[98e-19-R18-eRedCap] - Version 0.0.11

RAN

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3GPP TSG RAN Meeting #98-e RP-223551

Electronic Meeting, December 12-16, 2022

Title: Moderator's summary for discussion [98e-19-R18-eRedCap]

Agenda item: 9.3.1.7

Source: Moderator (RAN1 VC, CMCC)

Document for: Discussion&Decision

1 Introduction

WID[1] indicates that the following aspects are to be checked in RAN#98e:

Table 1:

• Whether UE peak data rate reduction for UE is limited only with UE BB bandwidth reduction or standalone • Whether or not/how a separate early indication can be supported • Other restrictions of the WI (e.g., connectivity restrictions, band, etc.)

From the contributions [2-20], without any doubts, above three pending issues are in the spotlight, which can be epitomized as below for those 3 pending issues:

- **Issue 1. UE peak rate reduction as a standalone feature:**
  - Yes: Apple, CMCC, Intel, Sierra, Qualcomm
  - No: Futurewei, Huawei, Nokia, Nordic, Spreadtrum, Xiaomi, ZTE
  - No for Rel-18 but maybe for Rel-17: CATT
  - UE BB bandwidth reduction and UE peak rate reduction not independent features: Ericsson
  - Also open to removing the UE peak rate reduction objective: Futurewei
- **Issue 2. Additional separate early indication:**

- Yes, already in Msg1: Apple, DCM
- Yes, both Msg1 and Msg3: Futurewei, Huawei, Qualcomm
- Yes, at least Msg3, maybe also Msg1: Ericsson, Nokia, Nordic
- Yes, Msg3 but not Msg1: CATT, Intel, MediaTek
- Yes, Msg1 and/or Msg3: Xiaomi, ZTE
- Maybe Msg3 but not Msg1: CMCC, Vivo
- Decide in WG: Ericsson, Sierra

- **Issue 3. Other restrictions of the WI (e.g., connectivity restrictions, band, etc.):**
  - At least restrictions of no CA and DC: DCM
  - Inheriting Rel-17 restrictions: Nordic, Xiaomi

Besides these 3 pending issues described in the WID, another issue about target peak data rate is brought up in this meeting after it emerged in RAN1#111, where 10Mbps was taken as working assumption according to the value used in the justification when companies proposed to replace existing 10Mbps with 6Mbps.

Table 2:

Agreement
• **The minimum DL peak rate target (for FD-FDD) is [10] Mbps based on peak data rate calculation according to 38.306.** • **The same value for X is used for DL and UL**

- **Issue 4. Target (downlink) peak data rate:**
  - 6 Mbps: DCM, Nordic, Spreadtrum
  - 6-10 Mbps: Ericsson, ZTE
  - 10 Mbps: CATT, Nokia

Moreover, several other issues are raised by companies, including

- **Miscellaneous**
  - M-1: Specify an SI indication to indicate whether a UE can camp on the cell/frequency or not: Sierra
  - M-2: UE complexity (peak rate) reduction in FR2: Ericsson, Spreadtrum, opposed by Futurewei
  - M-3: Support NCD-SSB for RedCap UEs in idle/inactive state: Vivo
  - M-4: Make UE capability filtering by the UE optional: Qualcomm

- M-5: Specify support for lower UE power class: Vivo
- M-6: An additional separate initial BWP is not needed: Ericsson (can be decided in WG)
- M-7: Clarification on the objective for UE BB bandwidth reduction: CATT
- M-8: RAN paging only for Enhanced eDRX: xiaomi

2 Views collection and Proposals (Initial Round)

2.1 Issue 1 - UE peak rate reduction as a standalone feature

The main concern on standalone UE peak rate is market fragment resulted from multiple R18 eRedcap types, e.g., one of BB bandwidth reduction, one of standalone UE peak rate only.

From the proposals on this issue, **Intel states "Standalone PR1, if supported, should not result in more than one new UE type for Rel-18 eRedCap (Rel-18 eRedCap UE of standalone PR1 is same as Rel-17 RedCap UE except more relaxed UE processing capability, in this sense, Rel-18 eRedCap UE of standalone PR1 may be considered the same UE type as Rel-17 RedCap UE "**, it looks a good clarification of what the standalone UE peak rate looks like when it is supported, since even standalone PR1 is supported, it is still at least an add-on of Rel-17 Redcap, even not necessarily an add-on of Rel-18 eRedcap. In addition, CATT's proposal **"Standalone peak data rate reduction may be considered as a TEI for Rel-17 RedCap"** also provides the same understanding. Based on the proposals, and moderator's understanding on the status (add-on is more of optional than of mandatory based on discussion till now) that the UE type is not defined purely based on UE's peak rate, moderator would like to propose

Proposal 2.1-1:

- PR1 is supported as an optional add-on for both Rel-17 Redcap and Rel-18 eRedcap
  - R17 RedCap + PR1 should be of the single R17 UE type
  - R18 + BW3/PR3 + PR1 should be of the single R18 UE type
- Note: optional means add-on is not necessarily supported by Redcap capable UE.

Feedback Form 1: Could we accept Propsoal 2.1-1?

1 – CATT We are fine to go with this proposal 2.1-1. We are open to consider 'Rel-17 RedCap + PR1' , either as Rel-17 RedCap UE type or Rel-18 RedCap UE type.
2 – Spreadtrum Communications No. - The essence of this issue is low-end market fragmentation. Take the PR1 as an add-on for R17 RedCap will introduce another kind of low-end RedCap, then, there are two type of low-end RedCap in the market. The market fragmentation issue is still exist.

- In addition, take the PR1 as an add-on for R17 is an old story, several companies proposed to relax the constraint for R17 RedCap in the later stage of R17, but RAN1/2 cannot make consensus (R1-2110639). For now, we already introduced R18 solutions, why we need to reconsider this abandoned solution again at this stage?

3 – vivo Mobile Communication Co.

In our view, the Rel-18 eRedCap WI shall not touch Rel-17 UE capabilities. If PR1 can be supported standalone, it can be supported by Rel-18 eRedCap UE without BW3/PR3. PR1 can also be supported as add-on for Rel-18 eRedCap UEs supporting BW3/PR3.

4 – Nordic Semiconductor ASA

@VIVO, R17 RedCap UE + PR1 could be still R18, but it would NOT be able to use R18 separate early identification.

We agree with SPRD that support R17 RedCap UE + PR1 has been discussed in RAN1, but did not collect sufficient support. Same situation as now.

Our main concern to P2.1-1 is that R17 RedCap + PR1 will fragment RedCap market. Here, it should be noted, that chipset implementing only R17 RedCap + PR1, would be able to operate under R18 RedCap BW3/PR3 scheduling. Therefore, even if 3GPP would not support explicitly R17 RedCap + PR1, chipset may implement only R17 RedCap + PR1.

Regarding DUAL RAT devices, it is very unclear, whether any processing blocks can be shared between NR and LTE other than FFT and perhaps demodulator. The processing timeline of NR is very different to that of LTE, and requires more frequent interrupts, causing processing overhead. Therefore, the processing requirements for NR demodulator are higher than LTE demodulator. Channel estimator for NR DMRS and LTE CRS would be different.

Finally, even if R17 RedCap + PR1 could be regarded as the same UE TYPE with R17 RedCap, it will require own/dedicated scheduler, not to waste MNO's spectral efficiency. Scheduler scheduling less PRBs rather than bluntly reducing modulation order and coding rate. This in fact having synergy with BW3/PR3 anyway.

5 – NTT DOCOMO INC.

We are fine with the Proposal.

6 – Huawei Tech.(UK) Co.. Ltd

First, there is no scope in the WI to consider the first bullet, which seems like a late-TEI-17.

For the Rel-18 proposal, there is much disagreement in the papers on whether this generates a new UE type, beyond the PR3/BW3 UE that RAN1 already agreed. If it does, that is inconsistent with the already-agreed WID text to aim for up to one new UE type, and that applies to Rel-18 as well as the proposal to back-port

to Rel-17, where the WID has a similar constraint. The first step of this discussion should be to see if there is consensus among all companies that the Rel-18 proposal does not generate a new UE type. If it is agreed by all that this is not a UE type, then the technical merits could be discussed.

A UE with PR3+PR1 has different PDSCH/PUSCH capability than PR1 only, resulting in different expectations of how its transmissions will be scheduled, i.e. to be in 5 MHz or to process only 5 MHz (of certain transmissions), and it also has different processing timelines. The network implementation has to account for these differences, to avoid imposing the tightest restriction on all the UEs. These two UEs would both be addressing the same market segments, and both be marketed as RedCap UEs, yet have different performance, and different needs from the network. They constitute two different UE types, and this is out of alignment to the WID's aim.

On the technical merits, the complexity saving of such a PR1-only UE is minimal (<5%), and in our view not worth the effort.

7 – Ericsson LM

No. We do not want to change Rel-17 RedCap specifications at this late stage. We prefer that the simplest Rel-18 eRedCap UE implements UE BB bandwidth reduction option BW3/PR3 as well as UE peak rate reduction option PR1. As an alternative, we are fine with removing the PR1 objective altogether from the Rel-18 WI scope.

8 – Classon Consulting

[for FUTUREWEI] No. This was already considered and dismissed for Rel-17. The single UE type for Rel-18 is (currently) BW3/PR3+PR1, do not agree to introduce other types in Rel-18. As in our paper, we are also OK to remove PR1 altogether.

9 – Sierra Wireless. S.A.

WRT the proposal:

I complement the FL's creative here. The proposal is acceptable to us but a strait forward approach is preferable. I don't see any issue with completing this within the Rel18 scope as 3GPP adds new Rel 18 optional features to older (e.g. Rel 15-17) UE types all the time.

WRT the low PR1 cost savings argument:

If the argument is that PR1 does not provide enough cost savings going from 85Mbps to 10Mbps then it certainly should NOT be combined with BW3/PR3 to go from 12 to 10Mbps. Removing PR1 entirely could be a compromise we accept.

WRT to single UE type or not discussion:

Since the peak data rate (e.g. 10mbps) and latency are the same for a PR1 or BW3/PR3 implementation, from a customer perspective, **they are the same** and thus a chipset/module maker would chose only ONE of these implementations to commercialize, not both thus there is no market fragmentation. Also, since PR1 is much closer in design to a Rel17 Redcap, more of the Rel17 Redcap design can be re-used which reduces NRE which will result in a cheaper UE. PR1 is also much easier to implement in the network. From a network perspective, these devices are treated differently but in Rel 17 with the optional HD-FDD and modulation options, the infra treats these differently as well but these were NOT considered different

UE types by RAN/RAN1 so we should be consistent. What is certain is that a PR1 device will not need a separate Msg1 early indication and may not even need a separate msg 3 early indication - this is future proof a PR1 implementation is not a separate UE type.

10 – Meta Ireland

We prefer not to change the Rel-17. The additional scheme will be reflected in Rel-18 eRedcap UE with BW3/PR3 at least.

11 – Qualcomm Incorporated

We are fine with the proposal.

If companies cannot agree to make the change in Rel-17, then it should be done in Rel-18.

A few additional comments:

- We find the arguments regarding introducing "new UE types" somewhat puzzling. I wonder if the same companies bringing up "UE types" ever counted how many different values the existing scaling factors can be set to, i.e. how many UE types we would have already if we wanted to use their definition of what "UE type" is.
- There is no implementation burden on the network (if we apply the change in Rel-18). If the network wants to treat these UEs as if they were BW3, it can certainly do so.
- Regarding Nordic's comment on early indication for 10Mbits/s devices, such early indication is not needed. The messages size before capability exchange is limited to about 3kbits, which the 10Mbps/s device will support in both 15kHz SCS (10kbits) and 30kHz (5kbits). This can be required for smaller than 20MHz as well, if desired.
- Responding to another comment by Nordic regarding the common blocks between LTE and NR, the tone processing/demodulation, among others, is common. This commonality is lost if the UE has to implement 4 times the BW compared to what the standard designed for.

Lastly, when this discussion started, half the companies really wanted RF BW reduction, the other half wanted no reduction at all. Then we ended up with a compromise of BW reduction. But somehow, now it seems like everyone thinks BW reduction is the greatest solution, although no one (or very few) wanted it to begin with. Somehow, now, many companies say all eRedCap UEs must have reduced BW, which we don't understand.

12 – Apple Poland Sp. z.o.o.

We can accept moderator's proposal.

Regarding the concern on changing the Rel-17 spec, we do not understand the point. With the moderator proposal, the UE will indicate the following: 'Rel-17 Redcap' as what it is + Rel-18 'PR1'. This is how the ASN.1 code design in 3GPP protocol since in LTE and reused in NR, i.e., a UE indicates supporting features on a per release basis. For instance, A Rel-16 UE indicates what Rel-15 feature it supports + What Rel-16 features it supports. Nothing special here.

On the argument of number of 'UE Types', it is quite puzzling for us. Since Rel-15, the restriction is put on the combination of three parameters 'v*Q*f'. The scaling factor is indicated by RRC parameter 'scalingFactor' with four candidate values 1,0.8, 0.75 and 0.4. In addition to the 'scaling factor', a UE is able to select other modulation parameters supportedModulationOrderDL and supportedModulationOrderUL for DL and UL for peak data rate indication as long as the 'no smaller than 4' restriction is NOT violated. The supported modulation orders include Pi/2-BPSK, BPSK,16QAM, 64QAM and 256QAM, which correspond to 'Q=1,2,4,6,8'. Even in Rel-15 network, different UEs already indicate different 'v*Q*f' values, e.g., 4, 4.8, 6, 6.4, 8 etc. and have been handled by network. Do we count them as different eMBB UE types? Why it suddenly becomes seriously concerns for this discussion. Note that, even with 'BW3/PR3+PR1', different 'v*Q*f' values can be indicated by Rel-18 eRedcap UEs. Does it violate the rule of 'a single UE type for Rel-18' or not? If not, why 'PR1 only' violates the rule?

13 – ZTE Corporation

If R17 RedCap + PR1 should be of the single R17 UE type, it is meaningless to introduce Rel-18 RedCap UE based on PR3, since they have the quite limited market gap. Moreover, it does not make sense to change the Rel-17 specification based on standalone PR1 as part of Rel-18 WI scope. Therefore, we'd better not to support standalone PR1 currently. Also, we are OK to remove PR1.

14 – Guangdong OPPO Mobile Telecom.

We prefer to have an add on feature to the Rel-18 RedCap UE. To our understanding, it can be optional to Rel-18 by make it difficult to be with Rel-17 as this is a frozen release. Plus, the target date rat of Rel-17 is quite different to this add on and make it not very needed.

In overall, we want to minimized the combinations(UE types) of new RedCap capabilities.

15 – New H3C Technologies Co.

No. we don't hope tp change Rel-17 at this stage. For rel-18, this motivation of introducing UE type is n't clear to us.

16 – MediaTek Inc.

We cannot support this proposal because it introduces further RedCap market fragmentation. Given the fact that the second bullet has been agreed by RAN1, we don't support the first sub-bullet.

The detailed reasoning is listed below.

1. UE type: Are both regarded as R18 RedCap UEs? We think so because both support target peak data rates of only 10Mbps and should not be considered as Rel-17 RedCap UEs.

2. Early indication complexity (if supported): If both are supported, two sets of early indication should be considered to distinguish one capability from the other.

3. UE complexity/cost segmentation: Based on TR38.865, PR1 has about 4% complexity reduction compared with Rel-17 RedCap UEs while PR3/BW3 has about 7.5-8.5%. This hence introduces different RedCap UEs with different complexities to the market and causes further RedCap market fragmentation.

4. gNB scheduler: As pointed out by Nordic, if both are supported, gNB is supposed to schedule these two types of UEs corresponding to their capability. However, is this a realistic assumption? Will gNB in the end of the day only schedules in a way corresponding to one of them (e.g. R18 BW3/PR3 + PR1 since BW3/PR3 has more strict constraint on the number of allocated PRBs)? If this is the case, we should just specify one of them in the beginning.

17 – Samsung Electronics Polska

We'd like to further clarify where/how to handle "R17 RedCap + PR1 should be of the single R17 UE type"? In TEI R17 in RAN 2?

18 – Verizon UK Ltd

Not in favor of changing Rel-17. Whether or not it can be an Rel-18 feature, we are open minded, especially if it shares some common dimensions with LTE devices.

19 – Lenovo (Beijing) Ltd

Rel.17+PR1 was discussed in RAN1/RAN2 in R17 but was not agreed. We don't think it is good to reopen the discussion.

20 – MediaTek Inc.

Besides what we have responded, we are also fine with removing PR1 from R18 eRedCap WID (as proposed by Ericsson and Sierra as compromise).

21 – LG Electronics Inc.

No. Firstly, we think there is no need to involve Rel-17 RedCap UEs for this discussion. For add-on vs. standalone for Rel-18 eRedCap UEs, we only support the PR1 as an optional add-on to the UE BW reduction feature (BW3/PR3) for Rel-18 eRedCap UEs.

22 – Intel Belgium SA/NV

We are fine with the proposal assuming there is only one new UE type for eRedCap. As summarized by moderator, it can be considered that standalone PR1, being Rel-18 UE, belong to same UE type as Rel-17 UE.

23 – Panasonic Holdings Corporation

If Rel-17 is modified, it should be TEI and not this WI.

For Rel-18, to define both "R18 + BW3/PR3 + PR1" and " R18 + PR1" i.e. only the number of PRBs limitation is relaxed but the remaining are exactly same can be defined. The random access procedure should be same as "R18 + BW3/PR3 + PR1". Only the number of PRBs for unicast PDSCH/PUSCH may be different are something compromise direction.

24 – China Mobile Com. Corporation

We support the moderator's proposal.

According to the TR, it can be seen that the cost reduction gain gap between PR1 and PR3 is not large, however, PR1 is more simple to implement for network due to the following reasons. First is there is no need to consider scheduling restriction for R18 RedCap UEs before RRC connection, gNB complexity can be reduced. And the second is no additional spec impact for PR1 as standalone solution compares to add on way. And the moderator's proposal is good compromise to avoid the UE type segment.

25 – VODAFONE Group Plc

We agree with Huawei's comments in regards to reaching a consensus whether having PR1 as a standalone technique will generate a new UE type and/or require different handling by the network than BW3/PR3 UEs. We understand the need to have an alignment between LTE and NR to facilitate early deployments, but it is important to reach the first consensus in order to guarantee there'll be no further market fragmentation

26 – Nokia Corporation

Proposal 2.1-1 requires some adjustment. Given PR1 is a Rel-18 feature it should not be considered a Rel-17 capability. Perhaps the intention is to say that Rel-17 RedCap + PR1 would be an evolution of Rel-17 RedCap UE type, and Rel-18 + BW3/PR3 + PR1 would be a new Rel-18 UE type.

Our main concern on RedCap overall is about market fragmentation, and hence it is important to avoid multiple combinations of incremental features. Perhaps the main issue is not whether or not PR1 is a separate feature, but how many UE feature groups we will target for Rel-18 RedCap WI in the end. It is somewhat artificial to focus the discussion on PR1 while we would allow half a dozen separate capabilities for Rel-18 RedCap by the end of the release!

Hence, one possible compromise is to say there will be no separate capability for UE supporting only BW3/PR3 and another one for UE supporting BW3/PR3+PR1, i.e. PR1 will be part of the basic Rel-18 RedCap capability. Also the power saving enhancements will be part of the basic Rel-18 RedCap capability, so that we don't have RedCap UEs supporting power saving and others not supporting it. With this in mind it is more palatable to accept adding PR1 as evolution of Rel-17 RedCap UE type (with a Rel-18 capability, as explained above).

27 – Orange

UE peak rate should not be a standalone feature

28 – Sequans Communications

No.

PR1 should be an add-on only to R18 BW3/PR3 (as initially recommended by RAN1).

Clear market segmentation is key for success of Redcap/eRedcap.

The proposal to have PR1 as an add-on to Redcap has several drawbacks. It would lead to Redcap addressing the eRedcap market – challenging the adoption of BW3/PR3. It would blur product positioning as Redcap peak data rate would then range from around 10Mbps to 20 times more. Moreover, this was already discussed and not agreed in Rel-17, we should not reopen that discussion.

Similarly, PR1 should not be agreed as standalone in R18 either – for the same reasons.

The rationale provided (dual mode device) is not convincing to us. Whether BW3/PR3 cost savings could not be leveraged in that case depends of the implementation. Moreover, the complexity saving of PR1 alone is limited. Hence this particular case/implementation should not be a reason to break the market segmentation.

29 – Sony Europe B.V.

Do not support the proposal as a whole.

The first sub-bullet is really changing the outcome of R17, a closed release.

We support the second sub-bullet: "R18 + BW3/PR3 + PR1 should be of the single R18 UE type". This achieves the 10Mbps target data rate and provides complexity reduction in both buffer memory, transport channel processing and physical channel processing.

We think that a "PR1 add-on" for R17 has a very different meaning to a "PR1 add-on" for "R18 + BW3/PR3". For R17, the PR1 add-on significantly reduces peak rate compared to the R17 baseline. For R18, the PR1 add-on provides a modest additional reduction in peak data rate.

30 – Nordic Semiconductor ASA

Regarding QC comment on "only half of companies not supporting BW3/PR3". The recommendation from RAN1 is clear:

"RAN1 recommend that a single option is down-selected from a list of options as the main Rel-18 RedCap UE complexity reduction option at RAN plenary. .... BW1/BW3/PR3"

"Furthermore, RAN1 recommends that Option PR1 is considered as a potential add-on. Whether to adopt this potential add-on can be decided during WI phase. "

So if this gets too controversial, we are OK to drop PR1.

We would repeat argument again, that MNO carrying about its spectrum usage efficiency, would not prefer to reuse R17 RedCap scheduler for R17+PR1 UE. In fact the highest MCS that gNB can schedule for R17+PR1 in 20MHz would be MCS4 (QPSK + 0.3 coderate)!?

And disagree with Sierra Wireless statement(s). Even if each chipset picks only one option, network needs to handle both -> fragmentation. Also we doubt that cost of R17+PR1 will be lower than that of R17+PR3/BW3+PR1, since cost correlates with complexity.

31 – Nordic Semiconductor ASA

Sorry for typo: "only half of companies ~~not~~ supporting BWP3/PR3"

2.2 Issue 2 - Additional separate early identification

From moderator's view, there are two alternatives in this meeting:

- One is to simply confirm a separate early identification can be supported and then leave it to RAN1 to decide how to indicate since all companies have confirmed the necessity even shown different flavors.

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- Another is to completely resolved it in this meeting, i.e., select both Msg 1&3, or select Msg 3 only.

From moderator's understanding, in RAN1 discussion, companies didn't expect to relax the UE processing time, however, it will more or less deviate from this direction if Msg 1 is supported for early identification. From the views reflected in the contributions, without Msg 1 seems quite acceptable, moderator would like to propose

Proposal 2.2-1:

- Support for an additional separate early indication in Msg3 only.

Feedback Form 2: Could we accept Proposal 2.2-1?

1 – CATT Support moderator's proposal. For Rel-18 RedCap UE, sharing PRACH with Rel-17 RedCap UE is reasonable. The system will not broken but can avoid RACH resource partitioning. Supporitng addiontal separate early indication in Msg3 should be enough.
2 – Spreadtrum Communications Our preference is "Support for an additional separate early indication in both Msg1 and Msg3". We share the similar views as some companies (mentioned in their contributions) that Msg1 based early indication is benefit to the scheduling of Msg2 and Msg3. In addition, even we introduced separate early indication in Msg1, it is up to the gNB implementation to configure it or not. This increases the NW flexibility.
3 – vivo Mobile Communication Co. Support moderator's proposal. Given RAN1's agreements on resource allocation and UE behavior for broadcast channels, there is no strong motivation to support additional separate early indication (EI) in MSG1, supporting it would further fragment the PRACH resources and result in addition specification effort in RAN2 for association between the PRACH and feature combinations. We are fine to support separate EI in MSG3.
4 – Nordic Semiconductor ASA MSG3 is clearly needed, but MSG1 may be still needed for BW3/PR3 UE, depending on further discussion in RAN WGs. At the same we do not see an issue with reusing the existing mechanism for MSG1 separate early identification. In other words, adding R18 RedCap to existing early identification mechanism will not result in significant spec change.

5 – NTT DOCOMO INC.

We suggest removing ”only” in the proposal and separate early indication in Msg1 should be discussed in WG whether/how to support.

Based on the agreement at RAN1#111 meeting, the special handling of RAR PDSCH for Rel-18 eRedCap was agreed. According to the agreement, when the time separation between RAR PDSCH and Msg3 is not sufficient and the BW of the PDSCH is larger than 5MHz, the UE reception scheme is up to UE implementation. This implies that the performance of the RAR PDSCH reception would not be guaranteed. Accordingly, if separate early indication in Msg1 for Rel-18 eRedCap is not supported and the NW cannot tell whether the UE is Rel-18 eRedCap or a legacy UE, the FDRA/TDRA configuration of Msg3 for legacy UEs needs to be restricted to avoid the case that Rel-18 eRedCap operation of the PDSCH reception is up to UE implementation. In addition, the special handling of Msg3 was also agreed for Rel-18 eRedCap. Therefore, to enable NW to appropriately schedule Msg2/3 for Rel-18 eRedCap and legacy UEs, the separate early indication in Msg1 is clearly beneficial.

6 – Huawei Tech.(UK) Co.. Ltd

We support having an early indication in both Msg1 and Msg3, and only in Msg3. There are technical advantages for the scheduling of Msg2 (RAR), by having early indication in Msg1. The topic is well-understood in RAN1, so they can consider the technical solutions in minimal time. Hence RAN can make the less-interventionist decision to support early indication “at least” for Msg3, and indicate leaving RAN1 to decide finally about Msg1 according to technical merits.

Of course, we would also agree to Spreadtrum’s proposal.

7 – Ericsson LM

No. We prefer to leave this discussion to the WGs, but our view is that separate early indication should be supported in both Msg1 (configurable) and Msg3 (always). Based on the agreement from RAN1#111, it is possible for RAR PDSCH to be scheduled with more than 5 MHz. Since a Rel-18 eRedCap UE may only be able to process 5 MHz per slot, more than one slot may be required to process the RAR PDSCH. Therefore, the TDRA for Msg3 PUSCH for the Rel-18 eRedCap UE should allow for extended processing timeline for RAR. This may be possible only if separate early indication in Msg1 is configured. The alternative would be to always schedule Msg3 PUSCH for all UE types with an extended timeline, which may not be feasible and desired. As already mentioned, we prefer to leave this discussion to the WGs.

8 – Classon Consulting

[for FUTUREWEI] No, Msg1 is also needed. This should be up to the network to treat rel-18 redcap along with rel-17 or separately, say for example in a 20MHz deployment case where the rel-17 redcap are handled in a similar way as non-redcap UEs.

9 – Sierra Wireless. S.A.

There was consensus that msg3 early indication should be specified but the decision WRT msg1 early indication is technically complex thus we should leave this up to RAN1 to decide. If we can’t agree in RAN PL, pushing the decision to the WGs, should be the default way forward.

10 – Meta Ireland

Support first bullet by moderator summary. For the 2nd bullet, our position is support both Msg1&3 or Msg3 only. RAN can leave this issue to RAN WG. They will find some solutions based on the limited timeline.

11 – Qualcomm Incorporated

We prefer to support both Msg-1 and Msg-3 based early indication. The network can, of course, decide which one, or neither, it wants to use. But we are flexible to consider other options including Proposal 2.2-1.

12 – ZTE Corporation

As for msg1 identification, companies may have different understanding and it can be further discussed in WG. Therefore, we suggest to remove 'only' and add 'at least'.

13 – Guangdong OPPO Mobile Telecom.

We also think the msg 1 is not justified for the earlier indication as the need wide bandwidth before Msg3 is not identified. For the msg 3, it can be discussed in the working group level, we can say that will be discussed in WGs for whether and how to support it.

14 – New H3C Technologies Co.

we support early identificaiton for both msg1 and msg3.

15 – MediaTek Inc.

We support seperate early indication via Msg3/MsgA PUSCH. The reason is becasue confining Msg4 PDSCH to 5MHz causes siginicant SNR loss (about 7.5dB in TDD) compared with Rel-17 20MHz RedCap UEs.

As to separate early indication via Msg1/MsgA PRACH, we don't see strong motivation to support it. Both Msg2 and Msg3 are typically small and are confined within 5MHz. Furthermore, dedicated PRACH resources are expensive to NW and further PRACH fragmentation should be avoided unless deemed necessary.

16 – Samsung Electronics Polska

First of all, we think this can be discussed and decided in WG.

Moreover, we don't see strong motivation to supports separated early capability report (from R17 Redcap) in Msg 3 for R18 redcap.

17 – Apple Poland Sp. z.o.o.

We support Msg-1 based early indication, which is mainly motivated to support limiting Msg3 BW within 5MHz BW as agreed in RAN1 111 meeting. Note that, although Msg3 payload is assumed to be small and fit in the 5MHz BW, however, there is no any limitation from specification perspective. In theory, it is gNB scheduler choice to select the exact BW and Msg3, which can be larger than 5MHz. Then, if it is still allowed for large Msg3 payload scheduling for legacy UE, how network can figure out whether the target device is normal UE, Rel-17 Redcap or Rel-18 eRedcap? To achieve this, Msg-1 based identification is

required. Otherwise, network has to alway schedule Msg3 with up to 5MHz BW, which puts restriction at network side.

On Msg-3 based early identification, the only benefit we see is for Msg4 scheduling; Otherwise, it is sufficient to reply on eRedcap UE capability report for identification. We are open to discuss it.

18 – Lenovo (Beijing) Ltd

Besides early identification in Msg3, we also support early identification in Msg1 since it is beneficial in terms of RAR scheduling. This can be discussed further in WG.

19 – LG Electronics Inc.

We support separate early indication mechanism in Msg1 and/or Msg3 by network configuration which is to provide the same degree of flexibility as we provided for Rel-17 RedCap.

We think separate early indication in Msg1 can be a useful tool for gNB to schedule Msg2 and Msg3 when Rel-18 eRedCap UEs coexist with Rel-17 RedCap and/or non-RedCap UEs, and as long as it is configurable by the network, the RACH preamble shortage problem introduced by further RACH partitioning for Rel-18 RedCap UEs can be avoided as needed.

20 – NEC Corporation

In our view, this should be decided by RAN1 and RAN2. It is too early to make decision by RAN.

21 – Intel Belgium SA/NV

We are OK with the proposal, since RAN1 already agree on the behavior handling different cases of RAR/msg3 scheduling

22 – Panasonic Holdings Corporation

This should be discussed in WG level. No need of RAN plenary decision.

23 – China Mobile Com. Corporation

Support the moderator's proposal.

According to RAN1 agreements, the scheduling of RAR PDSCH is allowed to be larger than the maximum number of unicast PRBs that the UE can process per slot. For uplink transmission of Msg3, even MCS0 is used, with spectrum efficiency 0.2344, 14 OS (2 DMRS) ,11 RB can carry a TB size of 370bit. Usually Msg.3 has a smaller TBS such as 56 or 72 bits. So the scheduling of Msg3 is likely to be within 11RB/12RB. So there is no need for gNB to identify R18 RedCap UE for scheduling of Msg2 and Msg3.

And also considering that RACH indication has been used by quit a few features, such as 2-step RA, slicing, R17 RedCap, CE, etc. It will be further fragmented if early indication is introduced for R18 RedCap by Msg1, and the PRACH collision will be increased or more PRACH resource needs to be reserved.

So we think early indication of R18 RedCap only by Msg.3 is reasonable.

24 – VODAFONE Group Plc We prefer to have support of Msg1 (configurable by the network) and Msg3 early indication, in order to provide the NW more flexibility
25 – Nokia Corporation We can support the proposal, but we are also OK to leave this for further discussion in the WGs.
26 – Sequans Communications We prefer to leave this discussion to WGs.
27 – Sony Europe B.V. We can support the proposal.

2.3 Issue 3 - Other restrictions of the WI (e.g., connectivity restrictions, band, etc.)

It looks not so compliated from the available proposals, moderator would like to check which of the options are acceptable to companies

Question 2.3-1: Which option is acceptable to you? Or any other options from companies?

- **Option 1: No CA and DC**
- **Option 2: Inheriting Rel-17 restrictions**

Feedback Form 3: Which option is acceptable to you? Or any other options from companies?

1 – CATT As Rel-18 RedCap should be a simplifed version (though named *enhancement*) based on Rel-17 RedCap UE, we think Option 2 is a better choice. With Option 2, for those not supported in Rel-17 RedCap (e.g. IAB, DAPS...), they will not be supported by Rel-18 RedCap UE naturally.
2 – Spreadtrum Communications Option 2 is prefered.
3 – Nordic Semiconductor ASA Option 2 is preferred.

4 – vivo Mobile Communication Co.

Option 2 is preferred.

5 – NTT DOCOMO INC.

We support Option 1. We are also fine to further discuss Option 2, but the details of ”Rel-17 restrictions” for Option 2 should be clearly listed for better understanding before we agree on Option 2.

6 – Huawei Tech.(UK) Co.. Ltd

We don’t see a strong need to change the WID on these points.

7 – Ericsson LM

Option 2 is preferred.

8 – Classon Consulting

[For FUTUREWEI] Don’t really understand why the new proposal is needed, the WID already states that by default Rel-17 is applicable, so a redcap UE would not support CA or DC.

9 – Sierra Wireless. S.A.

Option 2

10 – Meta Ireland

Option 2 has some problem. In Rel-17, RAN4 specification did not support NR-U and SL operation for RedCap Device which is not align with RAN principle. So this can misinterpret to developer. Alternative proposal is needed.

11 – Qualcomm Incorporated

We support Option 2.

Option 2 is anyhow the natural starting point, since the WID has the following wording: ”By default, all UE capabilities applicable to a Rel-17 RedCap UE are applicable unless otherwise specified”

12 – ZTE Corporation

Option2 is preferred as the starting point

13 – Guangdong OPPO Mobile Telecom.

Option 2 should be assumed by the description of WID

14 – New H3C Technologies Co.

support option 2

15 – MediaTek Inc.

We support Option 2.

16 – Samsung Electronics Polska By default, Option 2 shall be applied to R18 redcap as well, since R18 is further reduction from R17.
17 – Apple Poland Sp. z.o.o. Support Opt.2, which has been captured in WID as pointed out by QCM.
18 – Lenovo (Beijing) Ltd We prefer option 2.
19 – LG Electronics Inc. Option 2 is preferred.
20 – NEC Corporation We don't see need to update the WID. It should be option 2 by default.
21 – Intel Belgium SA/NV Option 2 is preferred
22 – Panasonic Holdings Corporation Our view is Opt.2 would be the default direction.
23 – China Mobile Com. Corporation Option 2
24 – VODAFONE Group Plc Option 2
25 – Nokia Corporation Option 2 has been the main assumption so far, and it is our preference as well.
26 – Sequans Communications Option 2

2.4 Issue 4 - Target (downlink) peak data rate

It looks not so compliated purely from the available proposals , moderator would like to check which of the options are acceptable to companies, since we anyway need to give a justification why the new value should be 6 Mbps rather than other values, e.g., 7 Mbps, 8 Mbps, etc, which is downward compatible with 6 Mbps

while leaving some margin. In this sense, moderator would like to check views and their justifications from companies.

Question 2.4-1: Which value for the peak data rate is acceptable to you? Or any other values from companies?

- **Option 1: 10 Mbps**
- **Option 2: 6 Mbps**

Feedback Form 4: Which option is acceptable to you? Or any other options from companies?

1 – CATT

Prefer Option 1.

1. A peak data rate of 10 Mbps is shown in the SID/WID.
2. 10 Mbps is the most common (if not the only one) assumption in RAN1 during SI phase.
3. Do not foresee huge cost reduction from 10 Mbps to 6 Mbps.

2 – Spreadtrum Communications

Option 2

- Further reduce the supported peak rate to 6 Mbps will not introduce additional impacts/UE types. According to the previous study and the typical payload size assumptions for the signals, if the allowed TBS within a TTI is around 3000 bits (i e 6 Mbps), the SIB/paging reception in idle mode and the RACH procedure will not be impacted (no additional impacts were expected compared to 10 Mbps peak rate) The UE with can report 6 Mbps capability after initial access Therefore, further reduce the supported peak rate to 6 Mbps will not introduce additional impacts and will not introduce another UE type.
- Further reduce the supported peak rate to 6 Mbps is benefit to the UE complexity and implementation. As captured in TR 28 865 further peak rate reduction to 6 Mbps is benefit to the memory/buffer requirements and then cost In addition. take 6 Mbps as the target peak rate can potentially provide more flexibility for UE implementation, since the UE can use a lower memory to match the low end use cases. With minimum supported peak data rate of 6 Mbps, the UE vendors are still allowed to design a UE that support 10 Mbps peak data rate(use a larger memory and report the capability by larger modulation order and/or scaling factor)

3 – vivo Mobile Communication Co.

We are fine to keep 10Mps as the target data rate.

We are open to also consider lower data rate as 6Mbps

4 – Nordic Semiconductor ASA

We have seen that lots of companies suggest that LTE-M can provide 4Mbits peak rate. However, in practice, no network/MNO supports (and most likely will not support) full-duplex or LTE-M2 Cat. The currently achievable peak rates using LTE-M are ~1Mbits. This why we think 6Mbit R18 RedCap would be well differentiated from LTE-M.

5 – NTT DOCOMO INC.

First, we would like to clarify that this Question intends the ”minimum” peak rate target. If this question intends just ”peak rate target”, we think both 10Mbps and 6Mbps should be supported as a specification of Rel-18 eRedCap similar to Rel-17 RedCap.

As the minimum peak rate target, we support Option 2. We share the same view as Spreadtrum.

In our view, 6Mbps as the minimum peak rate for Rel-18 eRedCap is reasonable to avoid the overlap with LPWA and to support large payload size of broadcast PDSCH, e.g., SIB1.

IoT devices are extremely cost-sensitive and this additional cost/complexity reduction gain by reducing the minimum peak rate is worth considering to maximize Rel-18 eRedCap market scale.

In addition, looking at the LTE IoT services, we would like to note that the peak rate is much smaller than 10 Mbps even for some LTE Cat.1 services in practice.

There is no large impacts on spec/NW and the UE type is still single, thus we support Option 2.

6 – Huawei Tech.(UK) Co.. Ltd

We don’t see the need to re-open an agreed WID on this point. The UE that results from proposed Option 2 does not match what was already agreed by RAN for the supported peak rate target of 10 Mbps. The complexity saving in going from ~100 Mbps to ~10 Mbps is around 5%, according to the SI. In going further, it makes a correspondingly tiny extra difference (apparently around 0.7% according to the presentation during Monday’s GTW), i.e. on a much smaller scale than RAN has decided against for other proposals on, e.g., processing time relaxation.

7 – Ericsson LM

Fine with Option 1 or Option 2.

8 – Nordic Semiconductor ASA

Regarding the Huawei comment, the savings mentioned by Huawei do not consider anything higher than HARQ buffer. However, final device is not built with MAC layer only. The RLC , NAS/IP buffers scale with max peak rate. Then one should NOT forget about security running on top, etc. Our understanding is that CAT1 2Rx devices/modules are on the market, so 5% reduction from CAT4 to CAT1 seems to make sense in LTE :)

9 – Classon Consulting

[for FUTUREWEI] Option 1, which is the default with no agreement.

10 – Sierra Wireless. S.A.

Strongly prefer Option 1: 10Mbps for the following reasons:

· The WID clearly states that we shall not overlap with LPWA and 6Mbps is very close to 4Mbps LPWA specified today. Note: The fact that no one has commercialized the 4Mbps is irrelevant in this discussion but is evidence that there is no market for such a device. On the other hand, CAT1 and CAT1bis at 10Mbps has a huge IoT market commercialization.

· The cost saving between 10 and 6Mbps is < 0.7% (from ZTE's RP-223263) – why are we even talking about this?

· RAN PL already had a huge discussion on this when the SI/WI was initially drafted and 10Mbps was agreed as a good compromise.

· When TDD or HD-FDD is supported, the 10Mbps peak rate will normally drop to ~<8Mbps so this is already very close to 6Mbps.

· To achieve a reference data rate (i.e. customer usable data rate) of 4Mbps, a higher peak data rate is needed due to SNR, scheduling, and congestion degradation.

· 10Mbps was used in the SI for the evaluation and RAN1 as made this a working agreement.

10Mbps lines up with CAT1, thus customer using CAT1 will feel comfortable to upgrade to eRedcap supporting 10Mbps.

11 – Meta Ireland

Support option 1 based on RAN1 study.

12 – Qualcomm Incorporated

We prefer Option 1.

But would not object to Option 2 or other intermediate options.

13 – ZTE Corporation

From technique point of view, option2 is more preferred.

In the SID, for economic video and industrial sensors, the required peak data rate is less than 10Mbps. The market requirement is still obvious. As mentioned, 4Mbps LTE-M are actually not commercialized. Therefore, 6Mbps peak data rate for eRedCap would keep a sufficient gap between LPWA and RedCap. The HD-FDD or TDD may decrease the data rate, but it would not cause any problem, since the low-end RedCap UE peak data rate still can be satisfied and market gap still exists.

Cost saving from PR3 to 6Mpbs PR1 is about 1%. given the fact that PR3 only provides 7% costing saving, we think it is meaningful to consider the extra 1%. With 10Mbps PR1, then the cost saving from PR3 would be 0.3%. If 1% cost saving is not considered, what's the reason to consider 0.3%?

Moreover, as mentioned by spreadtrum, the memory size also would be reduced and the cost would be further reduced.

Additionally, the 10Mbps peak data rate is used for complexity evaluation. It is not foreseen that the PR1 is combined with PR3 as add-on tech to further reduce the complexity. To achieve attractive additional complexity reduction, 10Mbps peak data rate is obviously not enough.

14 – Guangdong OPPO Mobile Telecom.

Prefer option 1 and not against others. But we should only keep one target rate. Minimize the UE types.

15 – New H3C Technologies Co.

Prefer option 2.

16 – Samsung Electronics Polska

Prefer Option1, which is align with the justification of WID. And with added on PR1, the peak data rate can be further reduced.

17 – Apple Poland Sp. z.o.o.

Prefer Opt.1.

The number '10Mbps' in WID should be treated as 'guideline' for any detailed design. From procedure wise, we should not change the approved design target in the middle or even end of WI purely to add some specific proposal. The number was explicitly debated in the study item phase and compromised on '10Mbps'. If companies had concerns, they should raise them when SID was approved. This is normal 3GPP procedure, which we should follow. Otherwise, how we treat any requirement/design goal captured in SID/WID in the future?

18 – Lenovo (Beijing) Ltd

we prefer to keep 10Mbps as the peak data rate as indicated in WID.

19 – MediaTek Inc.

Prefer Option 1. We prefer to keep 10Mbps as specified in both WID and SID.

20 – LG Electronics Inc.

Option 1 is preferred.

21 – NEC Corporation

We support option 1. The study and work items have been justified with peak data rate of 10 Mbps. 6 Mbps is comparable to 4 Mbps of LTE Cat.M2. In our view, option 2 should be categorized as LPWA.

22 – Intel Belgium SA/NV

We are open to Option 2.

23 – Panasonic Holdings Corporation

We prefer Option 1.

24 – NTT DOCOMO INC.

In our understanding, ”the minimum peak rate target” and ”the target peak rate” of Rel-18 eRedCap can be different values. We are fine with Option 1 for ”the target peak rate”, but Option 2 should be applied for ”the minimum peak rate target”.

Option 2 for ”the minimum peak rate target” is just enable the potential further cost/complexity reduction on memory/L2 buffer. Of course 10Mbps (or larger data rate) should be supported for Rel-18 eRedCap as a specification and no need to change the target peak rate scope of this WI.

From a NW operator point of view, one potential deployment target of Rel-18 eRedCap is the migration of LTE Cat.1. Regarding the LTE Cat.1 services, it should be noted that the peak rate is **up to** 10Mbps, i.e., **the maximum** peak rate is 10Mbps, and hence the **minimum** peak rate is smaller than 10Mbps for all the use cases. As presented by ZTE at the GTW session, 10Mbps as **minimum** peak rate is over designed for some target use cases of Rel-18 eRedCap and even for the LTE Cat.1 replacement.

@Sierra Wireless

Regarding the cost saving by reducing minimum peak rate, as commented by other companies, we see the gain not only from BB/RF part but also from memory/L2 buffer perspective. It was also studied in RAN1 and captured in TR that ”The required L2 buffer size at the UE scales **linearly** with the UE peak data rate...”. Given that IoT devices are cost-sensitive, this additional cost/complexity reduction gain is meaningful.

25 – VODAFONE Group Plc

We are fine with both values

26 – Nokia Corporation

As mentioned in response to issue 1, our main concern on RedCap is market fragmentation. So we definitely do not want to define two types of UEs, one with minimum 10Mbps and another with minimum 6Mbps data rate. We are fine with either value as long as a single value of minimum peak rate is selected for future work, and no separate UE capabilities will be defined for minimum peak rate in Rel-18.

27 – Sony Europe B.V.

Option 1.

There needs to be a clear distinction between redcap and LPWA use cases. A 10Mbps UE provides this clear distinction. 6Mbps is more blurred.

28 – Sequans Communications

We strongly support keeping 10Mbps:

- This was the minimum peak rate already agreed in the WID – why are we rediscussing this?

- It was used in the SID assumptions, where is the logic to change it now?

- This is again linked to product positioning/market segmentation. A 10Mbps peak data rate is aligned with LTE Cat1/1bis for which there is already a clear market segment. Hence 10Mbps provides a clear product positioning for eRedcap, aligned with LTE Cat1/1bis.

- The rationale (from ZTE) is comparing PHY peak data rate with application data rate. Obviously those should not be directly compared, it is expected that the PHY peak rate should be higher (given TDD/HD-FDD/upper layers overhead etc). Moreover we should not change the peak rate just based on one example application.

29 – Nordic Semiconductor ASA

Again, when comparing bit-rates to LTE-M, 1Mbits is the max in practice (half-duplex + M1 only). And WID says ”target peak rate” it does not say ”minimum peak rate as defined in 38.306”. If we reduce minimum peak rate to 6Mbits, it does not preclude 10Mbits implementations. Finally, if we drop PR1, then there is no need to further debate anything :)

2.5 Issue 5 - Miscellaneous

In this group of issues, **M-7 and M-8** are more of clarification or refinement according to lastest status of the discussion, however, it looks no confusion till now from the discussion in WGs. To check if the observation from moderator is correct, moderator would like to check views from companies if we need to update the WID according to M-7 or M-8,

Qustion 2.5-1

- Do we need to update the objectives according to M-7 and M-8 to improve the clarity?
  - M-7: example of update, 5 MHz BB bandwidth only for ~~PDSCH (for both unicast and broadcast) and~~ PUSCH~~, with 20 MHz RF bandwidth for UL and DL~~
  - M-8: example of update, Enhanced **RAN** eDRX in RRC_INACTIVE (>10.24s) [RAN2, RAN3, RAN4]

Feedback Form 5: Do we need to update the objectives according to M-7 and M-8 to improve the clarity?

1 – CATT

We support to make it more clear.

2 – Spreadtrum Communications

M-7: Unnecessary.

M-8: Seems OK.

3 – vivo Mobile Communication Co.

It is not critical or necessary to update the objectives.

For M-7, 5MHz BB bandwidth does not imply any assumption on UE post-FFT buffering. It can be interpreted as 5MHz BB processing capability based on RAN1 discussions. Rather, such correction may cause confusion/ambiguities.

For M-8, it is clear that CN eDRX is already supported in Rel-17. So for Rel-18 objective, it is for RAN eDRX.

4 – NTT DOCOMO INC.

We share the similar view as vivo for M-7. According to the RAN1 discussion, 5MHz BB BW is applied not only for PUSCH but also for PDSCH. Thus, we should rather keep the current sentence in the WID objective.

5 – Huawei Tech.(UK) Co.. Ltd

Not needed. RAN doesn't in general update WIDs as WG agreements happen.

6 – Nordic Semiconductor ASA

M7: We do not think there is a need to waste RAN time on how to clarify that PR3 for DL and BW3 for UL were in the end agreed in RAN1.

M8: RAN WGs (listed in objective) shall not make any agreements which are in SA or CT competence, so we do not see what is a value of adding "RAN" to WID

7 – Ericsson LM

We do not see a strong need to make these updates at this point.

Regarding M-7, to our understanding, the current WI objective on UE BB bandwidth reduction still holds true from UE point of view, i.e., no update of the WI objective is needed.

8 – Classon Consulting

[for FUTUREWEI] No strong need

9 – Sierra Wireless. S.A.

Not critical.

10 – Meta Ireland

Prefer keep the current WID.

11 – Qualcomm Incorporated

M-7: Strictly speaking, some change along the lines of the CATT proposal would be needed for clarity, but it is not critical to make this change at this Plenary.

M-8: We don't think it is an essential clarification, but we can accept it.

12 – ZTE Corporation

We are open and no strong view. If it is considered, the wording could be further discussed.

13 – Guangdong OPPO Mobile Telecom.

Both may not be needed, as the item is already on the track.

14 – New H3C Technologies Co.

it isn't necessary to update the WID

15 – MediaTek Inc.

For M-7, the "5 MHz BB bandwidth" in WID can be interpreted as "UE processing bandwidth" as discussed in RAN1. Hence, it is uncessary to revise WID.

16 – Samsung Electronics Polska

No need to update the WID. With agreements in WG, what to do in next step is clear.

17 – Apple Poland Sp. z.o.o.

M-7: No need to update. 'BB bandwidth' refers to number of RBs for BB processing. From this perspective, 5MHz BB BW is not only limited to Uplink, instead of unicast PDSCH as well. The revise indeed causes confusion.

M-8: Open to discuss.

18 – Lenovo (Beijing) Ltd

no need

19 – LG Electronics Inc.

We think none of the them are necessary.

20 – NEC Corporation

M-7 should not be adopted. 5 MHz BB bandwidth is valid for both PDSCH (for both unicast and broadcast) and PUSCH from UE processing point of view. We don't see the need of M-8. WID is already clear.

21 – Intel Belgium SA/NV

- For M7, prefer to keep original wording since it enforces UE capability of processing 5MHz bandwidth which is guideline for the agreements in RAN1.

- For M8, we prefer the original wording since 'in RRC_INACTIVE' already implies it is for RAN paging.

22 – Panasonic Holdings Corporation Our view is no strong need to update them.
23 – VODAFONE Group Plc No strong need
24 – Nokia Corporation We do not see a strong need to update them.
25 – Sony Europe B.V. We think these WID updates are too specific and the discussion can be left to RAN WGs.

For M-6, the proponent claims that it can be decided in WG, so it will be proposed for further discussion in this RAN meeting.

For from M-1 to M-5, each one seems to more or less up-scope the WID, but according to the guidance from RAN Chair announced on email reflector **"Considering the overall situation and the need for Rel-18 timeline discussion, there is no plan to discuss or approve new project proposals or up-scoping proposals, unless previously arranged."**, and hence the moderator does not propose to discuss them, unless there is a demonstration in this first round of strong interest to do so.

Qustion 2.5-2

- Which of from M-1 to M-5 could be taken as exception(s) to continue the discussion in this RAN meeting? Any justification for your proposed exception(s)?
    - If you are fine to suspend the discussion on from M-1 to M-5 in this meeting, please simply indicate "fine without exception" or something like that.

Feedback Form 6: Which of from M-1 to M-5 could be taken as exception(s) to continue the discussion in this RAN meeting? Any justification for your proposed exception(s)?

1 – CATT We are fine without exception.
2 – Spreadtrum Communications M-2/3/5 should be discussed in RAN, since they are related to the WI Scope. M-1/4 could be taken as exception(s) to continue the discussion, since these can be discussed in WGs (e.g., RAN2)

3 – vivo Mobile Communication Co.

We respect and support the guidance from RAN Chair about the up-scoping proposals. But we would like to highlight following for "M-5: **Specify support for lower UE power class**":

• This objective has been included in the draft WID RP-212705, which was an outcome from the RAN#94e Rel-18 scoping discussion, it is not a new proposal.

• It was also proposed by moderator in RAN#97-e meeting and agreed by all companies that the discussion for this particular objective could be to postponed till RAN#98 in RP-222633.

• RAN4 RF TU in total 2.75TU has been reserved in RP-222675 for such objective.

Therefore, M-5 should be concluded in this RAN meeting.

As justified in our contribution RP-223102 and also evaluations in RWS-210171 and RWS-210135 that significant device cost reduction and higher PA efficiency can be achieved by lower UE power class to 14dBm~20dBm and does notcause coverage issue for at least indoor scenario. We strongly propose to include the UE lower power class in the Rel-18 eRedCap WID. The focus should be FR1 and non-coverage-limited scenarios. The exact lower power class level can be decided by RAN4.

4 – Spreadtrum Communications

Sorry for misunderstanding of moderator's guidance, we update our reply as follows (please ignore the previous feedback):

We think **"M-2: UE complexity (peak rate) reduction in FR2"** could be discussed in this RAN meeting. This is not new proposal, as there are some notes in the SID and the draft WID implied that solutions for FR2 can be considered.

In Rel.17 we already defined some complexity reduction solutions for both FR1 and FR2, as there are also cost/complexity reduction requirements for FR2. However, with Rel.17 solutions (e.g., 100 MHz BW), the supported peak data rate of an FR2 RedCap UE is around 400 Mbps. This kind of peak rate is still high for some indoor RedCap cases, (e.g., industry AGV, etc.). In order to enlarge the RedCap market for FR2 and to avoid subsequent standalone enhancement for FR2, further complexity reduction solutions for FR2 can be considered together with FR1 in Rel.18 WI phase.

5 – Huawei Tech.(UK) Co.. Ltd

M1 - M5 are indeed up-scoping proposals, so this WI should proceed consistently with the chair's guidance, and better not have an autonomous per-WI choice on whether it grants itself a list of exceptions from the guidance!

On lower power class in particular: On one hand, as evaluated in the SI, in most scenarios, Rel-18 RedCap UE is coverage limited by uplink channels, especially PUSCH. Lower UE power class will further reduce uplink channels' coverage. On the other hand, it has not been studied in Rel-18 RedCap SI, and hence the corresponding UE complexity reduction is not known. Since RAN has been generally sceptical of low and unknown complexity savings in the discussion to approve the WI, we do not support adding this objective now.

6 – Nordic Semiconductor ASA

While we agree M1-M5 are up-scoping proposals. At the same time, we think M1 goes hand-in-hand with separate early indication and R18 RedCap UE type. There is certain degree of essentiality in M1. M2-M5 are enhancements, some having more benefit than other.

M6 can be left up to WGs, where discussion is already ongoing.

7 – Ericsson LM

We think M-1 can be discussed on WG level without the need for a WID revision at this point. We are open to adding M-2 (PR1 for FR2) to the WI scope.

8 – Classon Consulting

[for FUTUREWEI] fine without exception.

Not open to M2 (PR1 for FR2).

9 – Sierra Wireless. S.A.

As Nordic mentions, M1, in many ways, goes with the early indication discussion so is not an up scoping. Even though M1 could be discussed at the WG level (as Ericsson mentions), I think some in the WGs may argue, it is not in scope and that would waste more WG time than if RAN PL just put the objective into the WID (which we did for Rel 17).

10 – ZTE Corporation

We are fine without exception and put more attention on our focus issue

11 – Samsung Electronics Polska

We don't see strong motivation for up-scoping eRedcap WI.

12 – MediaTek Inc.

We are fine with no exceptions for M-1 to M-5.

1. **M-1:** No need to discuss M-1 in RAN. It can be discussed in WG (RAN2) and needs no WID revision.
2. **M-2:** Was not studied in SI and is not in WID. It is an up-scoping and we don't support it.
3. **M-3:** We are supportive for NCD-SSB to be used in RRC_Inactive mode for SDT which will continuously be discussed in WGs. But it is for SDT only and not for measurement and/or cell (re-)selection.
4. **M-4:** We have sympathy for the proposal, but we think it can be discussed in WG (RAN2) without RAN's discussion/decision.
5. **M-5:** We don't support for lower UE power class(es). The reasons are as follows.

(1) In our view, this is an **up-scoping** feature. To our understanding, there was no agreement to include such an objective to WID. What most companies agreed at RAN#97e was the moderator Proposal: "*Postpone the discussion on whether to include lower UE power class in the WI scope until RAN#98.*"

(2) As commented in RAN#97e, inclusion of additional UE power classes causes further **market fragmentation**. Without sufficient UE volume, the manufacturing cost will actually bring higher device cost for any RedCap UE type rather than reducing its cost.

(3) The **complexity reduction analysis** was not pursued in SI phase and its gain is not clear to us.

(4) If a lower power class, say 14 or 15dBm, is considered for indoor deployment, does RAN4 need to define new UE requirements for it? What are potential issues that RAN4 need to resolve? Is the potential induced **RAN4 workload** reasonable or more TUs are needed?

13 – Lenovo (Beijing) Ltd

fine without exception.

14 – QUALCOMM JAPAN LLC.

We would like to point out that RAN#97e discussion was very much focused on RAN1 aspects, and many upper layer items are postponed without sufficient discussion. This is because of the fact that the SI was limited to RAN1-only. As a result, the current WID is very sparse/incomplete on higher aspect. We think it is good allowing RAN2 to discuss some of the higher layer items in the coming quarter.

M-1: This is indeed something RAN2 should discuss. Should leave it to RAN2 discussion in the coming quarter.

M-2: Fine.

M-3: We no longer support this, because of its complexity and large specification impact. For idle mode/inactive operation, the release-17 support of initial access on RedCap UE specific initial BWP (with pending discussion on SDT) looks sufficient.

M-4: Proponent. OK to leave it to RAN2 discussion in the coming quarter.

M-6: This should be assumed by default.

15 – LG Electronics Inc.

We are fine without exception.

16 – NEC Corporation

We are fine without exception.

17 – Intel Belgium SA/NV

We are fine without exception

18 – Panasonic Holdings Corporation

Our view is No strong need to update them.

19 – Ericsson LM

M4: If this would help the UE vendors, we are fine with this. But with these two conditions:

- UEs are only allowed to do this as long as they dont support CA/DC. Otherwise there would be too many band combinations which increase overhead

- The mirrored filter which the UE replies with must include all bands that the UE supports (as defined by supportedBandList). This to avoid that the gNB would have to re-enquire the UE capabilities since the gNB (mistakenly) thinks that the UE has filtered out some supported band combinations which the gNB may be interested in.

We understand that the above two bullets are what the proponent (QC) has in mind, and hence we are fine with this proposal assuming it helps UE vendors.

Whether M4 it is discussed directly in RAN2 or has an explicit bullet in the WID: we don't have a strong view.

20 – NTT DOCOMO INC.

We support M-1 as a scope of this WI and details should be discussed in RAN2.

We share the similar concern on M-3 and M-5 and we don't support them.

21 – Nokia Corporation

We do not see a need to upscope the WID, especially considering the challenges to complete Rel-18 already, as discussed in Monday GTW. It is natural that some detailed aspects come up during the development of the specifications, and the WG can use its best judgment about what is essential without micro-management from RAN side.

22 – Sony Europe B.V.

OK with M-1 and M-2.

We don't support M-5. We think that there is not a significant complexity reduction and there will be negative coverage and market fragmentation implications.

2.6 Summary and Proposals after Initial Round

For Issue 1 - UE peak rate reduction as a standalone feature, during the initial round views collection on proposal 2.1-1,

Yes: CATT, NTT DOCOMO, Sierra, Qualcomm, Apple, Intel, CMCC

No: Spreadtrum, vivo, Huawei, Ericsson, Futurewei, Sierra, Meta, ZTE, OPPO, New H3C, MTK, Verizon, Lenovo, LGE, Panasonic, Vodafone, Nokia, Sequans, Sony

Don't want to touch R17 Redcap: vivo, Huawei, Ericsson, Futurewei, Meta, ZTE, OPPO, New H3C, Verizon, Lenovo, LGE

Fine to remove PR1: Huawei, Ericsson, Sierra, MTK, Nodic

During the discussion, companies present their understanding about the impact of introducing standalone PR1 on UE types, UE complexity(including dual-RAT mode UE)/Cost segmentation, and gNB scheduler. Some companies claim that they don't want to touch R17 specification, it is quite understandable. However, for the UE type, some companies claim that R17 Redcap capable UE plus R18 PR1 will result in new UE type, to this

comments, companies, e.g., Sierra, Qualcomm, Apple, Intel think it is just business as usual, yes, it maybe different from the UE type defined for R18 eRedcap UE, but it can belong to UE type defined for R17 Redcap UE without resulting in an additional UE type. From moderator's understanding, the reponse sounds reasonable.

Based on above understanding, moderator would like revise the proposal to resolve the concern on touching R17 specification and more UE types in R18 as below for further discussion in the second round

Proposal 3.1-1:

- PR1 is supported as an add-on for both Rel-17 Redcap capable UE and Rel-18 eRedcap capable UE
    - R17 RedCap + R18 PR1 should be of the single R17 UE type
        - No early identification for differentiating between UE supporting R17 Redcap and UE supporting R17 Redcap + R18 PR1
    - R18 + BW3/PR3 + R18 PR1 should be of the single R18 UE type
        - No early identification for differentiating between UE supporting R18 + BW3/PR3 and UE supporting R18 + BW3/PR3 + R18 PR1

For Issue 2 - Additional separate early identification, during the initial round views collection on proposal 2.2-1,

- **Yes:** CATT, vivo, Sierra, Qualcomm, MTK, Intel, CMCC, Nokia, Sony
- **No:** Spreadtrum, Nodic, NTT DOCOMO, Huawei, Ericsson, Futurewei, Meta, ZTE, OPPO, New H3C, Apple, Lenovo, LGE, Vodafone
- **No separate early indication:** Samsung
- **Leave to WGs:** Ericsson, Meta, ZTE, OPPO, NEC, Nokia, Sequans

From the discussion, all companies but one are supportive for an additional separate early indication, though the proponents are divergent on detailed solutions, e.g., Msg3 only, both Msg1 and Msg3, and some companies propose to discuss detailed solutions in WGs rather than in RAN. So, let's make it simple, moderator would like to modify the proposal as below for the second round discussion.

Proposal 3.2-1:

- Update the WID by adding objective: Support an additional separate early indication (RAN1, RAN2)
- How to support is decided by WGs

For Issue 3 - Other restrictions of the WI (e.g., connectivity restrictions, band, etc.), during the initial round views collection on question 2.3-1,

Option 1 (No CA and DC): NTT DOCOMO, Meta,

Option 2 (Inheriting Rel-17 restrictions): CATT, Nodic, vivo, Huawei, Ericsson, Futurewei, Sierra, Qualcomm, ZTE, OPPO, New H3C, Samsung, Apple, Lenovo, LGE, NEC, Intel, Panasonic, Vodafone, Nokia, Sequans

Conditional Option 2: NTT DOCOMO

From the discussion, it looks that vast majority of companies see no problem to reuse the Rel-17 restrictions, so moderator would like to propose Proposal 3.3-1 for the second round discussion.

Proposal 3.3-1

- For restriction of the WI (e.g., connectivity restriction, band, etc), keep the objective as it is, i.e., inheriting Rel-17 restrictions on Redcap

For Issue 4 - Minimum target peak rate, during the initial round discussion on Question 2.4-1,

10Mbps: CATT, vivo, Huawei, Futurewei, Sierra, Meta, Samsung, Apple, Lenovo, MTK, LGE, NEC, Panasonic, Sony, Sequans (15)

6Mbps: Spreadtrum, vivo, Nodic, NTT DOCOMO, ZTE, New H3C, Intel (7)

Fine to either of both, and other single value: Ericsson, Qualcomm, OPPO, Vodafone, Nokia (5)

The situation is quite obvious, more companies are reluctant to replace 10Mbps by 6Mbps or other values, and all companies have repeated the same comments as in RAN1, so moderator would propose 3.4-1 for GTW discussion without pursuing it in the following rounds.

Proposal 3.4-1

- Keep the minimum target peak rate as 10Mbps.

For Issue 5 - Miscellaneous,

- M-1: Specify an SI indication to indicate whether a UE can camp on the cell/frequency or not: Sierra
- M-2: UE complexity (peak rate) reduction in FR2: Ericsson, Spreadtrum, opposed by Futurewei
- M-3: Support NCD-SSB for RedCap UEs in idle/inactive state: Vivo

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- M-4: Make UE capability filtering by the UE optional: Qualcomm
- M-5: Specify support for lower UE power class: Vivo
- M-6: An additional separate initial BWP is not needed: Ericsson (can be decided in WG)
- M-7: Clarification on the objective for UE BB bandwidth reduction: CATT
- M-8: RAN paging only for Enhanced eDRX: xiaomi

For from M-1 to M-5, 12 of 22 companies comment in favor of **without exception** to the Chair's guidance in this meeting "**Considering the overall situation and the need for Rel-18 timeline discussion, there is no plan to discuss or approve new project proposals or up-scoping proposals, unless previously arranged.**" , and more companies comments that no strong needs to update the WID. Based on this observation, **moderator would like propose to close the discussion on from M-1 to M-8 in this RAN meeting. Proponet companies can bring them up in next meeting.**

3 Views collection and Proposals (Second Round)

3.1 Issue 1 - UE peak rate reduction as a standalone feature

Proposal 3.1-1

- PR1 is supported as an add-on for both Rel-17 Redcap capable UE and Rel-18 eRedcap capable UE
  - R17 RedCap + R18 PR1 should be of the single R17 UE type
    - No early identification for differentiating between UE supporting R17 Redcap and UE supporting R17 Redcap + R18 PR1
  - R18 + BW3/PR3 + R18 PR1 should be of the single R18 UE type
    - No early identification for differentiating between UE supporting R18 + BW3/PR3 and UE supporting R18 + BW3/PR3 + R18 PR1

Feedback Form 7: Could we accept Proposal 3.1-1

1 – CATT Fine with the proposal.
2 – Huawei Tech.(UK) Co.. Ltd Thanks for the summary and proposal. We would not agree to this, since it is the creation of a new UE type in a legacy (frozen) release, the complexity saving of which is not worth the market and implementation impacts, as has been shown in the SI. The R18 main bullet also seems a bit strange where it describes only one combination of techniques above a bullet that describes two combinations. If this main Rel-18 bullet is trying to make Rel-18 UE capability definitions now in RAN, we think it is better to wait for the usual RAN1 discussions later in

Rel-18 once all the technical details are set.

3 – Nordic Semiconductor ASA

Thanks to moderator for the summary and updated proposal.

If P3.1-1 would be agreed, then we introduce two 10Mbits UEs in the same release. One UE with 4-5% complexity reduction and the other UE with 8% complexity reduction based on SI. If 3GPP introduces new UE to market, then it should strive to maximize complexity reduction gain at the same time. Here, we tend to agree with Huawei.

The benefit of early adoption may not be there, since some companies seem not to agree that R18 PR1 could be early implementable feature in R17 (as pointed up by moderator). Moreover, as explained in our contribution, if chipset manufacturer does not want to implement complexity saving from BW3/PR3 it does not have to.

And for network side, BW/PR3 implementation delta is not high. Legacy broadcast and paging can be reused. MSG3 early identification is already supported in R17, adding additional UE type is trivial. And unicast scheduling restriction should be implemented anyway for both UEs in P3.1-1, this for spectral efficiency reasons.

Therefore we propose to follow RAN1 recommendation for PR1 as add-on, and if not agreeable then drop PR1.

4 – Classon Consulting

[for FUTUREWEI] No, we cannot accept this proposal.

PR1 as an add on in R18 was recommended in the SI and agreed in the WG. We are fine with continuing in WG, and also OK if RAN wants to remove PR1 altogether.

PR1 standalone (in R17 or R18, the proposal is not clear) is not acceptable for fragmentation and little benefit. It was considered in r17 and not agreed, and also not recommended for R18. The early indication part of the proposal also does not make sense as the network needs to know this limitation.

5 – Sierra Wireless. S.A.

Support the proposal since we feel there is no new UE type being created as both customers and the network would see them as the same type - just different UE implementations.

We also see no issue with 3GPP defining a two possible UE implementation to achieve 10Mbps. The complexity calculation from TR 38.865 showing an 8 vs 4% complexity reduction did not assume a typically commercialize UE - e.g., it done in did not consider a multi-mode UE (i.e. UE with LTE fallback) and it did not consider multi-band UEs. If it had the complexity reduction would be very similar .

6 – Qualcomm Incorporated

We support the proposal.

Regarding the comment form Nordic, surely, a UE that is capable to process 20MHz can certainly process 5MHz as well. But the reasons why it would be beneficial for the ecosystem to disallow scheduling more than 5MHz for this UE we cannot quite comprehend. Many times we heard the argument that fragmentation needs to be avoided. But it is difficult to see where the fragmentation would be, since 20MHz BW capability is already supported. Also, quite a large number of scaling factors are already supported.

7 – Apple Poland Sp. z.o.o.

We support the proposal.

On the market fragment point, as explained in the first round, it is difficult to understand the logic that the 'BW3/PR3+PR1' with different 'v*f*Q' (e.g., 4,6,8) is counted as a single Rel-18 eRedcap device, however 'PR1 with different 'v*f*Q" is counted as multiple Redcap devices.

8 – NTT DOCOMO INC.

We are fine with this proposal. However, PR1 should be supported at least as add-on feature for R18 BW3/PR3 and we cannot accept to drop PR1 from Rel-18 eRedCap scope, so we are also fine not to support the first sub-bullet (R17 RedCap + R18 PR1) if majority of companies don't support it.

9 – New H3C Technologies Co.

Support this proposal.

10 – vivo Mobile Communication Co.

By the way, we would like to clarify that our position is not correctly captured for this issue. We are fine for UE peak data rate reduction as standalone feature, but it can be supported by Rel-18 eRedCap UE without BW3/PR3.

But anyway, we are fine with the Moderator's proposal.

11 – Meta Ireland

Support these Moderator proposals.

12 – MediaTek Inc.

We appreciate the moderator's efforts, but we cannot agree to this proposal.

As explained by Nordic, these two UE implementation methods are provided to meet the same target peak data rate: one with ~4% and the other with ~8% complexity reduction based on TR38.865. In other words, if Proposal 3.1-1 is agreed, 3GPP is introducing two different RedCap *UE implementations* (*term borrowed from Sierra*) in the same release to the same business segment. This does not feel right to us. 3GPP should as a whole to maximize the market for a RedCap UE type defined in a release instead of creating different RedCap UE implementations in a release.

Our understanding is that proponents of the first sub-bullet is reluctant to support/implement the second sub-bullet which is understandable especially taking LTE/NR dual-mode into consideration. If that is the

case, proponents of first sub-bullet should propose to remove the second sub-bullet and revert RAN/RAN1's agreements. Alternatively, proponents of second sub-bullet should bring the proposal to Rel-17 RedCap maintenance (as a Rel-17 TEI, maybe) where, as claimed by proponents, it introduces neither new UE type nor new UE implementations.

In summary, this proposal will introduce two different Rel-18 Redcap UE implementations to the same market segment (with the same peak data rate target of 10Mbps). Our view is that only one of them should be agreed. If the majority want the first sub-bullet (i.e. standalone PR1), we are fine. However, the second sub-bullet (i.e. add-on PR1) has to go (which of course reverts RAN/RAN1 agreements). We cannot live with both UE implementations for the same Rel-18 RedCap release. Finally, we would like to repeat ourselves that we are also fine with removing PR1 entirely from Rel-18 RedCap.

13 – Spreadtrum Communications

Thanks for the summary and the update.

We cannot accept this proposal. we have the similar concerns as Nordic and MTK, 3GPP should not introduce two different low-end RedCap UE implementations for the same target use cases. Besides, if we understand correctly, the second sub-bullet is already agreed in RAN1, and it seems that there are no companies challenge the UE type for BW3/PR3 w/wo R18 PR1. Therefore, the question is still "whether to support standalone PR1 as a main solution in the case of we already introduced BW3/PR3", and our answer is NO.

In short, we have strong concern on market fragmentation due to two low-end RedCap UE implementations, also mentioned by many companies on NWM. To make progress, we can accept **compromise with removing PR1 entirely from Rel-18 RedCap** as proposed by Ericsson, Nordic and MTK. etc. Furthermore, if majority companies really want standalone PR1, we are also flexible to **down select the main solution between BW3/PR3 and standalone PR1 again**, to avoid market fragmentation.

14 – Spreadtrum Communications

PS: we would like to mention that our reply for issue1 in the initial round is not captured in the summary part (2.6).

15 – LG Electronics Inc.

We appreciate moderator's effort, but we cannot accept the proposal as it is.

But it would be acceptable to us if the Proposal 3.1-1 is modified to cover only the Rel-18 RedCap.

As commented previously by a few companies, if we mention Rel-17 RedCap here, we are actually re-opening the same discussion we had in Rel-17 RedCap, which we think should be avoided or at least is not urgent at all in this Rel-18 RedCap discussion.

We prefer to focus on the Rel-18 RedCap work scope within this NWM discussion.

16 – CMDI

[As moderator]

To Spreadtrum: sorry for missing the count, I will fix it in next round;

To LGE: the proposal does not touch Rel-17 Redcap, which just provides a description about what the standalone R18 PR1 could look like without introducing additional new UE type.

17 – Intel Belgium SA/NV

We are OK with the proposal

18 – Intel Belgium SA/NV

We are OK with the proposal

19 – Intel Belgium SA/NV

We are OK with the proposal

20 – Lenovo (Beijing) Ltd

We don't support R17 RedCap + R18 PR1. PR1 can be add-on for R18 RedCap, or it can be fully removed.

21 – Samsung Electronics Polska

We prefer to not touch R17 Redcap UE. We can be open for with/without PR1 for R18 UE.

22 – Ericsson LM

No, we do not want to change Rel-17 specifications, since this cannot be considered an essential correction for Rel-17. We may potentially consider introducing PR1 for both 20-MHz UEs and 5-MHz UEs, but in that case the change needs to be introduced in Rel-18 specifications, not in Rel-17 specifications. And regarding PR1 as an add-on to 20-MHz UEs, we have similar concerns as Nordic, Futurewei, MediaTek, and Spreadtrum.

23 – China Mobile Com. Corporation

We are fine with proposal.

24 – ZTE Corporation

PR3 is actually agreed for Rel-18 RedCap UE. PR3 also can be used for LTE-RedCap dual mode. We did not see much benefits to support standalone PR1, especially considering the complexity reduction. Therefore, we don't agree to have standalone PR1. And we are also OK to remove PR1 totally in Rel-18.

25 – Panasonic Holdings Corporation

We agree not to increase early identification. As this aspect is not fully concluded in WG in our understanding, ”R17 Redcap + R18 PR1” is same early indeitiffication with ”R17 Redcap” or ”R18 + BW3/PR3 + R18 PR1”.is not clear We would like to prefer this discussion in WG.

Our view is ”R18 + BW3/PR3” can be just implementation and no specific need to differentiate from ”R18 + BW3/PR3 + R18 PR1”.

At RAN plenary, our proposed conclusion can be ”R17 Redcap + R18 PR1” can be discussed but no new early identification procedure.

26 – VODAFONE Group Plc

The proposal does not seem very clear. Any discussion involving R17 RedCap would require to be handled as TEI or in R18 specs, since as mentioned by Ericsson it is not deemed as an essential correction. It still seems that many concerns are kept in regards to market fragmentation if PR1 is pursued as a standalone feature, and because of that our preference is to have it as an add-on for **R18**

27 – Sony Europe B.V.

Our understanding of this proposal is that we are going to specify both:

- “standalone” (“R17 RedCap + R18 PR1”); and
- “add-on” (“R18 + BW3/PR3 + R18 PR1”)

Both of these approaches provide a UE with 10Mbps peak DL/UL data rates. This is what we would term market fragmentation.

The issue of whether approaches are considered a certain “UE type” or not is not significant compared to the market fragmentation issue.

So, we do not support this proposal.

28 – Sequans Communications

Thanks for the update, but we cannot agree with this proposal.

We support PR1 as an add-on only to R18 BW3/PR3 (as initially recommended by RAN1).

We have concerns on standalone PR1 as indicated earlier:

- Market fragmentation: Redcap+PR1 would address same market as eRedcap (BW3/PR3), with different implementations/cost savings, challenging eRedcap adoption

- Blurred product positioning: Redcap peak data rate would range from around 10Mbps to around 20 times more.

- This was already discussed and not agreed in Rel-17, we should not reopen that discussion

The rationale provided (dual mode device) is not convincing to us:

- Whether BW3/PR3 cost savings could not be leveraged in that case depends of the implementation

- As indicated by Nordic, a eRedcap (BW3/PR3) implementation may not implement the associated complexity reduction if it wishes to do so.

29 – MediaTek Inc.

It seems the proposl has caused some confusion by mentioning Rel-17 RedCap. Maybe we can consider rephrasing the questions and proposals by leaving out Rel-17 RedCap (and early indication which is too early to say not needed.)

In our opinion, the key questions are:

1. For Rel-18 RedCap, should the support for UE BB bandwidth reduction (i.e. BW3/PR3) be a prerequisite for the support for peak data rate reduction (i.e. PR1)?

2. Are you fine with removing peak data rate reducation (i.e. PR1) from Rel-18 RedCap WID?

The answer is ”YES” to us for both questions.

30 – China Telecommunications

We do not support PR1 is as a standalone feature which may cause market fragmentation as many companies have pointed out. We also do not support Rel-17 specifications to be changed.

3.2 Issue 2 - Additional separate early identification

Proposal 3.2-1

- Update the WID by adding objective: Support an additional separate early indication (RAN1, RAN2)
- How to support is decided by WGs

Feedback Form 8: Could we accept proposal 3.2-1?

1 – CATT

Fine with the proposal.

To clarify, we think ’additional’ means ’separate from Rel-17 RedCap’

2 – Huawei Tech.(UK) Co.. Ltd

In the summary, our view is not correctly represented: We said we *support* these early indications for Msg3 and Msg1.

We have a concern on this proposal due to the word ”an” implying singular. It may not be the moderator’s intention - but, if Msg1 and Msg3 are both included, then the network might need to configure whether it is present for Msg1. This would possibly mean ”an” is an ambiguous term, since we’d have Msg1+Msg3 or only-Msg3. ”An” may further be ambiguous between 4-step and 2-step RACH versions of Msg3.

Suggest we write:

- Update the WID by adding objective: Support additional separate early indication**(s)** [RAN1, RAN2]
- How to support is decided by WGs

We could also suggest being exact about which WG decides (presumably it's RAN1), as otherwise the second bullet invites LS exchanges.

3 – Nordic Semiconductor ASA

Ok with the Huawei's updated version

4 – Classon Consulting

[for FUTUREWEI] OK with Huawei's update

5 – Sierra Wireless. S.A.

OK with Huawei's update - must allow for msg1 and/or msg3.

6 – Qualcomm Incorporated

Ok with the proposal, also ok with the Huawei update.

7 – Apple Poland Sp. z.o.o.

Ok with update from HW.

8 – NTT DOCOMO INC.

Support HW's update.

9 – CMDI

[As moderator]: Yes, I have no intention to ask WGs to do downselection in this proposal, current version is what I copied from current WID, let's make it clearer as Huawei suggested and reflect it in the final round. for the second bullet, since Msg3 is quite agreeable, and may need RAN2 involvement, that's why I generally use WGs instead of RAN1, as to invite LS, it is business as usual, so no worrying. By the way, it looks that I missed that Huawei is also fine with Msg3, I will correct it in next version.

10 – New H3C Technologies Co.

Support this proposal with HW's update

11 – vivo Mobile Communication Co.

Actually, we prefer the original wording from the Moderator, and the details could be discussed and decided in WG(s).

12 – Meta Ireland

Support the HW's update Objectives.

13 – Spreadtrum Communications

OK with the Huawei's updated version

14 – LG Electronics Inc.

Fine with HW's update.

We think collecting voices also from the operators in this RAN plenary discussion makes the overall process more efficient, but we can follow a majority view.

15 – Lenovo (Beijing) Ltd

Fine with Huawei's version

16 – Intel Belgium SA/NV

With the clarification from CATT, we are OK with HW's update

17 – Nokia Corporation

We are fine with update in Huawei #2.

18 – NEC Corporation

We are OK with the Huawei's revision.

19 – MediaTek Inc.

We prefer Moderator's proposal but we are OK with Huawei's revision.

20 – Samsung Electronics Polska

We still don't see strong motivation to support additional separate early indication for R18 Redcap from R17 Redcap UEs. and think this shall be discussed in WG level. For the sack of progress, we can live with the wording "If needed, support an additional separate early indication (RAN1, RAN2)"

21 – Ericsson LM

We propose to change the proposed WI objective to "Support additional separate early indication(s) [RAN1, RAN2]" to make it clear that might be more than one indication (i.e., Msg1 and/or Msg3). By the way, our view does not seem to be correctly captured in the summary in section 2.6.

22 – VODAFONE Group Plc

Our view was also not corretly captured in the summary in section 2.6. We are fine with Huawei's update

23 – China Mobile Com. Corporation

Ok with Huawei's version

24 – ZTE Corporation OK with Huawei' update.
25 – Panasonic Holdings Corporation We are OK with Huawei's update.
26 – Sony Europe B.V. OK with the proposal

3.3 Other restrictions of the WI (e.g., connectivity restrictions, band, etc.)

Proposal 3.3-1

- For restriction of the WI (e.g., connectivity restriction, band, etc), keep the objective as it is, i.e., inheriting Rel-17 restrictions on Redcap

Feedback Form 9: Could we accept proposal 3.3-1? or anything missing?

1 – CATT Fine with the proposal.
2 – Huawei Tech.(UK) Co.. Ltd We'd like to clarify vs. the summary that we actually said we did not see much need to change the WID at all, rather than stating as to Rel-17. Anyway, if the new proposal 3.3-1 means no change to the WID for this point, then it is OK to us.
3 – Nordic Semiconductor ASA Agree with proposal, this would be conclusion rather than agreement, if plan is NOT to update R18 WID
4 – Classon Consulting [for FUTUREWEI] OK to conclude no update to the WID. No need to try to restate what the WID says.
5 – Sierra Wireless. S.A. Agree. No WID update needed.
6 – Qualcomm Incorporated Agree with the proposal.

7 – Apple Poland Sp. z.o.o.

Support the proposal. Do not see the need to update WID.

8 – NTT DOCOMO INC.

We are fine with the proposal.

9 – New H3C Technologies Co.

fine with this proposal.

10 – vivo Mobile Communication Co.

Fine with the proposal.

11 – Meta Ireland

If almost companies are fine with the moderator proposal, we are not against the consensus.

12 – MediaTek Inc.

We are in principle fine with the moderator's assessment.

As this aspect is not captured in the current WID, we think the WID needs revision. Similar to Rel-17 RedCap WID, it can be stated under Notes.

Notes:

· The work defined as part of this WI is not to overlap with LPWA use cases.

· Coexistence with non-RedCap UEs and Rel-17 RedCap UEs should be ensured.

· This WI considers all applicable duplex modes unless otherwise specified.

· **This WI focuses on SA mode and single connectivity with operation in a single band at a time.**

13 – Spreadtrum Communications

Fine with the proposal.

PS: we would like to mention that our reply for "Issue 3: Other restrictions" in the initial round is not captured in the summary part (2.6).

14 – Spreadtrum Communications

Fine with the proposal.

PS: we would like to mention that our reply for "Issue 3: Other restrictions" in the initial round is not captured in the summary part (2.6).

15 – LG Electronics Inc. We support this proposal.
16 – Lenovo (Beijing) Ltd Fine with the proposal
17 – Intel Belgium SA/NV Fine with the proposal
18 – Nokia Corporation We support the proposal.
19 – NEC Corporation We are fine with proposal 3.3-1. WID update is not needed.
20 – Samsung Electronics Polska Support the proposal.
21 – Samsung Electronics Polska Support the proposal.
22 – Ericsson LM Agree
23 – VODAFONE Group Plc Support
24 – China Mobile Com. Corporation Support
25 – ZTE Corporation Support
26 – Panasonic Holdings Corporation We are OK.

27 – Sony Europe B.V. OK
28 – Sequans Communications Agree
29 – MediaTek Inc. We could not find such restriction (i.e SA only, and no DC/CA) is the current R18 WID (RP-222675). It would be highly appreciated if someone can explain why WID update is not needed. (Is the reader supposed to read R18 WID as well as R17 WID to fully capture R18 scope?) Otherwise, we suggest to add the following to R18 RedCap WID. · **This WI focuses on SA mode and single connectivity with operation in a single band at a time.**

3.4 Issue 4 - Minimum target peak rate

Proposal 3.4-1

- Keep the minimum target peak rate as 10Mbps.

No further views collection and discussion in NWM.

3.5 Issue 5 - Miscellaneous

No further views collection and discussion in NWM.

3.6 Summary after Intermediate Round

For Issue 1. UE peak rate reduction as a standalone feature:

Proposal

- **PR1 is supported as an add-on for both Rel-17 Redcap capable UE and Rel-18 eRedcap capable UE**
  - 17 RedCap + R18 PR1 should be of the single R17 UE type
    - No early identification for differentiating between UE supporting R17 Redcap and UE supporting R17 Redcap + R18 PR1
  - R18 + BW3/PR3 + R18 PR1 should be of the single R18 UE type
    - No early identification for differentiating between UE supporting R18 + BW3/PR3 and UE supporting R18 + BW3/PR3 + R18 PR1

https://nwm-trial.etsi.org/#/documents/8408

- **Yes:** CATT, Sierra, Qualcomm, Apple, NTT DOCOMO, New H3C, vivo, Meta, Intel, CMCC (10)
- **NO:** Huawei, Nodic, Futurewei, MTK, Spreadtrum, Lenovo, LGE, Ericsson, ZTE, Vodafone, Sony, Sequans, China Telecom (13)
- **Not strong:** Samsung, Panasonic

Observations:

- Compared to last round's proposal and discussion, this proposal has resolved the concern on more UE types, however, opponent companies comment that 3GPP should not define dual approaches to meet the same target peak data rate, so some companies would drop R18 PR1 than support standalone R18 PR1
- Some companies have misunderstood the proposal which does not impose anything on R17 specification
- Some companies propose to downselect between BW3/PR3 and standalone PR1, or support only add-on

Based on the discussion till now, it seems not either a problem of UE types or touching R17, it is mainly concerning to defining two approaches to meet similar target. currently, the only way that moderator can do is to list all the options mentioned in the past rounds here for views collection, then we can provide a whole picture about the status in next GTW

Proposal 4.1-1

Downselect one from the options in this meeting

- Option 1: PR1 is supported as an add-on for both Rel-17 Redcap capable UE and Rel-18 eRedcap capable UE
    - R17 RedCap + R18 PR1 should be of the single R17 UE type
        - No early identification for differentiating between UE supporting R17 Redcap and UE supporting R17 Redcap + R18 PR1
    - R18 + BW3/PR3 + R18 PR1 should be of the single R18 UE type
        - No early identification for differentiating between UE supporting R18 + BW3/PR3 and UE supporting R18 + BW3/PR3 + R18 PR1
- Option 2: Support PR1 only with UE BB bandwidth reduction
- Option 3: No PR1
- Option 4: Support standalone PR1 only, aborting BW3/PR3 (overturn existing agreements)

For Issue 2. Additional separate early indication:

Proposal

https://nwm-trial.etsi.org/#/documents/8408

- Update the WID by adding objective: Support additional separate early indication(s) (RAN1, RAN2)
- How to support is decided by WGs

Observations: one more round discussion

Since this version is quite acceptable and vast majority of companies believe that at least Msg3 is needed for early indication, then if we add ”if needed”, the situation will not improve, even repeat the same discussion in WGs and then come back to RAN again, so moderator will list as an option for downselection in this meeting.

Proposal 4.2-1

Downselect one from the options in this meeting

- Option 1
  - Update the WID by adding objective: Support additional separate early indication(s) (RAN1, RAN2)
  - How to support is decided by WGs
- Option 2
  - Update the WID by adding objective: If needed, support additional separate early indication(s) (RAN1, RAN2)
  - How to support is decided by WGs

Issue 3. Other restrictions of the WI (e.g., connectivity restrictions, band, etc.) (end up with conclusion in Wed’s GTW)

Conclusion

- For restriction of the WI (e.g., connectivity restriction, band, etc), keep the objective as it is, i.e., inheriting Rel-17 restrictions on Redcap

Issue 4. Minimum target (downlink) peak data rate(end up with conclusion in Wed’s GTW)

Conclusion

- Keep the minimum target peak rate as 10Mbps.

4 Views collection and Proposals (Final Round)

4.1 Issue 1 - UE peak rate reduction as a standalone feature

Proposal 4.1-1

Downselect one from the below options in this meeting

- Option 1: PR1 is supported as an add-on for both Rel-17 Redcap capable UE and Rel-18 eRedcap capable UE
  - R17 RedCap + R18 PR1 should be of the single R17 UE type
    - No early identification for differentiating between UE supporting R17 Redcap and UE supporting R17 Redcap + R18 PR1
  - R18 + BW3/PR3 + R18 PR1 should be of the single R18 UE type
    - No early identification for differentiating between UE supporting R18 + BW3/PR3 and UE supporting R18 + BW3/PR3 + R18 PR1
- Option 2: Support PR1 only with UE BB bandwidth reduction
- Option 3: No PR1
- Option 4: Support standalone PR1 only, aborting BW3/PR3 (overturn existing agreements)
- Option 5: Others (Anything missing and different from above 4 options)

Feedback Form 10: Could we agree with this proposal to end this issue in this meeting? and Please indicate the worst one that you can live with?

1 – MediaTek Inc.

Thanks, moderator, for the proposal.

- Preference: Option 2 (for better complexity reduction and to respect RAN1's recommendation and agreements)

- Acceptable / Can live with: Option 3

- Unacceptable: Option 1

2 – Classon Consulting

[for FUTUREWEI] RAN1 leaves the PR1 standalone decision to RAN, so from that perspective the proposal to decide in RAN is ok/aligned. The question should really be, can we agree to Opt 1? The current status in RAN/RAN1 if no further agreement is Opt 2. Our preference is Opt 2, we can accept at the worst Opt 3.

3 – Sierra Wireless. S.A.

Option 1: Acceptable

Option 2: Unacceptable

Option 3: Can live with

Option 4: Can live with but would revert RAN1 agreements

If no RAN agreement can be made in RAN# 98e, the note

"Whether UE peak data rate reduction for UE is limited only with UE BB bandwidth reduction or standalone"

should be removed and the WID objectives remain unchanged (i.e., no aggregable limitations are agreeable so BW3 or PR1 or BW3+PR1).

4 – T-Mobile USA Inc.

OPTION 5: This option trades off Network Spectral efficiency for UE complexity. As seen in the spirited 2RX discussion most operators prioritize network spectral efficiency over UE complexity. Further evidence of this was the early indication of 1RX and 2RX in R&. TMUSA prioritizes network spectral efficiency over device complexity as such we don't support PR1 or BW3/PR3. Techniques applied in R17 are more than adequate to address the UE complexity vs network spectral efficiency tradeoff. This proposal in R18 goes to far!

5 – CATT

Thanks moderator's great effort to find a way forward. At least, the whole group has clear understanding on the technical and non-technical concerns/opinions for this complicated issue.

From our side, we support this proposal, and:

Option 1: 1st preferece

Option 2: 2nd preference

Option 3: 2nd preference

Option 4: last preference (We supported this option at the end of the SI. However, revisiting plenty of corresponding RAN1 agreements and efforts isfrustrating)

6 – Huawei Tech.(UK) Co.. Ltd

Option 2, or option 3 with the understanding that if option 3, then RAN1's agreement relating to PR3/BW3 still stand.

We respectfully do not agree with the suggestion that it has been established there are no new UE types, etc. in option 1. That is exactly the concern, of course, whether we call them types, or versions, or two competing UE market fragments, or another name. There is impact to the network, and impact to the market, while the benefit is too small. Our other concerns on UE capability decisions being interleaved inside option 1 is also still there.

7 – Qualcomm Incorporated

We support Option 1

We object to Option 2

We object to Option 3

Not really promoting Option 4 but can live with it

8 – NTT DOCOMO INC.

We are fine with either Option 1 or Option 2 but cannot accept both Option 3 and Option 4.

UE BB bandwidth reduction can provide cost/complexity reduction gain from BB/RF perspective and further UE peak rate reduction can provide the gain from memory/L2 buffer perspective. Given that the targets of Rel-18 eRedCap is low-end IoT devices, both of them should be the part of Rel-18 eRedCap WI scope.

9 – vivo Mobile Communication Co.

We are fine with Option 1, Option 2 or Option 3. We object Option 4 given all the efforts we spent and progress we made for past RAN1 meetings for UE BB BW reduction.

10 – Spreadtrum Communications

Thanks moderator great efforts for the updated proposal.

Our views for the options are as follows:

- Option 1: Objection
- Option 2: 1st preference
- Option 3: 2nd preference
- Option 4: If majority support, we can live with this option for progress.

Option 1 will introduce two low-end RedCap UE implementations, we cannot accept. In addition, R17 RedCap + PR1 solution was rejected in R17 RAN1/RAN2, and we are frustrating on reopening this option.

Option 2 is align with RAN1's agreements, nothing else needs to do.

Option 3 will overturn add-on PR1 related agreements in R18 RAN1.

Option 4 will overturn all BB BW reduction related agreements in R18 RAN1

11 – Lenovo (Beijing) Ltd

We are fine with opt.2 and can live with opt.3.

12 – Apple Poland Sp. z.o.o.

Support Opt.1 and can live with Opt.3.

Objection to Opt.2.

13 – Panasonic Holdings Corporation

We support option 2 and 3. We can live with option 1. We don't support option 4 as all efforts RAN1 made are gone.

14 – MediaTek Inc.

Besides Option 1, Option 4 is also unacceptable to us.

If Option 4 is agreed, we share a similar view with vivo that all the discussions and efforts RAN1 has made in SI and WI phases are in vain. BW3/PR3 has been the majority view. "PR1 only" was not recommended by RAN1 due to its marginal complexity reduction. We should respect WGs' discussion and decision. If one has to go to move forward, it should be PR1 rather than BW3/PR3.

15 – China Mobile Com. Corporation

Support option 1□ object option 3 and 4

16 – Nokia Corporation

Option 1: it is still confusing if the R17 RedCap evolution would be a Rel-18 capability or not, and it is not possible to agree on it without this clarification first.

Option 2: acceptable

Option 3: no strong views, as the extra savings from PR1 are not significant

Option 4: not acceptable. This would mean reverting many RAN1 decisions and discarding the conclusions of the TR. We do not believe RAN1 did a bad job with the eRedCap SI, and hence there is no reason to discard its conclusions.

Option 5: move forward with either option 2 or 3 and encourage the proponents to submit Rel-17+PR1 combination as TEI-18, once PR1 design is clear in RAN1.

17 – CMDI

[As Moderator] to Nokia, for Option 1, it is just R17 RedCap capability with add-on R18 PR1, if iyou think this kind of UE is R17 RedCap evoluation, from UE type point of view, it is of R17 RedCap UE type, from capablity point of view, of course, it supports certain R18 UE capablity.

To MTK, Option4 is first metioned in your smmary in last round.

18 – New H3C Technologies Co.

We prefer option 2 which aligns with RAN1 agreement and object option 1 because it makes UE market fragement.

19 – LG Electronics Inc.

We can agree on the proposal for down-selection in this meeting.

We support Option 2. We can also live with Option 3. Objection to Option 1.

20 – Nordic Semiconductor ASA

Option 1 -> we cannot support due to fragmentation of market and is against RAN1 SI recommendation

Option 2 -> this is preferred solution aligned with RAN1 recommendation

Option 3 -> we can live with this option for compromise

Option 4 -> we cannot support, this would mean that all work (and corresponding TUs) so far in RAN1 has been wasted. This option reverts existing agreements and for sure would be formally objected by us.

21 – MediaTek Inc.

To Moderator, Yes, we know we did mention Option 4. But it was more like a hypothetical proposal under the condition that if most companies really wanted to revert the agreements. It was not a direction that we wanted to go or wanted to promote. Furthermore, this just does not feel right to us. Previous RAN/RAN1 agreements are overturned just because proponents in the minority camp could not get what they want.

22 – VODAFONE Group Plc

1st Preference: Option 2

2nd Preference: Option 4 (but understand other companies proposal that previous TUs would to waste)

3rd Preference: Option 3

23 – Samsung Electronics Polska

Support opt 2 and can live with opt 3.

24 – ZTE Corporation

Option 1: Not support. Complexity reduction is small, market fragmentation would be caused, and it is not aligned with the RAN1 recommendation.

Option 2: Support. It is aligned with the current agreement.

Option 3: Can live with. Regarding the agreements for PR1 also need to be dropped, including 10Mbps peak data rate we agreed yesterday.

Option 4: Not support. Almost all the previous RAN conclusion and RAN1 agreements are reverted.

We hope 3GPP work is technical, serious and formative, not agreed yesterday and reverted today. We also do not understand why option2 is unacceptable for some companies now. In the SI stage, in the WI phase, option 2 is what we discussed and agreed.

25 – Intel Belgium SA/NV

Option 1 is still preferred with the understanding that standalone PR1 is considered same type as Rel-17 RedCap UE.

Option 4 is not agreeable. It is surprising if we drop all agreements achieved during the past two RAN1 meetings which spent quite a lot efforts

26 – Sequans Communications

Option 1: Object (for reasons given earlier)

Option 2: Support (as recommended by RAN1)

Option 3: Object (PR1 was agreed in the WID, we should make progress rather than step backwards)

Option 4: Object (BW3/PR3 agreed in the WID, lot of work already done by RAN1 in SI/WI)

From RP97e agreements/WID, we should only choose on whether PR1 is add-on to BW3/PR3 (Option 2) or standalone (Option 1)

We are not sure how it helps to add further options that revert previous agreements.

27 – CMDI

[As moderator] Now it looks we are in deadlock. Final try, I recall one agreemennt on PR1, following whch, assuming e.g., Y=2X, add-on and standalone will offer different peak data rate, is it possible to resolve the concern on dual implementation for same target service?

- **UE peak data rate reduction is supported at least as an add-on to UE BB bandwidth reduction,**
  - **The constraint *vLayers·Qm·f* ≥ 4 is relaxed to *vLayers·Qm·f* ≥ X.**
  - **FFS: the value of X**
- **If UE peak data rate reduction is supported as a standalone feature,**
  - **The constraint *vLayers·Qm·f* ≥ 4 is relaxed to *vLayers·Qm·f* ≥ Y.**
  - **FFS: the value of Y**
  - **Note: Whether this option is supported will be decided in RAN plenary.**

28 – Ericsson LM

Based on the discussion so far, we can support Option 1 (and can live with Options 2/3/4).

29 – Sony Europe B.V.

Preference is option 2.

We would be OK with option 3.

30 – Guangdong OPPO Mobile Telecom.

We see the option 1-4 are all acceptable. However, the Option 4 seems to be the worst case, as some(still small) complexity saving is lost by discarding the current agreement so far.

We generally still prefer option 1.

4.2 Issue 2 - Additional separate early identification

Proposal 4.2-1

Downselect one from the 2 options in this meeting

- Option 1
  - Update the WID by adding objective: Support additional separate early indication(s) (RAN1, RAN2)

- How to support is decided by WGs

- Option 2
  - Update the WID by adding objective: **If need,** support additional separate early indication(s) (RAN1, RAN2)
  - How to support is decided by WGs

Feedback Form 11: Could we agree with this proposal to end this issue in this meeting? and Please indicate the worst one that you can live with

1 – Classon Consulting [for FUTUREWEI] OK to decide now. Prefer Opt 1, can live with Opt 2.
2 – T-Mobile USA Inc. REDCAP is a single class of UE's thus we don't see a need to differentiate between R17 UE's and R18 UEs. MSG3 early indication in R17 is more that adequate for any R18 feature. T-MUSA doesn't support either option.
3 – Sierra Wireless. S.A. Prefer Opt 1 but can live with Opt 2.
4 – CATT Either way is fine (though we believe Msg3 early indication is enough)
5 – Huawei Tech.(UK) Co.. Ltd Option 1. Having option 2 simply circulates the decision back to the WGs. RAN is the more senior decision-making body, and is in possession of all the relevant information it seems.
6 – Qualcomm Incorporated We would prefer Option 1 but can accept Option 2 as well.
7 – NTT DOCOMO INC. We prefer Option 1.
8 – vivo Mobile Communication Co. We prefer option 2, and think this should be anyway discussed and decided in WG. We could accept option 1 if majority companies prefer it.

9 – Spreadtrum Communications

Prefer Opt 1, can live with Opt 2 if majority companies support Opt 2 .

Actually, we share HW's view, we should make progress and make some decision in RAN, it seems option 2 doesn't help the progress.

10 – Lenovo (Beijing) Ltd

We prefer option 1.

11 – Apple Poland Sp. z.o.o.

Prefer Opt.1. Also can accept Opt.2 although it means leaving decision to WG level.

12 – Panasonic Holdings Corporation

We are ok with either, but preference is option 1.

13 – China Mobile Com. Corporation

Either is fine.

14 – NEC Corporation

We support option 2. RAN plenary does not need to rush into conclusion at this stage and can leave it to the WGs. Hard decision can be done in March, if necessary.

15 – Nokia Corporation

We prefer option 1. We can live with option 2 as well.

16 – New H3C Technologies Co.

support option 1 and live with option 2

17 – MediaTek Inc.

Again, we think separate Msg3 early indication is needed to avoid making unnessary Msg4 PDSCH scheduling contraint and caussing link performance loss to Rel-17 RedCap. On the other hand, we think separate Msg1 early indication is not necessary.

With this, we prefer Option 1 but can live with Option 2.

18 – LG Electronics Inc.

Prefer to decide in this meeting.

We prefer Option 1.

19 – Samsung Electronics Co.

We prefer Option 2.

As indicated in the previous round, we did not want to make moderator in trouble, and that is why we proposed Option 2 for the sake of progress. The decision should not be taken merely based on the number of supporters, but should be based on the technical discussion in all the relevant WGs, which are both RAN1 and RAN2 in this case.

We would like to stress that, at the first place, we are not sure the proposals on the table can be the ”objective” of the WI. Such (separate) early indication should be the outcome of the technical discussion from the proper objective, *e.g., specify the mechanism to support the eRedCap UE before normal capability exchanges*, etc. Furthermore, as said above, the proposed objective contains the impact to both RAN1 and RAN2, while RAN2 had even no TU for this item before at all. We understand that proponents want to make a decision in RAN for the progress, but think that the decision on such details should be made in the relevant WGs.

20 – Nordic Semiconductor ASA

It seems that MSG3 separate early identification is needed, and thus we prefer Option 1. But we are fine to continue technical discussion ”on the need” in RAN1/RAN2, so OK with Option 2

21 – VODAFONE Group Plc

Prefer Option 1

22 – ZTE Corporation

We support Option1.

Until now, we did not see the technical reason why msg3 early indication can not be supported. Regarding the early indication, RAN1 actually already has the sufficient discussion, and majority thinks msg3 early indication is needed to be supported. Therefore, ‘if needed’ would lead us back to the origin and re-discuss the necessity does not make sense. Then, we would suggest to change the wording a little bit, and make it as a medium round.

‘Support additional separate early indication(s) unless it is unfeasible.’

23 – Deutsche Telekom AG

We support option 1

24 – Intel Belgium SA/NV

Option 1 is preferred. Without a clear guideline from RAN, it is expected the same debating will repeat again in RAN1.

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25 – Ericsson LM

We prefer Option 1 (but can live with Option 2).

4.3 Summary and Proposals after Final Round

For Proposal 4.1-1, during the ”final round” discussion, ti looks we are in deadlock, none of four detailed solutions is agreeable.

Option 1:

Acceptable: Sierra, CATT, Qualcomm, NTT DOCOMO, vivo, Apple, Panasonic, CMCC, Intel, Ericsson

Object/No: MTK, T-Mobile, Spreadtrum, LGE, Nodic, T-Mobile, ZTE, Sequans

Option 2:

Acceptable: MTK, Futurewei, CATT, Huawei, NTT DOCOMO, vivo, Spreadtrum, Lenovo, Panasonic, Nokia, New H3C, LGE, Nodic, Vodafone, Samsung, ZTE, Sequans, Ericsson, Sony

Object/No: Sierra, T-Mobile, Qualcomm, Apple, T-Mobile

Option 3:

Acceptable: MTK, Futurewei, Sierra, CATT, Huawei, vivo, Spreadtrum, Lenovo, Apple, Panasonic, Nokia, LGE, Nodic, Vodafone, Samsung, ZTE, Ericsson, Sony

Object/No: T-Mobile, Qualcomm, NTT DOCOMO, CMCC, T-Mobile, Sequans,

Option 4:

Acceptable: Sierra, CATT, Qualcomm, Spreadtrum, Vodafone, Ericsson

Object/No: MTK, T-Mobile, NTT DOCOMO, vivo, Panasonic, CMCC, Nokia, Nodic, T-Mobile, ZTE, Intel, Sequans

At least Option 4 should be aovided. Option 3 seems contradictary with the claim from companies that IoT device is sensitive, we should keep rational to it.

Between Option 1 and Option 2, moderator would like to make the last try in this meeting with proposal 5.1-1, otherwise, it looks that we will have to figure out smarter solution till next RAN meeting. Companies may say why don’t have a try of Option 2, yes, we can anyway do it in Friday’s GTW if companies still don’t think proposal 5.1-1 will work or help.

Proposal 5.1-1

- PR1 is supported as an add-on for both Rel-17 Redcap capable UE and Rel-18 eRedcap capable UE
    - R17 RedCap + R18 PR1 should be of the single R17 UE type

        - No early identification for differentiating between UE supporting R17 Redcap and UE supporting R17 Redcap + R18 PR1

    - R18 + BW3/PR3 + R18 PR1 should be of the single R18 UE type

        - No early identification for differentiating between UE supporting R18 + BW3/PR3 and UE supporting R18 + BW3/PR3 + R18 PR1

- Define value of X and Y in RAN1 to guarantee R17 UE type and R18 UE type to different minimum peak rate to differentiate distinct target.

Table 3: RAN1 agreement on PR1 in RAN1#111

- **UE peak data rate reduction is supported at least as an add-on to UE BB bandwidth reduction,**
    - **The constraint $v_{Layers} \cdot Q_m \cdot f \geq 4$ is relaxed to $v_{Layers} \cdot Q_m \cdot f \geq$ X.**
    - **FFS: the value of X**
- **If UE peak data rate reduction is supported as a standalone feature,**
    - **The constraint $v_{Layers} \cdot Q_m \cdot f \geq 4$ is relaxed to $v_{Layers} \cdot Q_m \cdot f \geq$ Y.**
    - **FFS: the value of Y**
    - **Note: Whether this option is supported will be decided in RAN plenary.**

For Proposal 4.2-1, during the ”final round” discussion, we can see companies strive for consensus.

Option 1: Futurewei, Sierra, CATT, Huawei, Qualcomm, NTT DOCOMO, vivo, Spreadtrum, Lenovo, Apple, CMCC, Nokia, MTK, LGE, Nodic, Vodafone, ZTE, DT, Intel, Ericsson

Option 2: Futurewei, Sierra, CATT, Qualcomm, vivo, Spreadtrum, Apple, CMCC, NEC, Nokia, MTK, Samsung, Nodic, Ericsson

Neither: T-Mobile

Observations:

The proposal in the intermediate round, i.e., option 1, is not simply based on counting supporters, in fact it is trying to avoid a back-and-forth discussion between WGs and TSG, since this proposal is not put on the table for the first time and it is not expected that here the majority of companies will change their minds in one quarter. It can be imagined that it will be brought back to RAN if still minority of companies claim that it is not necessary, unless these companies will change their minds in next quarter even they will not right now. From moderator’s observation, this kind of concern is more valid than conern of partially resolving this issue in RAN.

That is all that we can do in this NWM discussion, I have no plan to extend this discussion in this week.

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Moderator will show this round's status in Friday's GTW to see which one is more agreeable.

5 Views collection and proposals (Extended Round)

5.1 Issue 1 - UE peak rate reduction as a standalone feature

Proposal 5.1-1

- PR1 is supported as an add-on for both Rel-17 Redcap capable UE and Rel-18 eRedcap capable UE
  - R17 RedCap + R18 PR1 should be of the **single R17 UE type**
    - No early identification for differentiating between UE supporting R17 Redcap and UE supporting R17 Redcap + R18 PR1
  - R18 + BW3/PR3 + R18 PR1 should be of the **single R18 UE type**
    - No early identification for differentiating between UE supporting R18 + BW3/PR3 and UE supporting R18 + BW3/PR3 + R18 PR1
- Define value of X and Y in RAN1 to support **R17 UE type** and **R18 UE type** with different minimum peak rate to differentiate distinct target.

Table 4: RAN1 agreement on PR1 in RAN1#111

- **UE peak data rate reduction is supported at least as an add-on to UE BB bandwidth reduction,**
  - **The constraint $v_{Layers} \cdot Q_m \cdot f \geq 4$ is relaxed to $v_{Layers} \cdot Q_m \cdot f \geq X$**
  - **FFS: the value of X**
- **If UE peak data rate reduction is supported as a standalone fea**
  - **The constraint $v_{Layers} \cdot Q_m \cdot f \geq 4$ is relaxed to $v_{Layers} \cdot Q_m \cdot f$**
  - **FFS: the value of Y**
  - **Note: Whether this option is supported will be decided in RAN plenary.**

Feedback Form 12: Could you accept proposal 5.1-1? or do you agree with the spirit of this proposal in general(as warm-up for next meeting)?

1 – Nordic Semiconductor ASA

We are generally Ok with the proposal. But we think that the target bitrate for Rel-17 RedCap should be comparable with LTE Cat2, something like 40Mbps.

2 – Sierra Wireless. S.A.

Thanks again to the FL for coming up with a creative proposal.

However, we feel this is going in the wrong direction as two distinct peak data rates will now certainly create two Rel 18 Redcap UE types/categories and actually now create market fragmentation. Since Sierra is strongly concerned with market fragmentation (as other companies have also indicated), this approach is unacceptable to Sierra.

Given the unfortunate deadlock situation, our proposal is to delay this decision for one plenary cycle. This will allow companies to further discuss UE types, market fragmentation, and network implications. Also, there is no urgent need to make this decision at this meeting since the work needed to specify PR1 is very small (e.g., mostly just need to decide on the values for X and Y).

3 – T-Mobile USA Inc.

T-Mobile USA - In general we don't like the idea of introducing new UE categories into REDCAP Introducing PR1 and/or PR3 is a really bad idea that fragments the market and further reduces network spectral efficiency.

4 – Nordic Semiconductor ASA

We agree, fragmentation remains, but at least there is a clear difference between UEs defined by 3GPP, which may be motivated by a different use-case. Defining two different UE types for the same UE category (i.e. Option 1) would be the worst possible way-forward, at hand. ... in our opinion.

At the same time, we are a bit confused that R17 RedCap + PR1 (10Mbit) was previously called "same type" as R17 RedCap , but R17 RedCap + PR1 (40Mbit) suddenly is referred as a new UE type?

R17 RedCap + PR1 (40Mbit) would waste less spectral efficiency than R17 RedCap + PR1 (10Mbit) , assuming it is not accompanied with scheduling resource restriction (PR3/BW3).

Finally, we think that the best way forward is to follow RAN WG's recommendations.

5 – Huawei Tech.(UK) Co.. Ltd

Thanks for the big effort, and another try.

Sadly, we can't agree to this, because of a few things:

- This alters, or creates a new, Rel-17 RedCap UE type. It cannot really be said to alter it, because UEs have been produced complying with older (i.e. current) Rel-17 spec versions, and now this new R17+R18 UE comes along as the so-called 'single' type. It seems to invalidate the valid implementations, and might also invalidate certain aspects of Rel-17 UE capability definitions and signaling. Thus it appears to make a new, late, Rel-17 UE type, regardless of the version of the specs it might be put in.
- Another effect of the X,Y approach is to effectively define two different PR1-based UE types. It is still market fragmenting, just along a different direction than before; it might even be another level of fragmentation, on top of having PR1 standalone or add-on.
- We remain unclear how to understand the relation between the sub-bullet of Rel-18 and UE capability definitions for this release. That needs proper consideration.

So overall, it seems there is not a way to achieve the proponents goals that does run into these problems from one direction or another.

6 – Qualcomm Incorporated

Yes, we can agree to the proposal as a framework to facilitate further discussion.

7 – Guangdong OPPO Mobile Telecom.

The problem of fragmentation into more UE types of option 1 is somehow not desirable to us. But this would be better than having a standalone feature of PR1. We can accept it as some middle ground.

But saying that, we also want to remind that int he WG discussion, we should avoid implement the option 1 as a standalone PR1 in spec., like independently stating that data rate reduction is one optional UE capability.

8 – Spreadtrum Communications

Thanks a lot to the moderator for the great efforts on this issue.

We are still negative for this proposal, share the similar view as HW. In addition:

- Unclear on scope□if R17 RedCap + R18 PR1 is the single R17 UE type, should it be discussed in R17 TEI, not in R18 eRedCap? Besides, it seems we don't need to call it as R18 PR1, constraint relaxation(PR1) was already discussed in R17 phase.
- The value of X and Y is not clear so far, if the distinction for peak data rate is small, then this proposal is meaningless for companies have concerns on dual implementation for the same use cases. So no need rashly make decision, we are fine with Sierra's proposal that we can discuss it at the next RAN.

9 – MediaTek Inc.

Thanks moderator for the proposal but we still cannot agree to this. We think if a new peak data rate (assuming higher) is introduced, it suits to Rel-17 RedCap better and should be discussed as Rel-18 TEI based on Rel-17 RedCap.

The target peak data rate for R18 is currently specified as 10Mbps and we would like to stick to that. If the R17RedCap+R18PR1 with a different target peak data rate is introduced, should we change the peak data rate target in Rel-18 WID? or not?

Our understanding is this new introduced UE with a new peak data rate target will indicate itself as Rel-17 RedCap in early identification (via Msg1 or Msg3). In this regard, we can regard it as a Rel-17 RedCap UE. In this case, the Rel-17 RedCap WID actually has specified a wide range of data rates to support. (See *text* below for details.) What is the new data rate target we are introducing? Is it not covered by Rel-17 RedCap WID? Or is it not achievable by the final Rel-17 RedCap? If so, a Rel-18 TEI based on Rel-17 RedCap is more acceptable than mixing with Rel-18 RedCap.

Sharing a similar view with Nokia, we think a potential wayforward is to leave Option 2(i.e. BW3/PR3+PR1, or Option 3, i.e. BW3/PR3 only) in the final round as it is for Rel-18 RedCap. Proponents who are interested in Rel-17 RedCap + PR1 can propose it as a Rel-18 TEI with a proposed peak data rate target. Then, companies can justify its neccessity and evaluate its impact, for example, re-eveluate what Rel-17 RedCap can do and cannot do, concerns with market fragmentation, impact on Rel-17 RedCap, and so on.

[Rel-17 RedCap WID, RP-211574, Section 3 Justification]

Use case specific requirements:

· Industrial wireless sensors: Reference use cases and requirements are described in TR 22.832 and TS 22.104: Communication service availability is 99.99% and end-to-end latency less than 100 ms. ***The reference bit rate is less than 2 Mbps (potentially asymmetric e.g. UL heavy traffic) for all use cases and the device is stationary.*** *The battery should last at least few years. For safety related sensors, latency requirement is lower, 5-10 ms (TR 22.804)*

· Video surveillance: As described in TR 22.804, ***reference economic video bitrate would be 2-4 Mbps****, latency < 500 ms, reliability 99%-99.9%.* ***High-end video e.g. for farming would require 7.5-25 Mbps****. It is noted that traffic pattern is dominated by UL transmissions.*

· Wearables: ***Reference bitrate for smart wearable application can be 5-50 Mbps in DL and 2-5 Mbps in UL, and peak bit rate of the device can be higher, up to 150 Mbps for downlink and up to 50 Mbps for uplink****. Battery of the device should last multiple days (up to 1-2 weeks).*

10 – Xiaomi Communications

Share the similar view with Spreadtrum that it seems more appropriate to discuss it in R17 TEI if taking R17 RedCap + R18 PR1 as the single R17 UE type, and we only need to focus on R18 + BW3/PR3 + R18 PR1 in the discussion of R18 RedCap.

11 – NTT DOCOMO INC.

According to the proposal, the peak rate would be as follows in our understanding.

- R17 RedCap: ~150Mbps
- R17 RedCap + R18 PR1: XMbps (10< X < 150 Mbps, e.g., X=50Mbps)
- R18 + BW3/PR3 + R18 PR1: 10Mbps

Given that there is no overlap among the above three types of UEs in terms of the peak rate, we are fine with the Proposal.

However, if majority of companies have a concern on the potential fragmentation and/or introducing another range of peak rate for RedCap even though R17 pure RedCap UE and R17 RedCap + R18 PR1 are handled as a single UE type, we are also fine to support the original WG's recommendation, i.e., PR1 is supported as add-on feature of UE BB BW reduction in R18 and not supported as standalone feature.

12 – Panasonic Holdings Corporation

Thanks DOCOMO for the calculation of the peak rate. We have been not sure what is the target peak rate for ”R17 RedCap + R18 PR1 should be of the single R17 UE type” as it does not so concrete on what PR1 limit. People seems to have different peak rate assumption on this. If 50 Mbps is target, it looks similar to LTE category 2. As 10 Mbps is similar to LTE category 1 and 150 Mbps is similar to LTE category 4, to target around 50 Mbps could be something good number. As the peak rate and the capability is less than Rel.17 UEs, if such UE is introduced, the initial access procedure should be same as ”R18 + BW3/PR3 + R18 PR1” in order not to the design complicated.

We think the description of ”R17 RedCap + R18 PR1” brings the confusion to modify Rel. 17 although moderator said ”the proposal does not touch Rel-17 Redcap, which just provides a description about what the standalone R18 PR1 could look like without introducing additional new UE type.” As mentioned by several companies, it should be described as ”R18 ~~+ BW3/PR3~~ + R18 PR1” i.e. just not to have ”BW3/PR3”.

Overall, one of direction we see is following.

- DL and UL peak data rate is the order of 50Mbps (similar to LTE category 2).
- Above is realized by just PR 1 with 20 MHz RF bandwidth and without further PRB restriction.
- Initial access procedure (SIB, Paging, random access procedure) is same as ”R18 + BW3/PR3 + R18 PR1”. Therefore, only unicast PDSCH/PUSCH data rate is high compared with ”R18 + BW3/PR3 + R18 PR1”.

13 – CMDI

[As moderator] to MTK and Xiaomi, we should be frank, if things are as easy as you suggested after so long discussion, i.e., put them in TEI, regardless in R17 or R18, if it is really agreeable, what are we doing in this week on this issue? anyway, we need more time to think more on all different options.

14 – MediaTek Inc.

Thanks DCM and Panasonic for further discussing detailed numbers.

The peak data rates with 20MHz for Rel-17 RedCap with vlayers*Qm*f = 4 are shown below based on TS38.306 [Also see our tdoc R1-2209519]

1. SCS=15kHz with 106PRBs, DL peak rate = 56.7 Mbps, UL peak rate = 60.7 Mbps
2. SCS=30kHz with 51PRBs, DL peak rate = 54.6 Mbps, UL peak rate = 58.4 Mbps

If 50Mbps is the target, the relaxation of the constraint would be from 4 to around 3.5 or 3.65. Do companies see the need for this degree of relaxation?

15 – Panasonic Holdings Corporation

Thanks MediaTek for your reply and explanation in your tdoc of R1-2209519. I’m now confusing the relation between 150 Mbps peak rate of Rel.17 Redcap and your calculated number of 50 to 60 Mbps. If these are already available, I agree no need to introduce 50 Mbps order range.

16 – ZTE Corporation

Thanks moderator's efforts. We understand the motivation of this proposal is to distinct the minimum peak data rate for PR3 and PR1, assuming that the PR1 provide higher peak data rate than PR3 based on the minimum peak data rate 10Mbps agreed. But there are still some problems.

1. Given the fact that 10Mbps for the standalone PR1 can only provide 4% complexity reduction, the standalone PR1with larger peak data rate can provide very limited complexity reduction. Moreover, considering PR3 is supported, the necessity of introducing a new UE with higher complexity is not foreseen.

2. PR3 also can achieve higher peak data rate, since what we defined is the minimum peak data rate. Then the market for PR3 and standalone PR1 still can not avoid overlapping due to the different implementation in Rel-18.

Therefore, we still can not accept this in Rel-18 RedCap WI scope.

17 – MediaTek Inc.

To Moderator, with all due respect, we did not say it would be easy if it were proposed as a TEI. We do think it would cause less confusion if it is discussed in TEI based on Rel-17 RedCap. Our propsal for being discussed in TEI was based on the reasoning: (1) this UE would indicate itself as a Rel-17 RedCap (instead of Rel-18 RedCap) in the early indicaiton (either Msg1 or Msg3), (2) the new proposed target rate would be likely covered by Rel-17 RedCap WID (from 5Mbps to 150Mbps) and requires no changes in Rel-17 RedCap WID, unlike changes needed for Rel-18 WID, and (3) the specification change would be small (i.e. changing the minimum value in T38.306) for PR1 only. But of course, the fundamental concerns (e.g. market fragmentation) remain the same and that is why we said companies would need to re-evaluate its impact (with a new proposed target rate) on market fragmentation, R17 Redcap, and so on.

18 – MediaTek Inc.

To Panasonic, I guess 150Mbps mentioned by DCM is from the following text in the Rel-17 RedCap WID, but DCM can further clarify.

· *Wearables: Reference bitrate for smart wearable application can be 5-50 Mbps in DL and 2-5 Mbps in UL, andpeak bit rate of the device can be higher,* ***up to 150 Mbps for downlink and up to 50 Mbps for uplink****. Battery of the device should last multiple days (up to 1-2 weeks).*

19 – Sony Europe B.V.

We agree with the sentiments from Sierra Wireless.

This proposal creates even more market fragmentation than the original proposal of two different ways of achieving 10Mbps (aka "standalone" and "add-on").

Hence, we do not support this proposal.

We also feel that introducing this new standalone UE (R17 + PR1) is not in the spirit of TEI and should not be discussed as TEI.

20 – NTT DOCOMO INC.

Thank MTK and Panasonic for the discussion.

Regarding the 150 Mbps peak rate for R17 RedCap, we intend the maximum peak rate from WID description for R17 RedCap as MTK mentioned.

50 Mbps for R17+PR1 in our previous comment is just one example and we don't have a strong view so far. However, if we introduce a UE type which supports the peak rate between pure R17 RedCap and R18+BW3/PR3+PR1, we should carefully assess the peak rate range not to overlap with those for other types of RedCap UEs to avoid market fragmentation.

More specifically, as MTK kindly shared the minimum peak rate of R17 RedCap that it is around 55~60 Mbps, and hence the maximum peak rate of R17+PR1 should be smaller than this value and of course the minimum peak rate should be much larger than 10 Mbps.

21 – Panasonic Holdings Corporation

Thanks DOCOMO for the clarification. Similar to Sony, DOCOMO and others, we also don't see much benefit to have 10 Mbps order by multiple means. Then possibility can be 25 Mbps order range. It means the boundary between LTE category 1 and 2, which means more granularity than LTE. We don't see much merit of such smaller granularity as semi-conductor technologies improved further compared with LTE times. Then current our view is the UE without BW3/PR3 looks not so essential.

22 – Intel Belgium SA/NV

We are supportive to the proposal. Allowing higher minimum peak data rate than 10Mbps (agreed for BW3) would be reasonable, since it avoids the concerns from some companies regarding the support of two UE capabilities with the same peak data rate.

23 – Sequans Communications

Thanks to the moderator for the update.

Unfortunately, we cannot accept this new proposal.

The eRedcap minimum target peak rate is 10Mbps.

The Redcap minimum peak rate (that can be advertised by UE) is around 55/60 Mbps.

Considering that eRedcap will also support higher peak rates (10Mbps is the minimum), we don't see room to further allow lower peak rates for Redcap without risking market fragmentation. In LTE there is no category between 10Mbps and 50Mbps and this has been beneficial to the ecosystem.

Our preference is to keep only PR1 as an add-on to BW3/PR3 (Option 2 from 4.1.1), which is in line with RAN1 TR recommendation and previous RAN meeting agreement.

24 – Nordic Semiconductor ASA

We confirm that current minimum peak rate of R17 RedCap, based on 38.306, would be around 55Mbits. In this case, Y should target 25Mbits

25 – Ericsson LM We are fine with the proposal. If a decision cannot be reached in this meeting, the proposal can be considered together with other options in the next meeting.
26 – VODAFONE Group Plc We still don't understand how PR1 can be supported as an add-on for **R17** Redcap capable UE in a release that is deemed as frozen. The RAN-level action was to check whether PR1 could be introduced as an add-on or standalone for **R18** RedCap. Our preference still is to have a single solution for the complexity reduction in R18 in order to address the concerns on market fragmentation, meaning either BW3 only, PR1 only or BW3+PR1 (meaning, PR1 as an add-on)
27 – Classon Consulting [for FUTUREWEI] Not our preference, till has market fragmentation and rel-17 impact.
28 – China Mobile Com. Corporation We are supportive to the proposal

6 Final Agreements or Conclusions

For for Issue – 1, UE peak rate reduction as a standalone feature

Conclusion

- Revisit in RAN#99 (no additional discussion in RAN1 in 1Q'23)

For Issue – 2, Additional separate early indication

Agreement

- Support additional separate early indication(s) (RAN1, RAN2)
- How to support is decided by WGs

7 References

1. RP-222675, WID on Enhanced support of reduced capability NR devices
2. RP-222828, Revised WID: Enhanced support of reduced capability NR devices Ericsson
3. RP-222829, Views on WI scope for Enhanced support of reduced capability NR devices Ericsson
4. RP-222922, Views on scope of the eRedCap WI Qualcomm Incorporated
5. RP-222964, On open issues: Enhanced support of reduced capability NR devices Nordic Semiconductor ASA

https://nwm-trial.etsi.org/#/documents/8408

6. RP-222977,Discussion on Rel-18 WI scope for eRedCap Intel Corporation
7. RP-222989, Discussions on Rel-18 RedCap WI scope Nokia, Nokia Shanghai Bell
8. RP-223016, Support of standalone UE peak rate reduction for Rel-18 eRedCap Qualcomm Incorporated
9. RP-223038,Views on Rel-18 eRedCap WID scope Spreadtrum Communications, H3C
10. RP-223044,Views on open issues for R18 RedCap WI CMCC
11. RP-223102, Discussion on Rel-18 eRedCap WID scope vivo
12. RP-223120, Views on further reduced capability NR devices xiaomi
13. RP-223128, Views on scope of Rel-18 RedCap CATT
14. RP-223168, Discussion on enhanced support of reduced capability NR devices NTT DOCOMO, INC.
15. RP-223204, On Rel-18 enhanced support of reduced capability NR devices Apple
16. RP-223249, Discussion on remaining issues in Rel-18 RedCap WID MediaTek Inc.
17. RP-223263, Discussion on Rel-18 eRedcap scope ZTE, Sanechips
18. RP-223337, Views on work item scope for Rel-18 RedCap UEs Futurewei
19. RP-223393, Discussion on Rel-18 eRedCap WI scope Sierra Wireless. S.A.
20. RP-223403, Discussion on Rel-18 Further NR RedCap UE complexity reduction Huawei, HiSilicon