about an NCD-SSB from signalling standpoint. The concept of non-cell-defining SSB (NCD-SSB) and the corresponding procedures, i.e., measurements, cell (re-)selection, do not exist in the current RAN2 specifications and using NCD-SSB for measurements and cell (re-)selection would still require the UE to re-tune to the CORESET#0 for reading SIBs.*

Therefore, we believe both Scheme 1 and Scheme 2 can be supported in R17. However, if work on Scheme 2 is not finished in RAN2/RAN4 in Q1 22, then RAN can consider to drop. Scheme 2

2 – Ericsson LM

We support Proposal 1.

Similarly to numerous companies in the previous round, we agree to adopt scheme 1 (and drop scheme 2) to streamline the discussion and to realistically expect RedCap can be completed in the remaining allocated time for Rel-17 discussions. Further discussion between details of scheme 1 and 2 and which to adopt will consume cycles in RAN2, meaning the available time in the next RAN2 meeting will be consumed for this discussion. This would result in starting the discussion on what details need to be specified, and the actual specification work, only in or prior to the very final RAN2 meeting before the stage-3 freeze of Rel-17. Practically speaking, this means the feature will not be completed in time for Rel-17.

3 – Futurewei Technologies

P2: Since proposal 1 has overwhelming support, we can accept it to reduce the workload in RAN2. Similarly, while we feel scheme 2 can be further discussed in the WGs based on the LS, we will not object if the group strongly prefers to adopt scheme 1 and drop scheme 2.

4 – NTT DOCOMO INC.

P1: Support

P2: We are fine to adopt scheme 1 and drop scheme 2

5 – CATT

P1: Support. This accommodates the current RAN2 situlation (*The concept of non-cell-defining SSB (NCD-SSB) and the corresponding procedures, i.e., measurements, cell (re-)selection, do not exist in the current RAN2 specifications*), and make it more realistic to complete RAN2 work within Rel-17.

P2: Fine to adopt scheme 1 (while dropping scheme 2).

6 – Guangdong OPPO Mobile Telecom.

We support P1, but are wondering if the wording ”in a cell associated with CD-SSB/NCD-SSB” is correct. In practice, one cell can contain both CD-SSB and NCD-SSB at the same time, then in this case should we call this cell is assiciated with CD-SSB or with NCD-SSB? Since the intention is related to paging monitoring, wouldn’t it be more accurate to say in an initial DL BWP associated with CD-SSB or NCD-SSB as in R17 we need to handle one additional initial BWP for RedCap UEs in the cell. So We suggest rewording to P1 as:

RAN2 should work on the assumption that the cell reselection measurements and cell ranking is performed based on the “intra-frequency” cells on the frequency of CD-SSB, regardless of whether the UE monitors paging in <u>an initial BWP</u> associated with CD-SSB (scheme 1) or <u>an initial BWP</u> associated with NCD-SSB (scheme 2).

P2, we are also fine to adopt scheme 1 and drop scheme 2.

7 – Huawei Technologies France

As we commented in GTW and email discussion, proposal 1 should not only be applied to intra-frequency, it should also be applied to inter-frequency. In general consistent principle should be applied to both cases, otherwise we leave inter-frequency undetermined and would create unnecessary discussion in WGs again.

Regarding schme1 vs scheme 2, as we explained before, we strongly recommend scheme 1 to be adopted which in our view is the only realistic way to accommodate NCD-SSB within Rel-17.

8 – Samsung Electronics Co.

P1: Support;

P2: We are also fine to adopt scheme 1 and drop scheme 2.

9 – QUALCOMM JAPAN LLC.

P1: Support. We are OK to add inter-frequency measurements being done on CD-SSB layer, even though we thought it was already the common understanding.

P2:

We think the work on scheme 2 is manageable once P1 is agreed. We understand other key aspects of scheme 2 for WG level discussion is the following.

- RAN2: RedCap UE awareness of RAN upon paging for paging routing to correct CORESET/initial DL BWP
  - Can be done, e.g. by extending *UERadioPagingInformation* (38.331). This works in both idle mode and RRC_inactive paging. Avoids SA2 and RAN3 impact.
- RAN2: Procedure for system information modification notification and acquisition that follows.
- RAN2: Define necessary RRC configurations and associated behaviours.
- RAN4: If deemed necessary, a new requirement for intra-frequency cell reselection measurement, which becomes ”tune-way” based with respect to the frequency the UE is monitoring paging.

10 – MediaTek Inc.

Proposal 1: We do not agree

P1 is already true for scheme 1, so P1 is only needed to address scheme 2.

If scheme 2 is to be pursued, P1 defeats the purpose of introducing the NCD-SSB in the first place which was to avoid retuning. Relying on the CD-SSB for RRM will force retuning to always take place for measurements, resulting in additional power consumption in devices which cannot afford to consume more power.

If workload is the concern, it is better to exclude scheme 2 altogether from Rel-17 as in P2. It is our view that not having this feature is better than having a poorly designed one.

Proposal 2: We agree

We agree with this proposal to adopt scheme 1 and drop scheme 2 to reduce RAN2 and RAN4 workload.

11 – China Mobile Com. Corporation

For P1, we share similar view with Huawei that the proposal is applied to both intra-frequency and inter-frequency.

For P2, scheme 1 can be adopted in R17 without involve additional workload for RAN2 and RAN4. If in the future, paging capacity is find to be a problem due to increased number of UEs, enhancement such as scheme2 can be considered in later release.

12 – VODAFONE Group Plc

We’re fine with the two proposals

13 – Intel Corporation (UK) Ltd

We copied scheme 2 here (proposed in RP-2113046):

“In this scheme, an idle/inactive RedCap UE camps on a cell associated with NCD-SSB, receives paging and performs access using the separate RedCap specific initial BWP. System information is acquired from the initial DL BWP associated with CD-SSB, e.g. upon the system information modification notification.”

We understand that the phrase used in the proposal “a cell associated with NCD-SSB” refers to scheme 2.

A similar scenario can also be applicable for RRC_CONNECTED, i.e. CD-SSB is not present within the active DL BWP. We think it should be:

A RRC_CONNECTED RedCap UE is served by a cell and the active DL BWP associated with NCD-SSB (CD-SSB is not present in the active DL BWP). For such scenario, if pagingSearchSpace is configured in active DL BWP, UE can receive paging DCI indicating PWS or SI updates, etc., and SI delivery can follow legacy mechanism (if CORESET#0 and the types 0/0A PDCCH CSS sets are not included within the active DL BWP, use dedicated RRC for SI delivery.) And the UE performs RRM/RLM based on NCD-SSB.

To our understanding, the main concern from RAN2, and the point addressed in the contribution, is the scenario involving "a cell associated with NCD-SSB" for IDLE/INACTIVE mode. The similar scenario for RRC_CONNECTED mode is not address by the contribution and we do not see the problem for that case. Therefore, we would prefer one of following ways forward:

1/ The scenario involving "a cell associated with NCD-SSB for RRC*IDLE/INACTIVE is precluded. The scenario while the scenario wherein paging search space can be configured in an active DL BWP without CD-SSB is still valid for RRC*CONNECTED;

Or

2/ Leave the discussion on Scheme 2 to RAN2 completely, and RAN2 should discuss it based on RAN1 LS

14 – vivo Mobile Communication Co.

We donot agree P1 according to the previous technique concern. Considering all other companies support it, we are fine to compromise to accept this proposal.

With this, we think we have to adopt scheme 1 directly, as in scheme 2, UEs monitoring paging on the separate initial BWP with NCD-SSB have to frequently retun to initial BWP with CD-SSB for RRM, which will increase UE power consumption.

We are a little confuse about comments like "P1 is agreeable while scheme 2 could be further discussed in RAN2", since we have similar understanding as MediaTek that P1 already defeats the purpose of introducing the NCD-SSB in idle/inactive mode.

15 – LG Electronics Inc.

P1: Support.

P2: We think WG discussion is needed perhaps based on P1 (if agreed).

16 – Ericsson LM

As WI rapporteur : As pointed out by Intel, it might be good to clarify that the discussion about dropping Scheme 2 concerns idle/inactive mode (and not necessarily connected mode).

3.4 Summary from Intermediate Round

Proposal 1 was very widely supported with just 2 companies (MediaTek and vivo) have a concern. Their concern is that is P1 is agreed and scheme 2 remains as a configuration option then this will require the retuning between paging reception and measurements for RRM (this concern is addressed if the proposal 2 is also agreed).

Several comments towards the wording of the proposal were made. These were:

1/ Clarify that the proposal also covers inter-frequency measurements as well as intra-frequency

2/ the UE monitors paging ~~in a cell~~ an initial BWP associated with CD-SSB/NCD-SSB… ” to address the concern that a cell could be associated with both a CD-SSB and an NCD-SSB.

3/ Clarify that the proposal only covers Idle/Inactive (not Connected)

Based on the feedback the moderator’s view is that this proposal will be agreed and all that remains is to conclude the final wording. All 3 wording suggestions have been included in the revised proposal below:

Moderator’s proposal 1: RAN2 should work on the assumption that the cell reselection measurements and cell ranking are performed are based on measurements on the CD-SSB, regardless of whether the UE monitors paging in an initial BWP associated with CD-SSB (scheme 1) or an initial BWP associated with NCD-SSB (scheme 2). This applies for intra- and inter-frequency measurements, and for IDLE and INACTIVE states.

Proposal 2 was very widely support with just 4 companies with any concerns. Qualcomm and Nordic Semiconductor believe that scheme 2 can be completed in Rel-17 and LG and Futurewei would prefer WG level discussion although Futurewei would be willing to accept if there is strong preference.

Based on this level of support, the moderator’s proposal is to try to take an agreement to adopt scheme 1 and drop scheme 2.

Moderator’s proposal 2:

- Scheme 1 (i.e. UE in IDLE and INACTIVE monitors paging in an initial BWP associated with CD-SSB) is adopted for further work in Rel-17.
- Scheme 2 (i.e. UE in IDLE and INACTIVE monitors paging in an initial BWP associated with NCD-SSB) is not considered further in Rel-17

3.5 Final Round

Companies are asked to comment on the proposals from the moderator in the summary from the Intermediate Round.

Feedback Form 6: RP-2113046 - Final Round

1 – MediaTek Inc.

We support Proposal 2, and object to Proposal 1.

- If Proposal 2 is agreed (i.e. Scheme 2 is not pursued), Proposal 1 is redundant as it is already true for Scheme 1.
- If Proposal 2 is not agreed (i.e. Scheme 2 is pursued), Proposal 1 defeats the purpose of introducing the NCD-SSB, i.e. to avoid retuning. This will result in increased power consumption in RedCap devices as explained in our earlier response.

It is better to not have Scheme 2, rather than having a badly designed version of Scheme 2. From our perspective, Proposal 2 is the only acceptable proposal.

2 – QUALCOMM JAPAN LLC.

P2: We would like to request RAN to confirm that release-18 discussion on scheme 2 is not precluded. Unfortunately there is no immediate release-18 WI to work on it (RedCap enhancement starts as an SI). We understand companies are mostly concerned about work load rather than the feasibility of the solution.

P1: Our intention in RP-213046 was to try to accommodate both scheme 1 and scheme 2 in a way that RAN2/4 work is manageable in the last quarter. (OK, I realize it is called a badly designed solution by one company ;-))

The current P1 text would not provide much value now without scheme 2. At least it is strange to have scheme 2 in it if P2 is agreed. It should be sufficiently clear to everyone that the frequency of CD-SSB layer is used for cell reselection in case of scheme 1.

3 – NTT DOCOMO INC.

P2: We support the proposal and are open to further discuss scheme 2 in Rel-18

P1: If P2 is agreed, P1 is not necessary to be agreed

4 – DENSO CORPORATION

Sorry for missing to participate in the intermediate round... On Proposal 1, we incline to the view from MediaTek and Qualcomm. If Scheme 2 is out from Rel-18, there is no point to agree on Proposal 1, since which is somehow obvious in accordance with the existing mechanism.

We understand that there was a history in RAN1 why Scheme 2 was developped. RAN1 considered the option that the same PUCCH resource can be used for both RedCap UEs and non-RedCap UEs. So, the initial UL BWP for RedCap needs to be located at the carrier edge. It works for (HD-)FDD, but for TDD, the center frequency has to be the same for the initial DL BWP and initial UL BWP. So, a separate initial DL BWP can be configured for RedCap UEs, as well as UL. If CD-SSB/CORESET# is not confined with the separate initial DL BWP, Scheme 2 is considered, whilst it can work even without NCD-SSB.

We're aware that Scheme 2 is currently an working assumption in RAN1 and whether it is acceptable from RAN2 and RAN4 perspectives is to be discussed at the next WG meeting, as asked by RAN1 LS (R1-2112802). We're also O.K to leave it to the WG level discussion. If it cannot be discussed due to the workload in the next quarter, then Scheme 2 is likely to be postponed to Rel-18.

5 – CATT

We support moderator's proposal 2 and agree with the comments above that if P2 is agreed then P1 is not needed.

6 – Huawei Technologies France

We understand P1 is technically right, but we also understand if P2 is agreed, P1 is the natural consequence and of course no need to mention scheme 2 again. Therefore we suggest we agree P2, if companies want to make it clear, we can say that we agree P2 with the understanding that the cell reselection measurements and cell ranking are performed based on measurements on the CD-SSB for intra- and inter-frequency cases for idle and inactive modes.

Whether scheme 2 can be considered in future release is a separate discussion and we can focus on what to be pursued in Rel-17 in this thread.

7 – Samsung Electronics Co.

We also support P2 as indicated earlier, and share the view with many others that P1 would not be needed if P2 is agreed. We also think that this thread can be focused on the scope of Rel-17.

@DENSO
(merely to share our understanding on the history in RAN1,) center frequency alignment issue is not related to scheme 2 (which is about paging on a separate initial BWP with NCD-SSB), but mainly related with RACH, for which, RAN1 already decided to support RACH on a separate initial BWP without NCD-SSB.

8 – Futurewei Technologies

We can support P2 with the understanding that P1 would not be needed.

9 – Intel Corporation (UK) Ltd

We are fine with current proposal 1 and proposal 2 updated by Moderator considering it has been clarified that there is no impact on the discussion for RRC_CONNECTED state, and it can also reduce the work load in RAN2.

10 – vivo Mobile Communication Co.

Our first preference is to reject both moderator proposal 1 and 2, leaving it to WG to decide.

We can accept to agree on moderator proposal 2 only, as in such case proposal 1 is the default, or refining proposal 2 to include proposal 1 as below:

Scheme 1 (i.e. UE in IDLE and INACTIVE monitors paging and performs measurement for cell (re-)selection in an initial BWP associated with CD-SSB) is adopted for further work in Rel-17.

We cannot accept moderator proposal 1 if moderator proposal 2 is not agreed.

11 – China Mobile Com. Corporation

We support P2 and agree with others that P1 may not be needed when P2 is adopted. Whether scheme2 can be considered in further release depends on implement requirement in the future.

12 – VODAFONE Group Plc

We support Proposal 2. We also agree that Proposal 1 is not needed if scheme 2 is dropped and scheme 1 adopted.

13 – Nordic Semiconductor ASA

P1: OK

P2: Not OK : It seems that Moderator only counts votes but not addressing technical comments ;)

- RAN2 had no issue with supporting paging on NCD-SSB, it had issue with RRM measurements and re-selection/selection, this is addressed with P1
- There is no work left for RAN1 regarding Scheme 2
- RAN2/4 has still Q1 22 for regular work item phase

Therefore, **based on what technical grounds we are dropping Scheme 2? There is clearly no feasibility issue to revert Working Assumption. If workload is an issue (which we disagree) then this shall be postponed to R18 and this should be capture in meeting notes.**

Regarding MTK comment on retuning, it has been RAN1 understanding (based on last meeting discussion) that UE does not need to do measurements every DRX cycle, and thus retuning is not that frequent. Moreover, for inter-frequency measurements this is done already in legacy.

14 – Ericsson LM

There seems to be a small typo in P1: ”...are performed are based...”.

Otherwise, we support P2 and have similar thinking as other companies that P1 is not really needed in this case.

15 – Nokia France

We support proposals 1 and 2 together, and we do not see any inconsistency between them.

3.6 Summary from Final Round

MediaTek and Vivo do to agree to only Proposal 1 as they consider that Proposal 1 combined with scheme 2 is a unacceptable due to increased UE power consumption associated to retuning between paging reception and RRM measurements.

Qualcomm explained that the original intention with their proposal in RP-213046 was to try to find an approach that could accommodate both scheme 1 and scheme 2. If scheme 2 is not part of Rel-17 they would like to have the opportunity to discuss it in Rel-18. DCM would also be open to discuss scheme 2 on Rel-18. The moderator thinks that this Rel-18 aspect cannot be consider within this email discussion.

Nordic semiconductor would be OK with proposal 1 but both proposal 2 and question the technical grounds for not supporting scheme 2.

Several companies comment that if proposal 2 is agreed then proposal 1 becomes redundant and hence suggest to only agree proposal 2, possibly with some rewording to merge in aspects from proposal 1. The moderator agrees with the comments that if proposal 2 is agreed then proposal 1 becomes somewhat redundant, but this is frequently the nature of step by step decision making within 3GPP and there does not seem to be any contradiction between the proposals. In the moderator’s view it is still worthwhile to try to agree both of the proposals.

Given that only one company has serious concerns to agree proposal 2 then the proposed conclusion is that both proposals are agreed together. This will be proposed to be discussed in the Thursday or Friday GTW.

Moderator’s proposals (to be agreed together):

1. RAN2 should work on the assumption that the cell reselection measurements and cell ranking is performed are based on measurements on the CD-SSB, regardless of whether the UE monitors paging in an initial BWP associated with CD-SSB (scheme 1) or an initial BWP associated with NCD-SSB (scheme 2). This applies for intra- and inter-frequency measurements, and for IDLE and INACTIVE states.
2. Scheme 1 (i.e. UE in IDLE and INACTIVE monitors paging in an initial BWP associated with CD-SSB) is adopted for further work in Rel-17. Scheme 2 (i.e. UE in IDLE and INACTIVE monitors paging in an initial BWP associated with NCD-SSB) is not considered further in Rel-17

4 Redcap frequency bands (RP-213427)

RP-213427 discusses the topic of frequency bands applicable for RedCap UEs, revisiting the discussion [93e-16-RedCap] from RAN#93e. The document makes the following proposal:

Proposal: Go one step further than the RAN#93e agreement and clarify that the following bands/features will be clearly identifiable in the specs as not applicable for RedCap UE in Rel-17:

- Redcap bands supporting V2X/PC5 on n47,
- Redcap operation in unlicensed band,
- Redcap bands supporting SUL.

Moderator's update following Monday GTW discussion:

Based on the feedback provided during the Monday GTW discussion, it seems that the proposal in RP-213427 is not going to be agreeable as proposed but the moderator would like collect feedback on 2 additional questions.

Question 1: Should RAN#94e make any restatement or clarification of the agreement from RAN#93e in order to ensure clarity for RAN4 and ensure they do not spend time discussing this topic?

Towards the end of the discussion it was questioned whether the RAN4 specifications need to have a list or table of RedCap supported bands. The RAN4 Chair expressed the view that such a list/table is not required and not having it could help reduce specification maintenance.

Question 2: Is there a necessity for RAN4 specifications to include a list/table of RedCap bands?

4.1 Initial Round

Companies are invited to comment on RP-2113427

Feedback Form 7: RP-2113427 - Initial Round

1 – Nordic Semiconductor ASA No strong view, but considering work-load in RAN4, proposal sounds reasonable.
2 – Ericsson LM We support the moderator's proposal. Otherwise we are concern that RAN4 will spend too much time in discussing what needs to be done in RAN4 for these bands/features. This will also further clarify the agreement at RAN#93e. Having no requirements in RAN4 does not mean that the feature is precluded since there is RAN2 capability signaling etc., which can still allow the UE to indicate support for these bands/features. However, requirements to be met are up to the UE implementation.

3 – Intel Corporation (UK) Ltd

Moderator's comment:

Following discussion during the Monday GTW, an update to this NWM document has been made to include 2 additional questions. Please read the "**Moderator's update following Monday GTW discussion** " above and provide your feedback to the 2 additional questions.

4 – Deutsche Telekom AG

As also indicated in the GTW today: nothing of this can be agreed and we though that the RAN-93e agreement on this was very clear.

We also have a problem, that such discussions come to the RAN plenary again, while having been concluded already.

5 – Ericsson LM

As WI rapporteur : Some comments argue that nothing to be agreed beyond what was agreed in RAN#93-e. Still, in order to minimize the time spent in RAN4 on this issue, it would be good to ensure now that everyone is on the same page. Currently is seems to be unclear whether the bands in question should be included or excluded in the RAN4 specifications for RedCap.

6 – Futurewei Technologies

We support the RAN4 Chair's comment in today's GTW that the list/table of RedCap bands is not necessary

7 – Ericsson LM

Our responses to the two questions from moderator are as follows:

[Answer to Q1]: We think clarification of the agreement from RAN#93e will help RAN4 discussion. A simple suggestion is to clearly state that none of the bands/features will be specified in RAN4 specs in R17. The reason is that all of them require some level of specification update in RAN4.

[Answer to Q2]: This is actually quite a technical question which should be decided by RAN4 experts.

In our view defining redcap bands in new tables is the cleanest approach. In this case bands which are not supported for redcap should be excluded from the new table. This prevents any ambiguity. Another reason is that for big feature like redcap as the requirements can be different are defined in separate sections from where the bands are referred.

The alternative approach is not to define redcap in new table. This approach will leave ambiguity especially if certain bands are not supported. If RAN4 follows this approach then RAN4 has to list bands not supported for redcap in the applicability section. Secondly as stated above redcap will have new requirements including REFSENS. The REFSENS requirement always has a corresponding band number,. So even in the second approach (w/o new table) indirectly the redcap bands have to be included in some of the sections containing redcap requirements.

Finally, TS 38.133 (section 3.5) also defines band groups for RRM requirements. Each band group lists the band numbers. For redcap there will be new band groups since requirements will be different.

In summary it will be impossible to skip band numbers for redcap.

8 – Guangdong OPPO Mobile Telecom.

Question 1: Clarify whether these bands could be supported in Redcap is helpful to RAN4 to avoid different understanding as already happened in last RAN4 and this RAN meeting.

Question 2: No strong view as long as is clear which bands are supported.

9 – vivo Mobile Communication Co.

For Q1: We think the agreement in RAN#93 is clear enough, which means that there is no need to have additional specification impact/change for RedCap UE supporting V2X/PC5 on n47, NR-U and SUL. Considering the legacy capability would be also included for RedCap, the UE is also allowed to indicate supporting these features with the same requirements as non-RedCap UEs.

For Q2: We have some sympathy with RAN4 chair, the table of band for RedCap specific is not needed to be defined in RAN4 spec. But we think this could be left to RAN4 to make decision.

10 – QUALCOMM JAPAN LLC.

Q1: We do not see the need of further clarification.

Q2: This can be left to RAN4. They may or may not find a good reason to introduce new list/table.

11 – Samsung Electronics Co.

Q1: We think decision in RAN #93 is clear but also no harm to further clarify the RAN4 scope as proposed in Ericsson's paper. At least, we did not see any different view from Ericsson's further clarifications

Q2: We are open to discuss on how to support RedCap in RAN4

12 – Huawei Technologies France

Q1: We think the agreement in RAN#93e is clear enough, no need to have further clarification.

Q2: How to implement the CR to complete the RedCap requirements can be decided by RAN4. Table of band list may not be necessary. Whether supporting a feature depends on a band table, that sounds unreasonable, since that is determined by UE implementation rather than a band notation in the spec.

13 – Xiaomi Communications

Q1: According to the discussion situation in RAN4, it seems different companies have different understanding. We think more clear clarification could facilitate RAN4's discussion

Q2: No strong view. It can be further discussed in RAN4

14 – ZTE Wistron Telecom AB

Q1: Further clarification could avoid different understandings on the agreements, thus would be helpful for RAN4's job, but if no further clarification could be agreed, we are fine to stay with the current agreements.

Q2: This is a pure RAN4 specific technical issue which can be completely left to RAN4 discussion, and we don't see the need to make a decision here at the moment.

15 – Intel Corporation (UK) Ltd

Q1: The last plenary guidance is quite clear. However, given the last RAN4 meeting discussion, we think that additional clarifications can still be helpful to avoid any RAN4 discussion. For instance, the following principle can be suggested "*RAN4 specs will not include any statement to explicitly preclude/include*

RedCap UEs also supporting V2X/PC5 on n47, RedCap UEs operating in unlicensed bands and RedCap UEs supporting SUL. No additional RAN4 discussion expected on the specification support for these use cases."

Q2: We are open to have further discussion. In case a list of RedCap bands is decided to be defined, then it needs to be defined in a manner not to preclude UE implementations supporting RedCap operation in the other bands (e.g. "*RedCap minimum requirements are defined for bands X, Y, ..., and support in other bands is not precluded*"). In the latter case specification will not preclude support of RedCap for specific bands, while spec impact will be avoided.

16 – Nokia France

Q1: A clear instruction should be given that no time at all should be spent on discussing these three aspects in RAN4.

Q2: We should be careful not to spend too much time discussing a table of bands in RAN4.

17 – MediaTek Inc.

A1: It was agreed for 3GPP not to do any work on this, and we believe that the outcome from last plenary is clear enough. However we do have sympathy for the concerns raised, given that this was never discussed in the scope of RedCap and came very late.

A2: Probably could leave that to RAN4.

4.2 Summary from Initial Round

For convenience, the agreement from RAN#93e (RP-212634) is restated below:

- In Rel-17, there will be no work on any RedCap specific specification update for any of the following:
  - RedCap UEs also supporting V2X/PC5 on n47
  - RedCap UEs operating in unlicensed bands
  - RedCap UEs supporting SUL
- The specification will not contain any explicit restriction to prevent implementation of RedCap UEs with these features.
- Note: The consequence of this agreement would be:
  - If any spec change/addition is found necessary in order to enable one of the options above then it will not happen in Rel-17.

The majority of companies believe that the agreement from RAN#93e was clear. It is also the moderator's opinion that the RAN#93 agreement was clear and it should have been sufficient to prevent companies contributing on these topics into RAN4. At same time, it is clear that something went wrong causing companies to contribute and RAN4 time to be wasted, and some of the companies who believe the agreement was clear are open to further clarification. Based on this the following proposal is made:

Moderator's proposal 1:

- Agreement from RAN#93e (RP-212634) remains an agreement.

– No RAN4 time to be spent discussing the 3 cases in Rel-17

Regarding question 2, the majority of companies seem to think that it is better that this is discussed in RAN4. Ericsson expressed the view that it will be ”impossible to skip band numbers for redcap”, and Intel expressed the view that even if a list/table is created then it can be carefully worded ”not to preclude UE implementations supporting RedCap operation in the other bands” (i.e. wording must be found that does not contradict the second major bullet of the agreement from RAN#93e). Based on this feedback, the moderator’s proposal is not to continue discussion of this question in RAN#94e but to leave it to RAN4

Moderator’s proposal 2: No further discussion of Question 2 (necessity for RAN4 specifications to include a list/table of RedCap bands) in RAN#94e. Discussion to be handled by RAN4.

4.3 Intermediate Round

Feedback Form 8: RP-2113427 - Intermediate Round

1 – Futurewei Technologies P1: It is not necessary to make an agreement for an existing agreement. P2: ok with moderator’s proposal#2.
2 – NTT DOCOMO INC. P1: As long as companies have common understanding that no RAN4 time to be spent discussing the 3 cases in Rel-17 based on the agreement in RAN#93e, we don’t think new agreement is necessary P2: Support
3 – CATT P1: We think the original agreement in RAN#93-e is clear and enough. P2: Fine to leave it to RAN4.
4 – Huawei Technologies France P1: We agree with the observations by moderator. The previous agreement in RAN#93e is clear enough. P2: Ok with moderator’s proposal.
5 – QUALCOMM JAPAN LLC. Support both P1 and P2.
6 – Samsung Electronics Co. We support moderator’s proposals
7 – China Mobile Com. Corporation Support proposal 1 and proposal 2.

8 – Ericsson LM We also support proposals 1 and 2. This will help RAN4 to progress the discussion in RF group.
9 – Intel Corporation (UK) Ltd We support moderator's proposal
10 – VODAFONE Group Plc We're fine with the two proposals
11 – ZTE Wistron Telecom AB We are fine with P1 and P2.
12 – vivo Mobile Communication Co. We support observation and proposals from moderator.

4.4 Summary from Intermediate Round

Regarding proposal 1, the majority of companies support the proposal with 4 companies taking the view that the previous agreed is clear enough and nothing additional needs to be captured. As the moderator commented in the summary to the Initial Round, the RAN#93e agreement should have been clear enough but the experience in RAN4 suggested otherwise. Therefore the proposal is to conclude this discussion as per proposal 1. Even those companies with the view that the RAN#93e agreement was clear should find this acceptable as there is no substantive change to what was previously agreed. The moderator also trusts that, following this discussion, companies will respect the agreement when making their submissions to the next RAN4.

Moderator's proposal 1:

- Agreement from RAN#93e (RP-212634) remains an agreement.
- No RAN4 time to be spent discussing the 3 cases in Rel-17

Regarding proposal 2 from the previous round, no concerns were raised so this topic (necessity for RAN4 specifications to include a list/table of RedCap bands) is now left to RAN4.

4.5 Final Round

Companies may comment on the moderator proposal from the summary from the Intermediate Round

Feedback Form 9: RP-2113427 - Intermediate Round

1 – NTT DOCOMO INC. OK with Proposal 1
2 – Huawei Technologies France

Thanks moderator for the proposal. To make it clear, it would be better to make minor change for the second bullet, “discussing“->”clarifying” as the proposal is rooted from question 1 for ”make any restatement or clarification of the agreement”.
3 – Futurewei Technologies Ok with proposal
4 – vivo Mobile Communication Co. We are fine with the proposal.
5 – Samsung Electronics Co. OK with moderator proposal
6 – Intel Corporation (UK) Ltd We support moderator’s proposal.
7 – CATT Thanks for moderator’s clarification. We are OK with the proposal.
8 – ZTE Wistron Telecom AB Ok with Moderator’s Proposal 1.
9 – VODAFONE Group Plc We’re fine with the proposal
10 – Ericsson LM We are fine with the moderator’s proposal. We prefer original wording from the moderator.
11 – Nokia France We support the Moderator’s proposal, keeping the word ”discussing”, which includes clarifying, restating or anything else. (We do not want some comment to come in RAN4 that discussion is permitted if it is not clarifying!)

4.6 Summary from Final Round

Huawei proposed to change the word ’discussing’ to ’clarifying’. Based on the majority comments from the earlier rounds the moderator’s proposal was that RAN4 would not spend time discussing the 3 cases covered by the RAN#93e agreement. It is also understood by the moderator this this was the original intention of the RAN#93e agreement. To change the wording to ’clarifying’ would seem to leave a big gap whereby RAN4 could still spend of lot of time discussing various aspects of the 3 proposals.

All other companies found the moderator’s proposal acceptable and hence the moderator suggests that this is taken as the conclusion of this discussion. Note that a clarification ”(covered by the RAN#93e agreement)” has been added to make it easier to understand the agreement if read out of the context of this report.

Conclusion for RP-213427 on RedCap Frequency Bands:

- Agreement from RAN#93e (RP-212634) remains an agreement.
- No RAN4 time to be spent discussing the 3 cases (covered by the RAN#93e agreement) in Rel-17

5 Summary

This section provides a summary of all conclusions from earlier sections of the document.

Conclusions on RedCap Status Report:

- RP-212914 is noted
- Status Report in RP-212802 is noted

Conclusion for RP-213427 on RedCap Frequency Bands:

- Agreement from RAN#93e (RP-212634) remains an agreement.
- No RAN4 time to be spent discussing the 3 cases (covered by the RAN#93e agreement) in Rel-17

Moderator's proposals for RP-213046 on RedCap Idle mode operation (proposal to be agreed together):

1. RAN2 should work on the assumption that the cell reselection measurements and cell ranking is performed are based on measurements on the CD-SSB, regardless of whether the UE monitors paging in an initial BWP associated with CD-SSB (scheme 1) or an initial BWP associated with NCD-SSB (scheme 2). This applies for intra- and inter-frequency measurements, and for IDLE and INACTIVE states.
2. Scheme 1 (i.e. UE in IDLE and INACTIVE monitors paging in an initial BWP associated with CD-SSB) is adopted for further work in Rel-17. Scheme 2 (i.e. UE in IDLE and INACTIVE monitors paging in an initial BWP associated with NCD-SSB) is not considered further in Rel-17