

3GPP TSG-RAN Meeting # 91-e Electronic Meeting, 22nd - 26th March, 2021 RP-210820

Agenda item: 9.6.4

Source: Moderator (Nokia)

Title: Intermediate Summary of discussion [91E][38][RedCap_scope]

Document for: Information

1 Introduction

Two aspects of the WID (RP-202933) are to be addressed at this meeting:

- Max bandwidth and Rx branch aspects left open at RAN#90e
- Other RAN2-related objectives, to be added following completion of the RAN2 aspects of the SI (see TR38.875).

2 Moderator's Intermediate Summary

The details of the initial and intermediate discussions are provided in subsequent sections of this document. Questions 1 to 6 were discussed in the Initial Round, and Questions 2-1 to 2-10, to further fine-tune the objectives, were discussed in the Intermediate Round.

In general, there are a few companies who expressed the view that points on which consensus was not reached yet in RAN2 should be left open for further discussion in RAN2. The Moderator disagrees with this view; the fact that RAN2 has failed to reach consensus is indeed a good reason why RAN plenary now needs to make a decision in order to manage the workload in the WGs. This should also be an incentive for more constructive engagement in the WGs in future.

A revised WID is provided in RP-210821, building on the comments received in the Intermediate Round. For further explanation, some feedback on the specific questions is provided here:

Question 2-1 (potential mandatory status of Rel-15 low-SE MCS table and PDSCH repetition)

Most companies support leaving the mandating of RedCap UE support for the Rel-15 low-SE MCS table and PDSCH repetition to the usual capability discussions of the WI in the WGs.

Question 2-2 (Rx branch and bandwidth related objectives)

In answer to a few comments, it should be clear that the bullet about the gNB knowing the number of Rx branches does not require it to be by early indication; UE capability signalling would satisfy this bullet. The “early indication” bullet only mentions RedCap UEs, not the number of Rx branches.

Question 2-3 (Access control/barring mechanisms)

The current wording allows RedCap UEs to be distinguished from non-RedCap UEs by early indication, and 1-Rx RedCap UEs to be distinguished from 2-Rx RedCap UEs by the system information indication and by UE capability signalling.

For UAC, there is agreement that legacy UAC applies to RedCap UEs. There seem to be different views about whether UAC should be extended to enable independent access control of RedCap and non-RedCap UEs, and, if so, whether this has any impact in RAN2.

Question 2-4 (UE types and capabilities)

The majority of companies are happy with one RedCap UE type with further distinctions between RedCap UEs being made by UE capability signalling. A few companies still want to keep open the possibility for multiple “types”, but it has not been clear from the comments what is the motivation for multiple “types” compared to using UE capability signalling.

Question 2-5 (eDRX up to 10.24s)

The meaning of “common design between RRC Inactive and Idle” is now clarified with “e.g. common set of eDRX values”.

The comments related to longer eDRX values are handled by the next question.

Question 2-6 (eDRX above 10.24s)

The comments are taken into account.

Question 2-7 (eDRX configuration)

Companies are evenly split about whether to include a statement in the WID that Idle eDRX is configured by the CN and Inactive eDRX is configured by the RAN or whether to leave this for further discussion in the WGs. This is therefore identified as a decision to be made in RAN2.

Question 2-8 (Further eDRX details)

There does not seem to be full agreement to add further details, and the main motivations cited by the proponents of adding more detail are already covered by other bullets (e.g. that PTW is not applicable for eDRX cycles up to 10.24 s).

Question 2-9 (RRM Relaxation)

In response to the comments, RRC_Idle/Inactive are now included as well as RRC_Connected. RAN4 impact is also included.

Question 2-10 (Coverage Enhancement)

Several companies commented that the CovEnh features should be available to RedCap UEs but that decisions about mandatory support would be taken later. The wording is therefore modified to clarify this, and the bullet is included.

3 Max bandwidth & Rx branch aspects

- a) Minimum number of Rx branches for frequency bands where a legacy NR UE (other than 2-Rx vehicular UE) is required to be equipped with a minimum of 4 Rx antenna ports.
- b) The possibility of, and any associated conditions for, optional support of a wider bandwidth up to 40MHz after initial access.

For these two aspects, as per the GTW session at RAN#91e on 22nd March 2021, the Chairman's guidance leads to focusing on agreeing the necessary objectives for identification and access control of RedCap UEs to enable 1-Rx devices to be developed and managed in an acceptable way, and not supporting bandwidths greater than 20MHz.

The corresponding updates to first main objective of the WID would therefore be as follows:

- Specify support for the following UE complexity reduction features [RAN1, RAN4]:
- Reduced maximum UE bandwidth:
- Maximum bandwidth of an FR1 RedCap UE during and after initial access is 20 MHz.
- Maximum bandwidth of an FR2 RedCap UE during and after initial access is 100 MHz
- Reduced minimum number of Rx branches:
- For frequency bands where a legacy NR UE is required to be equipped with a minimum of 2 Rx antenna ports, the minimum number of Rx branches supported by specification for a RedCap UE is 1. The specification also supports 2 Rx branches for a RedCap UE in these bands.
- For frequency bands where a legacy NR UE (other than 2-Rx vehicular UE) is required to be equipped with a minimum of 4 Rx antenna ports, the minimum number of Rx branches supported by specification for a RedCap UE is 1. The specification also supports 2 branches for a RedCap UE in these bands.
- A means shall be specified by which the gNB can know the number of Rx branches of the UE.

The related objectives to ensure acceptable management of RedCap UEs, and specifically also 1Rx RedCap UEs in bands where a legacy NR UE is required to be equipped with a minimum of 4 Rx ports, could be as follows (derived from the proposal in RP-210656), with opportunities for comments in Feedback Forms 1 & 2:

- Specify functionality that will enable RedCap UEs to be explicitly identifiable to networks - through an early indication in Msg1 and/or Msg3, and MsgA, including the ability for the early indication to be configurable by the network.

Moderator's Summary after Initial Round

Most companies are able to accept the way forward from Monday’s GTW session.

In the light of the comments made, a bullet is added above that "A means shall be specified by which the gNB can know the number of Rx branches of the UE."

Regarding the explicit identification of RedCap UEs, it seems to be clearer for most companies if the objective above focuses on the early identification. "Later" indication is covered by the signalling of UE capabilities. There is wide support for the early indication to be configurable by the network, and this is therefore added.

Support for 4-Rx is removed for frequency bands where a legacy NR UE is required to be equipped with a minimum of 4 Rx antenna ports.

There does not appear to be consensus about support of different numbers of Rx branches being band specific, so this is not included for now.

There were some comments about not allowing the 3dB antenna efficiency loss for 1 Rx devices, but in the absence of OTA testing for FR1 it is difficult to see how this could be reflected in the WID objectives.

There was one comment that RAN plenary should not make decisions where there was not consensus in the WGs. However, RAN plenary needs to do its job to manage the workload in the WGs, especially where WGs have had difficulty reaching consensus.

Feedback on one further question would be useful:

Question 2-1: Should low-SE MCS table and DL PDSCH repetition be mandatory for 1-Rx UEs?

Feedback Form 1:

Item	Company	Comments
1	Ericsson LM	[Ericsson] We think this discussion should be taken in RAN1 and expect RAN1 to be able to resolve this question.
2	Classon Consulting	[for FUTUREWEI] The low-SE MCS table provides more MCS choices for UEs that need extra-reliability, and is the right choice for these 1RX UEs that experience 10dB worse PDSCH performance than normal UEs. DL repetition also provides additional scheduling flexibility. It is reasonable for operators/networks that allow 1RX RedCap UEs into their networks to expect that the UEs implement these Rel-15 features.
3	Verizon UK Ltd	[Verizon] Agree with Futurewei. We may also use RedCap for critical IoT devices with high reliability. Thus, they should support low MCS tables and PDSCH repetitions.
4	T-Mobile USA Inc.	FUTUREWEI captures operator’s concerns about 1 Rx well with the following comment, "...for these 1RX UEs that experience 10dB worse PDSCH performance than normal UEs."

Item	Company	Comments
5	Guangdong OPPO Mobile Telecom.	[OPPO] This combination will provide reasonable RedCap device setting. It seems we can discuss the issue in UE capability stage. I will assume the LowSE capability bits is still there.
6	Qualcomm Incorporated	We think it is best to decide about this when there is a more complete picture about the full set of RedCap UE capabilities. It is especially unclear if these features would be implemented by the base station at the time when RedCap UEs are first available for deployment. If not, then testing will become a problem.
7	NTT DO-COMO INC.	We share the view with Ericsson that this should be discussed in RAN1
8	Apple Poland Sp. z.o.o.	We believe this should be discussed in the UE capability phase for Redcap together with other Rel-17 UE features.
9	Facebook	We agree with Ericsson that this should be discussed in RAN1.
10	CATT	In general, we share the views with other companies that this issue can be further discussed in RAN1. From technical perspective, we do not see any issue to use legacy MCS table even for 1 Rx RedCap UE based on previous evaluations in the SI phase. In addition, it is not clear to us whether the proposal is to use the low SE MCS table starting from the initial access phase, which would increase the network complexity and enforce gNB to support the low SE MCS table.
11	vivo Mobile Communication Co.,	[vivo] This should be decided in the UE feature session by the end of Rel-17.
12	NEC Corporation	We have similar view as other companies that this should be discussed further in RAN1.
13	Samsung Electronics Polska	Agree with other companies that this should be further discussed in RAN 1 and/or UE feature session. Besides, we also share the same concern with CATT on the potential impact on initial access.
14	MediaTek Inc.	This should not be captured in the WI objectives. Agree with other companies that a decision on mandatory UE capabilities for RedCap should take place in the RAN working groups following associated technical discussions, rather than in the plenary.
15	Spreadtrum Communications	Agree with Futurewei. Additionally, more MCS table choices can be introduced for 1Rx UE to resolve the DL performance degradation. Further evaluation and discussion can leave to RAN1.
16	Intel Corporation (UK) Ltd	Optional/mandatory requirements, especially related to coverage-related aspects can be discussed at a later stage at WG level, esp. once the list CE features, relevant to RedCap, are clear.

Item	Company	Comments
17	ZTE Corporation	We think this issue should be handled in RAN1
18	Beijing Xiaomi Mobile Software	In our view, we think supporting low-SE and DL PDSCH repetitions is helpful in term of reliability, scheduling flexibility and coverage and they should be supported for Redcap. While, on the other hand, I think this can be addressed in RAN1 and there is no need to touch it in RANP.
19	Nokia Corporation	In our view this should be discussed in RAN1.
20	Sony Europe B.V.	Optional and mandatory features can be decided at the end of the work item. This can be discussed in RAN1. There is a DL coverage loss from having 1 RX antenna and low-SE MCS table and / or PDSCH repetition would be ways of mitigating that coverage loss.
21	LG Electronics Inc.	We also think there is no need to put this level of details in the objectives. This has been already a known issue in RAN1 and therefore can continue to be discussed during the WI phase.
22	SHARP Corporation	[Sharp] We agree with Ericsson that this should be discussed in RAN1.
23	Huawei Tech.(UK) Co.. Ltd	We should not mandate any UE feature at this moment – to be discussed in RAN1 as usual business, rather than pre-empted from RAN. The proposal needs technical consideration in RAN1 because the TR implies no need to compensate DL coverage and UL is still the bottleneck. There is already discussion in RAN1 about the support of low-SE MCS table and it was not concluded yet, since there’s no consensus on the need to do DL coverage recovery. It would be useful, however, to discuss in RAN whether there is a consensus on the need of UL coverage improvements by some means, by either R17 CE features or legacy features.
24	VODAFONE Group Plc	While some details may need to worked out by RAN 1, we prefer that the WID does give some strong guidance on the mandatory need for features that can restore coverage losses.
25	Classon Consulting	To Huawei and others, the 10dB loss is there even if the UE is still in coverage. These features should be supported for better scheduling if these sort of worse RedCap UEs are introduced into the network, not an unreasonable request to manufacturers. While there is also an FFS in RAN1 to discuss which table to use for initial access, this proposal is just that the UE should support the features, not for initial access. As expressed in a later answer, Rel-17 CE features can be assumed by default to be either opt or mandatory, and on a case-by-case basis examined if there is any inconsistency. We feel that Rel15/16 coverage/reliability features should be given priority over the Rel-17 CE features for consideration....we should for sure use whatever we have in the toolbox. So a statement that these features would be available (opt or mand) by default is appropriate RAN-level guidance.

Question 2-2: Any further feedback on the above-modified objectives?

Feedback Form 2:

Item	Company	Comments
1	Ericsson LM	[Ericsson] We are fine with the above modified objectives together with the revised objective on UE capabilities and types in Section 3.1. However, it would be good to clarify that the new bullet “A means shall be specified by which the gNB can know the number of Rx branches of the UE” does not imply early indication of the number of Rx branches.
2	Classon Consulting	Agree with Ericsson that if the scope is expanded to include 1RX here, that we should have a single RedCap UE type as in Section 3.1. The purpose for including 1RX is for small size wearables, and should not be used to promote market fragmentation. Our reading of the 'means...' objective is that it could be but does not have to be through early identification. It is at least through the normal UE capabilities exchange.
3	T-Mobile USA Inc.	Our understanding was that the compromise on from the Monday GTW session was well captured by the moderator. The proposed compromise was that 1 Rx would be allowed for bands that require 4Rx for non-redcap, but that there would be a way to limit the access of 1 Rx UEs on the network, so that an operator could limit the impact of 1Rx UEs on the network.
4	Guangdong OPPO Mobile Telecom.	We think the means of indication of RX is not initial access for sure. The later bullet will take care of it. The added bullet is OK for us with this understanding. Msg 1 and/or Msg3 is more general. OK to us.
5	Qualcomm Incorporated	We are ok with the modified objectives.
6	Apple Poland Sp. z.o.o.	We are ok with the modified objectives.
7	NTT DO- COMO INC.	It is unclear whether coverage recovery techniques for PDCCH CSS and Msg4 should be specified for 1Rx case
8	Facebook	We are fine with the modified objectives.
9	CATT	We are fine with the modified objectives expect that we propose to add “(if supported)” for MsgA since it is our understanding that it is not clear yet whether RedCap UEs support 2-step RACH or not. <u>- through an early indication in Msg1 and/or Msg3, and MsgA (if supported), including the ability for the early indication to be configurable by the network.</u>

Item	Company	Comments
10	vivo Mobile Communication Co.,	<p>[vivo] Regarding early identification, First of all, there has been no conclusion/recommendation in either RAN1 or RAN2 about the necessity or detailed scheme of early indication. Secondly, it is unclear what exact WI scope is proposed</p> <p>1) What info are supposed to be carried in the early indication, is it about the #Rx, or BW, or combination of the two, or is it about the necessity of coverage recovery? This is related to how network would utilize such early indication in the initial access procedure. If the number of Rx should be carried, then, the scope "A means shall be specified by which the gNB can know the number of Rx branches of the UE" could cover it.</p> <p>2) What does "MSG 1 and/or MSG3, and MSGA" really mean here, does it mean all of them will be specified and if so what is the value to have multiple solutions for the same purpose? Or does it mean these are potential solutions for RAN1 or RAN2 to further down-select?</p> <p>3) Regarding MSGA, there was following RAN1 agreement made, which in our view means MSGA is clearly not recommended.</p> <p style="padding-left: 40px;"><i>Considerations on Option 4 (during MsgA transmission) are deprioritized until further progress is made on Options 1 and 2 for 4-step RACH procedure.</i></p> <p>4) Regarding MSG1, how does it work if the information carried by early indication is not just binary info (redcap or not) but rather multiple combinations related to the number of Rx or BW. And what is increase of MSG 1 overhead if dedicated MSG1 resource has to be reserved for redcap UEs</p> <p>The proposal says early indication is configurable by the network, but does it mean all redcap UEs has to mandatorily support early indication, or only some of them are mandated (e.g. 1Rx UEs), or it is UE optional? It seems not good to mandate UE to implement early indication if some network does not intend to use it in their deployment scenario.</p>
11	MediaTek Inc.	Agree with Ericsson that the new bullet should be clarified such that it does not imply early indication of number of RX branches
12	Spreadtrum Communications	We are fine with the modified objectives.
13	Samsung Electronics Polska	We are fine with the modified objectives.
14	Nokia Corporation	We are ok with the modified objectives.
15	Beijing Xiaomi Mobile Software	Although we still think it is necessary to support 40MHz, we can live with the modified proposal for compromise.
16	ZTE Corporation	We are ok with the modified objectives.
17	Sony Europe B.V.	OK with modified objectives. We assume that the early indication in Msg1 / Msg3 does not preclude further capabilities being sent in a later message.

Item	Company	Comments
18	SHARP Corporation	[Sharp] We are ok with the modified objectives.
19	Huawei Tech.(UK) Co.. Ltd	We agree with the modified objectives.
20	VODAFONE Group Plc	The ability to (configure the UE to) indicate 1rx in msg1/3/msg A is important.
21	Deutsche Telekom AG	<p>We suggest to reword from:</p> <ul style="list-style-type: none"> - For frequency bands where a legacy NR UE (other than 2-Rx vehicular UE) is required to be equipped with a minimum of 4 Rx antenna ports, the minimum number of Rx branches supported by specification for a RedCap UE is 1. <u>The specification also supports 2 branches for a RedCap UE in these bands.</u> <p>to:</p> <ul style="list-style-type: none"> - For frequency bands where a legacy NR UE (other than 2-Rx vehicular UE) is required to be equipped with a minimum of 4 Rx antenna ports, the number of Rx branches for a RedCap UE can be reduced to 2 or even 1. <p>We suggest leaving it up to RAN2 to decide the signalling, but make clear that we have 2 types of signalling:</p> <ol style="list-style-type: none"> 1) individual barring of REDCAP devices for 2 Rx and 1 Rx -> coding to be left for RAN2 2) early indication to gNB if a REDCAP device supports 2 Rx or 1 Rx -> message selection and coding to be left for RAN2

Question 1: *Could this be narrowed in scope by removing "or a later message"? The moderator's impression is that there is significant support for RACH-based identification. Should such an early indication be configurable, to give operators the freedom whether or not to use it? Feedback is invited.*

Feedback Form 3:

Item	Company	Comments
1	Classon Consulting	<p>[for FUTUREWEI]</p> <p>The aspects of how we let 1RX UEs into the network are more than just modifications of this RAN2 objective. For example, some companies in the last RAN1 meeting proposed that the number of RX branches a RedCap UE supports is not known by the network. So, similar to the Samsung-led WF, we need to ensure that the number of RX branches can be obtained by the network. We suggest a bullet under the Reduced minimum number of RX branches,</p> <ul style="list-style-type: none"> - For all bands, the number of antenna branches is assumed to be known at the gNB (either explicitly or implicitly) <p>Second, these 1RX UEs may have up to 10dB degradation for PDSCH, which will impact scheduling even when in coverage. If we support 1RX UEs,</p> <ul style="list-style-type: none"> - At least 1RX UEs have mandatory support of the Rel-15 optional features of the low-SE MCS table and DL PDSCH repetition. <p>Regarding early identification, the current sub-bullet indeed does not offer anything over the main bullet, since the main bullet would allow the WGs to decide to agree to either early identification or identify through the normal UE capability exchange. We do support that early identification in Msg 1 <u>is supported by specification and is mandatory for at least 1RX UEs</u>. However, for UE that have the same number of RX branches as a 'normal' UE, for efficiency purposes, these "near-normal" RedCap UEs should be able to e.g. reuse RACH occasions etc for the "normal" UEs and inform their RedCap status during the normal capability exchange. I.e., even if a network wants to use early identification it may only want to use it for the poor-performing UEs. So any statement on configuration should also be directed to the 1RX UEs we are discussing.</p>
2	CMDI	<p>[For CMCC]</p> <p>For supporting early identification, we can accept on condition that early identification should be configurable to give operators the freedom when/where/whether to use it, rather than a default behavior of the Redcap UE.</p> <p>on top that, if we can narrow it down to RACH-based early identification, we will not object it even it in fact should be left to RAN1 discussion.</p>
3	CMDI	<p>[For CMCC]</p> <p>For 1 Rx, we think that antenna efficiency should be taken in account to make its coverage comparable to 2Rx Redcap UE, which we believe is good balance between UE implementation and operator's network planning. as to how to capture it when OTA is yet in the air, we can refer what we have done for vehicular UE with 2Rx at this moment.</p>

Item	Company	Comments
4	Guangdong OPPO Mobile Telecom.	<p>[OPPO] We agreed the 1 RX is more realistic for RedCap UE in FR1. Following the motivation of that the 2RX is not needed, instead the 40 MHz is more useful. So, replace 40 MHz to 2RX would be more technically right and the basically give same data rate. As this would be a compromise, we can go with only 20 MHz. Hope we can converge in this direction.</p> <p>We see the earlier identification could be general, since the antenna impairment is not only due to the reduction to 1RX, but also form factor and others. Thus the main bullet is OK.</p> <p>For the sub-bullet, we are fine to remove "or a late stage". There is a bit unclear if we gonna support identification all by Msg1/3/A. At least Msg 1 and 3 is exclusive. It could be through "Msg1/MsgA_preamble or Msg3/MsgA_pusch"</p> <p>.</p>
5	Apple Hungary Kft.	<p>[Apple] While we think that which of the options among MSG1/3 or later can be discussed in RAN1 (and RAN2), we are ok with the proposed objective. For the part of deleting 'the later' part, we do not object strongly, and are willing to listen to other companies even though, the actual UE capability of the RedCap (information on RedCap UE) is sent later with UE capabilities.</p>
6	NTT DO- COMO INC.	<p>Considering the situation, we can live with the WF for minimum 1Rx and maximum 20MHz BW, while we think coverage issue should be addressed at the same time. As captured in the TR, coverage recovery is necessary for PDCCH CSS and Msg4 in addition to Msg2, Msg3, and PUSCH for 1Rx with antenna efficiency loss. It is necessary to be clarified whether antenna efficiency loss is necessary to be considered for 1Rx case (if not, coverage recovery is necessary only for Msg2), or whether coverage recovery techniques for PDCCH CSS and Msg4 should be specified. We think coverage recovery techniques for Msg3 and PUSCH can be discussed in CovEnh WI and existing TBS scaling is enough for Msg2.</p> <p>In addition, we share the view with FUTUREWEI that it is ensured that the number of RX branches can be obtained by the network for proper handling of RedCap UEs with different number of Rx branches during/after initial access. Regarding early identification, we think it is beneficial to be configurable to give operators the freedom whether or not to use it. Some coordination with [91E][37][Coverage_scope] may be necessary to resolve overlapping discussion.</p>

Item	Company	Comments
7	Spreadtrum Communications	<p>For BW, we support the current modification.</p> <p>As a chipset vendor, we care about cost reduction; also we consider the size of wearable (especially for watch) is limited so far; in addition, 1 Rx branch RedCap not only can be used for smart watch, but also can be used for industry wireless sensor and video surveillance. So we propose that for frequency bands where a legacy NR UE is required to be equipped with a minimum of 4 Rx, the specification supports {1 Rx branch, 2 Rx branches} for RedCap UEs in these bands.</p> <p>While we have some concern that a RedCap UE also supports 4 Rx branches for frequency bands where a legacy NR UE is required to be equipped with a minimum of 4 Rx. Obviously, for wearables, especially for watch, there is no room to equip 4 RX branches. For industrial wireless sensor and video surveillance use cases, we do not see the motivation to design 4RX redcap with 20M bandwidth. By rough calculation, the peak data rate will reach 300Mbps by 4RX with 20M bandwidth “Redcap”. It is more like a low-end smart phone than a Redcap and can easily enter into 5G network mimicking as a Redcap watch. In addition, introducing more Rx branches options will potentially lead to market fragment.</p> <p>For early indication, we are fine to remove “or a later message”, and as mentioned by CMCC, we also think this part should be left to RAN1 discussion.</p>
8	Intel Corporation (UK) Ltd	<p>On support of 1 Rx branches, we are open to the option of allowing 1 Rx branch in all FR1 bands. However, as mentioned by DCM, we would also like to confirm that there are no further relaxations related to antenna efficiency in FR1 bands (e.g., as was motivated by small form-factor constraints during the SI phase) to be considered during the WI.</p> <p>On UE identification, we support the moderator’s proposal including removal of “or a later message”, as, among other benefits, “early indication” can minimize impact from “too conservative DL scheduling” for non-RedCap UEs during initial access (PDCCH and PDSCH associated with Msg2/Msg3/Msg4, etc.).</p> <p>However, we also support the idea of having the early indication feature configurable since, in general, early indication comes at a price (e.g., reduction in RACH user capacity if using RACH partitioning, etc.) while the feature may not be necessary for all deployments and use-cases.</p> <p>We share the view from DCM that it may be good to have some coordination with the discussions in [91e][37][Coverage_scope] on coverage enhancement/recovery for RedCap UEs.</p>
9	China Telecommunications	<p>[China Telecom]</p> <p>We think it is helpful to be narrowed down by removing “or a later message”. We support to configure early identification with freedom for operators whether or not to use it. Furthermore, whether through an early identification in Msg1 or Msg3 can be discussed in next RAN1 meeting.</p>
10	Dish Network	<p>What is the rationale to have 4RX support included for RedCap UE’s for bands where 4RX is mandatory?</p>

Item	Company	Comments
11	Qualcomm Incorporated	<p>We support the Moderator’s proposal.</p> <p>Regarding the removal of ”or a later message”, we would not object to it, although we think it would be better to further change the sentence to: ”through at least an early indication in Msg1/3/A”.</p>
12	ZTE Corporation	<p>Regarding wider bandwidth, we think 40 MHz bandwidth is necessary for 1Rx wearables to achieve high data rate. However, for compromise, we can accept the Moderator’s proposal.</p> <p>For the early indication bullet, we are fine to remove ’or a later message’. Since early identification options would be further discussed in RAN1/RAN2, we are also fine to remove the whole sub-bullet from the WID.</p> <p>We think it is beneficial for network flexibility if such an early indication is configurable.</p>
13	Nokia Corporation	<p>”or later message” should be removed. Instead clear objectives should be defined in the WID to enable good progress in RAN2. We propose the following detailed objectives to be defined:</p> <ul style="list-style-type: none"> • Specify RedCap early indication in Msg3/MsgA, and optionally configurable by the network in MSG1 (/PRACH part of MsgA).
14	CATT	<p>For 1 Rx, we can live with it. However, we share similar view with many other companies that the antenna efficiency loss of 1 Rx should be comparable to 2 Rx, which provides flexibility and convenience for operators to manage the network planning. With such understanding, no particular optimization for 1 Rx UE is needed (e.g. DL coverage enhancement).</p> <p>Regarding to the identification issue, we think Msg1/3/A are ‘early identification’ methods and benefit the handling during RACH procedure, while a later message is a kind of existing UE capability report and can simplify the RACH procedure if certain conditions are met (e.g. 20 MHz initial UL BWP, good coverage by proper site planning). The specification shall provide enough flexibility to an operator to determine the identification strategy according to its deployment. So, we think the early identification should be configurable.</p>
15	VODAFONE Group Plc	<p>We would prefer that the 1 rx option was restricted to ”small form factor devices” (e.g. a device without any external antenna connector and size not exceeding 5 cm*5 cm*2 cm). The Futurewei comment on mandatory support for some optional R15 features seems sensible.</p> <p>We also believe that minimising the number of options is essential for delivering the economies of scale for NR to replace LTE Cat 4/1 IoT devices. Hence the 4 rx option might not be really helpful.</p> <p>As a detailed comment (e.g. for the meeting report) on the existing WID text, we assume that 20 MHz would be the only supported bandwidth (i.e. there aren’t 5 MHz and 10 MHz RedCap variants in R17).</p>
16	MediaTek Inc.	<p>RACH-based early identification should be configurable to allow operators the freedom to choose when and how to use it. In case operators choose not to use RACH-based early identification, the ’later message’, i.e. capability information would identify the UE as RedCap to the operator. Therefore it would be inadvisable to remove this option from the objective.</p>

Item	Company	Comments
17	Samsung Electronics Polska	<p>[Samsung]</p> <ul style="list-style-type: none"> • [Number of Rx] For the number of Rx, we don't think 4 Rx had been recommended by TR (seen the conclusion below). Therefore, we like to focus the number of Rx discussion within <u>1Rx and 2 Rx</u> and remove 4Rx from Redcap. <p>TR 38.875</p> <ul style="list-style-type: none"> - <i>Number of Rx branches:</i> - <i>For FR1 TDD bands where a non-RedCap UE is required to be equipped with a minimum of 4 Rx branches, the minimum number of Rx branches supported by specification for a RedCap UE is N, where N is to be down-selected during the WI phase or at RAN plenary between the following alternatives:</i> - <i>Alt 1: N=2</i> - <i>Alt 2: N=1, where N=2 is also supported</i> <ul style="list-style-type: none"> • [Capability report]For early capability report "in Msg1/3/A or a later message", we think it is benefit to early report UE capability. However, it might be better to also allow network to handle Redcap and non-Redcap commonly after initial access. Therefore, we suggest to <u>keep "or a later message"</u> in the WID and let WG to have further discussion for the design.
18	Ericsson LM	We prefer to keep "or in a later message". If there is an early RedCap UE indication, we do not think it should be used to indicate the number of Rx branches but be a more general RedCap UE indication to let gNB know that it is dealing with a UE with limited capabilities. The detailed capability signaling may not be known to gNB until after initial acce
19	Orange	As presented in RP-210668, Orange does not support relaxation to 1 Rx antenna due to the impact on spectral efficiency. One proposed way forward however would be to allow 1 Rx for certain bands where 4 Rx is currently mandated (ie. n7, n41), while n78 should remain with at least 2 Rx. We also support the fact that the number of Rx antennas should be known to the network for each band. This would allow the operator to redirect UEs to specific bands based on their number of antennas. Early identification is preferred.
20	Deutsche Telekom AG	Deutsche Telekom agreed with Orange and the content of RP-210668. Further just baring does not address our concerns. As Orange correctly points out, we need the information about the number of antennas at the network. Signalling needs to be introduced/adapted
21	Dish Network	We can accept 1RX / max 20MHz BW support and early identification as proposed by moderator. We do not prefer going to per-band # of RX discussion for 4RX bands, because of the bad implications. If e.g n78 has to support 2RX for Redcap, it means also bands n48 and n77 have 2RX support in device hardware in global SKU's nullifying the benefits of 1RX, or alternatively Redcap device with 1RX cannot support n78 even it supports n48 and n77 which is certainly not good either.

Item	Company	Comments
22	LG Electronics Inc.	<p>We are generally fine with the the proposal, but as commented by a few companies, we believe the 4 Rx should be removed from the objective as suggested below.</p> <ul style="list-style-type: none"> - For frequency bands where a legacy NR UE (other than 2-Rx vehicular UE) is required to be equipped with a minimum of 4 Rx antenna ports, the minimum number of Rx branches supported by specification for a RedCap UE <u>is 1. The specification also supports 2 and 4 Rx branches for a RedCap UE in these bands. will be decided at RAN#91e; hence no specific work for these frequency bands will be done before RAN#91e.</u> <p>For the question posed by the Moderator on whether to remove "or a later message", we prefer to remove the "or a later message" from the objectives as suggested below. If it is through a later message the it doesn't seem to be an early indication and in that case existing UE capability transfer frame work can be reused.</p> <ul style="list-style-type: none"> - Specify functionality that will enable RedCap UEs to be explicitly identifiable to networks. - <u>through an early indication in Msg1/3/A or a later message</u>
23	vivo Mobile Communication Co.,	<p>[vivo] For early indication, we think the motivation is for NW to identify redcap UEs. During the RAN2 discussion, there are several solutions to enable redcap UEs to be explicitly identified by network, such as UAC could also be an option to differentiate between RedCap and non-RedCap UEs. Besides, during RAN1 and RAN2 discussion, there was no consensus or recommendation about the necessity of the early indication and which early indication method is more appropriate. It is therefore not proper for RAN plenary to make the decision and we should allow more WG technical discussion and make decision on how to identify redcap UEs. Early identification could be adopted if there is common understanding on its necessary and the corresponding methods</p> <p>Thus, we think having the main bullet "specify functionality that will enable RedCap UEs to be explicitly identifiable to networks" is sufficient to allow more WG discussion and no need to make any down-selection now in the RAN plenary level.</p>

Item	Company	Comments
24	Huawei Tech.(UK) Co.. Ltd	<p><u>On early indication</u></p> <ul style="list-style-type: none"> • Yes, we can remove “or a later message”, and we understand that normal capability exchange will still occur, and is not considered part of early indication. • Yes, early indication can be configurable, assuming that operators want this. <p><u>On inclusion of 4Rx branches</u></p> <p>We agree with others to remove 4 Rx branches for RedCap UEs. The RAN1 agreement and TR are clear that the number of Rx branches is 1 or 2 in these bands, and the WID provides only for 1 or 2 DL MIMO layers. A 4 Rx UE is not contemplated in this situation.</p> <p>From the WID:</p> <p><i>o Maximum number of DL MIMO layers:</i></p> <ul style="list-style-type: none"> • <i>For a RedCap UE with 1 Rx branch, 1 DL MIMO layer is supported.</i> • <i>For a RedCap UE with 2 Rx branches, 2 DL MIMO layers are supported.</i>
25	Sony Europe B.V.	<p>[SONY]</p> <ul style="list-style-type: none"> - We are OK with redcap UEs supporting a maximum bandwidth of 20MHz - We are OK with the updated objective where the maximum number of RX antennas is 1. This is necessary for small form factor devices, where there is little performance gain from using 2 RX antennas. - We prefer to keep “in a later message” for early identification. We expect that there will be some minimum indication in Msg 1/3 required for support of the initial access procedure and there would be more detailed capability signalling in a later message
26	Verizon UK Ltd	<p>[VZ] We understand the concerns some other operators have but think this is really a market choice that if we want the market for NR, we have to support 1Rx. As for the meaning of the indication, we agree with Ericsson that it is better to interpret it generally as being a RedCap UE with limited capability (TBD details)</p>
27	China Unicom	<p>[China Unicom]</p> <p>For BW, we support the current modification that maximum bandwidth of an FR1 RedCap UE during and after initial access is 20 MHz.</p> <p>For minimum number of Rx branches, we agree the RedCap for minimum 1Rx is was restricted to ‘wearable devices’.</p> <p>We support that early identification should be configurable. For the sub-bullet, we agree to remove ‘or a later message’.</p>

Item	Company	Comments
28	BT plc	As stated in RP-210668, we are concerned about the impact of devices with 1 Rx on the operation of our network, and we are not supportive of any such relaxation. However we do recognise that there may be a way forward if 1 Rx devices are permitted in some, but not all of the FR1 bands, recognising the dimensions of small devices and lower frequency band antennas. But we could not accept 1 Rx devices operating in all FR1 bands where 4 Rx shall be supported by the UE, e.g. Band n78. Furthermore, as proposed by Orange and Deutsche Telekom, we believe that the device must signal to the network with the number of antennas, in order to enable the network to handle the UE accordingly.
29	Beijing Xiaomi Mobile Software	[Xiaomi]We thinks 40MHz bandwidth is necessary for high end wearables with 1Rx, however, for compromise to agree 1Rx by all, we can accept the current revision on bandwidth. We also think antenna efficiency loss should be considered for the 1Rx. but we are open to handle it in the coverage enhancement project or handled in the Redcap.
30	TELENOR ASA	Telenor supports the comments given by Orange and DT.

- Specify access control mechanisms to ~~and~~ allow operators to ~~restrict their~~ control RedCap UEs access to cells if desired.

- Specify a system information indication to indicate whether a RedCap UE can camp on the cell/frequency or not; the indication may be specific to certain RedCap UE capabilities.

Moderator's Summary after Initial Round

The first bullet about the system information indication is clarified according to the suggestions; the possibility of the indication being specific to RedCap UE capabilities is added.

It seems that there is not consensus on any RedCap specific modifications to UAC, and it is considered obvious that legacy UAC applies to RedCap UEs.

Question 2-3: Any further feedback on the above-modified objectives on access control mechanisms?

Feedback Form 4:

Item	Company	Comments
1	TELECOM ITALIA S.p.A.	As indicated by Orange, DT, BT and others it is important to to have mechanisms to signal to the network the numbers of supported antennas and to ensure the capability to redirect the UE to other frequency bands

Item	Company	Comments
2	Ericsson LM	<p>[Ericsson] A large majority of companies seemed to support the existing text related to UAC in the previous version with small updates. There seemed to be only 3 companies who wanted to completely remove the bullet relating to UAC, thus we don't understand why it is completely removed in the revision. SA1 doesn't need to be explicitly mentioned as was commented by some companies. We would be OK with:</p> <ul style="list-style-type: none"> • UAC should apply to RedCap UEs and changes to UAC, if any, should be specified after down-selection between the alternatives discussed in the RedCap SI. <p>Note that UAC was clearly discussed during the SI as one possible way to control and differentiate RedCap UE's access, thus it should be kept in the WI objective. Also, one of the options discussed in SI is to not do anything special for RedCap, so the bullet did not say any changes would be done – but that we will down-select during WG discussion.</p>
3	Classon Consulting	The updated wording looks fine, and gives the WGs sufficient freedom to design the signaling.
4	T-Mobile USA Inc.	We agree with Telecom Italia and others that the proposed compromise from the Monday GTW session was to have a way to distinguish between 1 Rx and 2Rx redcap UEs.
5	Guangdong OPPO Mobile Telecom.	We are fine with the updated bullet.
6	Verizon UK Ltd	We also like the NW to be able to differentiate RedCap UEs from regular UEs and control their access. We think the update looks fine.
7	Qualcomm Incorporated	We are ok with the Moderator's proposal.
8	NTT DO- COMO INC.	<p>We agree with Ericsson regarding UAC, and support to add following sub-bullet</p> <ul style="list-style-type: none"> • UAC should apply to RedCap UEs and changes to UAC, if any, should be specified after down-selection between the alternatives discussed in the RedCap SI.
9	Apple Poland Sp. z.o.o.	We are ok with the Moderator's proposal.
10	Facebook	We are fine with the Moderator's proposal.
11	vivo Mobile Communication Co.,	[vivo] We agree with Ericsson that majority companies support the UAC mechanism for access control. Thus, we support the Ericsson's suggested bullet on UAC.

Item	Company	Comments
12	CATT	<p>We share the same view with Ericsson. Majority companies suggested to introduce small modification to the existing text related to UAC, but not to remove it. In the SI phase RAN2 recommend that “UAC should apply to RedCap UEs and one option is that UAC can differentiate between RedCap and non-RedCap UEs. Different solutions for RedCap UAC have been studied and down-selection can be done in WI phase” so we are suggest:</p> <ul style="list-style-type: none"> - UAC should apply to RedCap UEs and <u>can differentiate between RedCap and non-RedCap UEs</u>, changes to UAC, if any, should be specified after down-selection between the alternatives discussed in the RedCap SI.
13	MediaTek Inc.	<p>We note that UAC does have significant support from the earlier responses. It’s therefore quite surprising that this objective has been removed. We propose that the objective is reintroduced as: <i>Specify the means to control RedCap access attempts using the UAC framework. SA1 and CT1 need to be consulted on this objective.</i></p>
14	Spreadtrum Communications	Agree with Ericsson. The UAC part should be kept.
15	Intel Corporation (UK) Ltd	<p>For system information, the new sentence “the indication may be specific to certain RedCap UE capabilities” looks like stage 3 details. We prefer that it be discussed in WI phase, but does not need to be captured in the WID. We are fine with the suggestion from moderator on UAC to remove the bullet on UAC considering no recommendation from RAN2 on this.</p>
16	Nokia Corporation	<p>We are ok with the updated objectives from the moderator to keep the objectives in the essentials and avoiding unnecessary workload. We agree that the system information is sufficient to control the access of RedCap UEs to the network. Furthermore, based on the early indication of a RedCap UE, the network is able to reject the access of the RedCap UE to the network using RRC Reject. Also by utilising UE capabilities in case of RRC Resume, the network is able to reject a RedCap UE. If companies want to work further on UAC, such as to add differentiation between RedCap and non-RedCap UEs, it would be better that companies then propose such updates to UAC in SA1, which is responsible of the UAC specifications.</p>

Item	Company	Comments
17	ZTE Corporation	<p>For access control, as we commented in the initial round, since there still have other indication options than system information indication, the specific indication method should be determined in WI phase. In addition, it is misleading when explicitly mentioning "capabilities" in the sub-bullet, because there are hundreds of UE capabilities, and it is unclear which ones are referring to. We suggest to modify the sub-bullet to</p> <ul style="list-style-type: none"> - Specify <u>at least</u> a system information indication to indicate whether a RedCap UE can camp on the cell/frequency or not; the indication may be explicit or implicit and may be specific to certain RedCap UE(s) capabilities. <p>For UAC, we don't understand why UAC objective is completely removed in the revision. Completely reusing existing UAC mechanism for RedCap UE is just one option that was discussed during SI, there are other solutions (with more support) that allows network/operator to differentiate UAC for RedCap and non-RedCap UE. Down-selection among options should be discussed during WID. So we agree with Ericsson's proposal in principle, and suggest to make below update based on initial round feedbacks.</p> <ul style="list-style-type: none"> • UAC should apply to RedCap UEs and changes to UAC, if any, should be specified after down-selection between the alternatives discussed in the RedCap SI, <u>consulting with SA/CT1, if needed.</u>
18	Beijing Xiaomi Mobile Software	<p>We would like to keep the UAC part in the previous version. The rapporteur says" it is considered obvious that legacy UAC applies to RedCap UEs." We do not fully agree. According to the SI, the legacy UAC without any change can be reused is just one of the options. Currently, we can not say the legacy UAC without any change would work.</p>
19	Sony Europe B.V.	Updated wording looks fine.
20	Huawei Tech.(UK) Co., Ltd	We agree with the modified objectives.
21	LG Electronics Inc.	We are okay with the Moderator's modified objectives on access control mechanisms.
22	SHARP Corporation	[Sharp] We are ok with the Moderator's proposal.
23	BT plc	<p>BT agrees that it is important to include signalling to indicate to the network the number of antennas in a UE, in order to allow the network to decide how best to support connectivity to the device.</p> <p>We believe that this is an essential feature if 1 Rx is to be permitted as a way forward.</p>
24	Orange	<p>We agree with Telecom Italia that the number of Rx antenna should be known to the network. The number of Rx antennas should also be part of the UE capabilities considered in the System Information indications for allowing a UE to camp on a certain cell or not.</p>

Item	Company	Comments
25	Deutsche Telekom AG	We do not think that this is about access control (UAC), but rather Cell Barring ... It is clear that a REDCAP device is not allowed (based on operator decision) on the cell, it shall "not hang around", but rather reselect to another cell (as for the cell barring). So RAN2 needs to introduce such signalling independently for 2 Rx and 1 Rx REDCAP.
26	Samsung Electronics Co., Ltd	We are fine with the latest proposal from the moderator, and also agree with the moderator that UAC does not have to be mentioned as the legacy UAC applies to RedCap UEs.

Question 2: Feedback is invited on these objectives.

Feedback Form 5:

Item	Company	Comments
1	CMDI	[For CMCC] to the objective "- Specify at least a system information indication to indicate whether a RedCap UE can camp on the cell or not." , we would like make it clearer a bit, since Redcap UE is just a general term, which can be further categorized to 2Rx and 1Rx at least, correspondingly, we need to consider the freedom to operators to configure different "camp on" conditions for Redcap UE with 2Rx, or Redcap UE with 1Rx, respectively e.g., "- Specify at least a system information indication to indicate whether a RedCap UE with 1 Rx or 2Rx can camp on the cell or not."
2	Guangdong OPPO Mobile Telecom.	[OPPO] Agree the system information and UAC. For the system information it would be ban access for all RedCap UEs? or it could be for some type of them. Then, we suggest to say: whether a RedCap UE type(s) can access
3	Apple Hungary Kft.	[Apple] We are ok with the most part, however checking with SA1 or CT1 or SA2 is not explicitly agreed. It can be decided if SA/CT involved is needed or not after discussion at WG level. We prefer to re-word the objective to reflect this like:
4	NTT DO-COMO INC.	We are fine with current formulation. Whether different access controls are necessary for RedCap UEs with different number of Rx branches can be discussed in normative work.
5	Spreadtrum Communications	Generally, we are fine with the system information and UAC part. No matter the system information part or UAC part, we think it is more reasonable to configure different conditions based on service types.
6	Intel Corporation (UK) Ltd	Support the proposed objectives. Also, fine to generalize to "RedCap UE type(s)" instead of "RedCap UEs" in the main bullet as suggested in some of the above responses.

Item	Company	Comments
7	ZTE Corporation	<p>For the first sub-bullet ‘Specify at least a system information indication to indicate whether a RedCap UE can camp on the cell or not.’, since there is no decision on options of indication during SI phase, we suggest to change this sub-bullet to ‘Specify mechanism to indicate whether a RedCap UE can camp on the cell or not.’</p> <p>For UAC sub-bullet, of course UAC will apply to RedCap UEs. The main issue is whether to differentiate RedCap UEs and non-RedCap UEs, so suggest to make it clear in WID that network should be able to differentiate Redcap and non-Redcap in UAC mechanism, detailed solution can be discussed during WI phase. We suggest to change this sub-bullet to <u>”Specify UAC mechanism to support network to differentiate UAC for RedCap UEs and non-RedCap UEs, consult with CT1/SA2, if needed.”</u></p>
8	Qualcomm Incorporated	We are ok with the proposal. We assume that the term ”to control RedCap UEs” already implies that RedCap UEs can be differentiated based on their capabilities. But we are ok with clarifying this further if needed.
9	Nokia Corporation	<p>In our view the moderator’s proposal includes unnecessary open aspects like “at least” and potentially even requiring SA/CT work (UAC aspects), which in our view should be avoided for good WID progress. Furthermore, in our view it should be possible to indicate for the whole frequency, not just a cell if a RedCap UE is allowed to camp on. Thus, we propose the following objectives:</p> <ul style="list-style-type: none"> • Specify a system information indication to indicate whether a RedCap UE can camp on the cell/frequency or not. <p>Legacy UAC applies to RedCap UEs, no need to further enhance</p>
10	CATT	We support the objectives in general. The details can be left to WGs (RAN1/RAN2/SA) discussion.
11	MediaTek Inc.	We agree with these changes to the objectives. It is important to discuss changes to the UAC framework with the SA/CT groups.
12	Samsung Electronics Co., Ltd	We support the proposed objectives, and are fine with the current formulation.
13	Ericsson LM	We are ok with the draft objective.
14	vivo Mobile Communication Co.,	<p>[vivo] We are generally OK with system information barring and UAC mechanism for access control.</p> <p>Regarding the UAC part, we think there is no need to explicitly mention on “Check with SA1”, whether to check with SA/CT or which part should be check with SA/CT is related to which option is down-selected. Thus, we prefer to remove “and checked by SA1”.</p>

Item	Company	Comments
15	LG Electronics Inc.	We suggest to add CT1 as consulted groups, since the stage-3 details on UAC are specified in CT1 specs. In addition, we suggest to simplify the wording by removing some parts that seem unnecessary. - UAC shall apply to RedCap UEs; <u>any changes to UAC, if any, should be specified after down-selection between the alternatives discussed in the RedCap SI and checked by relevant WGs including SA1 and CT1.</u>
16	Huawei Tech.(UK) Co.. Ltd	The first and second bullets are fine. Regarding UAC, there is no recommendation from RAN2 to have such enhancements, and so the WID should indicate that the UAC mechanism will be re-used, i.e. by deleting from "changes to UAC ..." to the end, i.e.: - <u>UAC shall apply to RedCap UEs; changes to UAC, if any, should be specified after down-selection between the alternatives discussed in the RedCap SI and checked by SA1.</u>
17	Sony Europe B.V.	[SONY] - System information should be able to distinguish which types of Redcap UE should be able to camp onto a cell (e.g. it should be possible to differentiate between 1RX and 2RX UEs)
18	Verizon UK Ltd	[VZ} We are OK with the proposal
19	Beijing Xiaomi Mobile Software	[Xiaomi] We are generally fine with the draft objective except for the UAC part where CT1 should also be consulted.

4 Other RAN2-related objectives

4.1 UE capabilities and types

- Specify definition of **one** RedCap UE type including capabilities for RedCap UE identification and for constraining the use of those RedCap capabilities only for RedCap UEs, and preventing RedCap UEs from using capabilities not intended for RedCap UEs including at least carrier aggregation, dual connectivity and wider bandwidths.

- The existing UE capability framework is used; changes to capability signaling are specified only if necessary.

Moderator's summary after initial round:

After considering that the FR creates implicit differentiation, the majority of companies seem to prefer a single RedCap type, and there is considerable concern to avoid market fragmentation. There was also a reasonable suggestion to remove "L1". The objective is modified above.

Question 2-4: Any further feedback on the above-modified objective?

Feedback Form 6:

Item	Company	Comments
1	Ericsson LM	[Ericsson] No further feedback.
2	Classon Consulting	We are fine with the understanding that the FR creates implicit differentiation. The one RedCap UE type reduces to knowing whether a UE is RedCap or not, market fragmentation is avoided, and the WG can focus on the issues of early identification and capability exchange without being encumbered by the type discussion.
3	Guangdong OPPO Mobile Telecom.	[OPPO] Since there may be 1RX/2RX UEs and access control for different UE types could be beneficial in case of network congestion, we prefer to keep open the UE type number and discuss during the WI phase.
4	Qualcomm Incorporated	We are ok with the Moderator's proposal. Clearly, UE capability differentiation within the single RedCap type must still be allowed.
5	NTT DO- COMO INC.	We are fine with the above-modified objective
6	Facebook	We share the same view as OPPO and prefer to keep it open at this stage.
7	vivo Mobile Communication Co.,	[vivo] Based on the companies' view in the first round, we did not see the majority to prefer a single RedCap type. It seems that companies have different preference on: one or two types or one type per FR. Considering there is no consensus, we think we should keep it open by now. We anyway will have further discussion in WGs during WI phase after we have clearer understanding on the UE capabilities.
8	MediaTek Inc.	We are ok with the proposed objective
9	Samsung Electronics Co., Ltd	Regarding the number of UE types, we are fine with one type only if 1 RX is mandatory for RedCap UEs. In other words, this proposal should not be used as a leverage for the number of RX discussion, and prefer making decision on this after concluding the number of RX discussion. We are also okay to discuss it in the work item phase, as commented previously. In addition, we are fine with the proposal for the capability.
10	Spreadtrum Communications	As for market fragmentation, we think it is determined by different use cases rather than the number of UE types. We support defining two RedCap types considering that network may want to differentiate the access control based on different UE capabilities. We share the similar view with OPPO to open the door on the number of UE type. The details can be further discussed in the WGs.

Item	Company	Comments
11	Intel Corporation (UK) Ltd	We would be fine with the moderator's proposal to limit to a single RedCap UE Type. It should be noted that this still allows for differentiated handling and access control of "sub-types" of RedCap UEs based on their supported capabilities – just that any "finer level of access control", based on particular combinations of UE capabilities, may need to wait until the NW receives the UE capability report.
12	ZTE Corporation	We are fine with above modified objective. It would be better to clarify one UE type per FR .
13	Nokia Corporation	We are ok with the modified objective from the moderator.
14	Beijing Xiaomi Mobile Software	We think it can be discussed in WI phase
15	Orange	If introduced, we think 1 Rx antenna devices should be differentiated from 2 Rx antenna devices by a different UE type.
16	Huawei Tech.(UK) Co.. Ltd	We can accept this modified objective, on the understanding that FR is a natural differentiator.
17	SHARP Corporation	[Sharp] We are ok with the proposed objective.
18	LG Electronics Inc.	We also would like to keep it open until we come up with a clear definition on the RedCap UE type(s) from RAN1 and RAN2 perspectives. Therefore, we prefer to go back to one or two.
19	TELECOM ITALIA S.p.A.	As already mentioned, it is important to differentiate device supporting 1 Rx or 2 Rx
20	Deutsche Telekom AG	Same as ORANGE
21	Classon Consulting	To Orange, based on the previous objective modification, 1RX can still be differentiated by their capability.

Question 3: *Feedback is invited on this objective. In particular, can the number of UE types be narrowed? Companies do not support more than two UE types, and there is*

Feedback Form 7:

Item	Company	Comments
1	Classon Consulting	It is unclear whether this is one or two types per FR or overall. We are OK with either 1 overall or one per FR. Essentially, if we agree to introduce 1RX RedCap UEs it should be for the size of the device, and not for the purpose of fragmenting the market and introducing multiple RedCap UE types in FR1.
2	CMDI	[For CMCC] try to understand what is the criteria for defining UE type, do we have some common understanding on it? if not, seems we should firstly discuss what the criteria will be, e.g., single nominal achievable data rate for both 2Rx and 1Rx Redcap UE, or same nominal coverage capability, or same bandwidth capability, etc.
3	Guangdong OPPO Mobile Telecom.	Same comments here. It is not clear whether the intention is to specify one or two types per FR. We agree that the number of UE types should be minimized, but two UE types can also be considered especially for FR1, e.g. one for 1RX and the other for 2RX. Network may want to differentiate the access control for these two types in some cases.
4	Apple Hungary Kft.	[Apple]. We agree with the objective as stated in 3.1 above, in that existing capability should be able to handle and changes are only needed when necessary (which can be discussed in WGs). We also prefer just the identification of RedCap by the NW before the capability provides further details, instead of defining multiple RedCap UE types. It is already agreed that there are several means by which the NW can identify it's the UE is a RedCap or not at initial access (via RACH for eg).
5	NTT DO-COMO INC.	We are fine to narrow down the number of RedCap UE types in this plenary, but the set(s) of L1 capabilities for RedCap UE identification have not been clarified, it is also OK to narrow down after the set(s) are well discussed in normative work.
6	Spreadtrum Communications	Different service equipped with different types of devices have different characteristics in terms of the physical capability and data service KPI requirements, etc. The exact Redcap characteristics will help network/operators to control or restrict the Redcaps' access. We think at least two UE types shall be specified for Redcap, and definition of RedCap UE types shall at least include the number of Rx branches and peak data rate. In order to realize further cost reduction for RedCap UE, different Layer-2 buffer size should be differentiated for different UE types as mentioned above that the gap of their peak data rate is in order of magnitude. However, this can be discussed at RAN2 during WI stage.
7	Intel Corporation (UK) Ltd	We support the moderator's proposal, including narrowing down the potential numbers of RedCap UE type(s) to no more than two. On the question of number of types per FR or across FRs, we interpret the above proposal to include the possibility of defining a <i>maximum</i> of two RedCap UE types for a given FR. Counting UE types across different FRs may not be of much significance to either the network or device sides.

Item	Company	Comments
8	Samsung Electronics Co., Ltd	One type per FR is preferred, but we are okay to determine whether to have one or two type(s) per FR in the WI phase.
9	Dish Network	We are supportive of narrowing down the RedCap UE types
10	ZTE Corporation	<p>We think one RedCap UE type per FR is enough. However, we are open to determine the number of RedCap UE type in WGs (RAN1/RAN2).</p> <p>Regarding "The existing UE capability framework is used; changes to capability signaling are specified only if necessary", we want to clarify whether it refers to the option1 solution in TR. If Yes, then we don't think this is needed. Down-selection among options should be done during WI phase. No need to take one option as baseline right now.</p>
11	Qualcomm Incorporated	<p>If the access control ends up relying on UE types, as discussed above, the number of UE types may not be limited to one or two. For example, one gNB might not support half duplex, so wants to bar HD UEs. Another gNB may want to bar 1Rx UEs. The combination of these two capabilities already means four UE types.</p> <p>We agree that changing the capability signaling should be avoided unless it is proven necessary.</p>
12	Nokia Corporation	We support that the existing UE capability framework is re-used. In our view in maximum of 1 RedCap UE type should be defined. It would even be possible to avoid any RedCap UE type and indicate RedCap UE to the network through UE capabilities. If more than one RedCap UE type is considered, it would create market fragmentation and make the initial access more complicated and unnecessary random access resources would need to be reserved
13	CATT	We support to limit the number of UE types to two and details can be further discussed in the WGs (RAN1/RAN2).
14	MediaTek Inc.	We are ok with the introduction of 1 RedCap UE type per FR. Any further differentiation (e.g. lower end and higher end RedCap devices) would lead to highly undesirable fragmentation in the market.
15	Ericsson LM	We are ok with the proposed sub-bullet, but we do not see a need to add "one or two" in the main bullet unless it is clarified what is meant by one or two UE types. Note that it is already clear that there will be more than two sets of L1 capabilities if different frequency ranges, different number of MIMO layers, optional 256QAM support, etc., are taken into account. We may be fine with clarifying that a single RedCap UE (per FR) should be able to address all RedCap use cases.
16	Deutsche Telekom AG	Deutsche Telekom: if we introduce more variants, then we end up with more "categories". The network shall be informed what a REDCAP UE can less than a normal UE. If we go to 1 Rx where 4 are needed today, then we have 2 REDCAP categories

Item	Company	Comments
17	vivo Mobile Communication Co.,	[vivo] We agree with the proposed objective. Regarding the number of UE types, we think two UE types should be defined. It will be challenging to achieve the targets on data rate/power efficiency for different use cases, e.g. sensor/low-end wearable vs. video surveillances with only one UE type. Anyway, the details should be further discussed in WGs during WI phase.
18	Huawei Tech.(UK) Co.. Ltd	Now that the maximum UE BW is 20 MHz in FR1, and 100 MHz in FR2, there only needs to be 1 type of RedCap UE per FR. The number of Rx branches is a part of the capability of the UE, indicated at the relevant stage(s) of access. It is preferable for RAN to decide this, as the WGs have had plenty of discussion without conclusion. The arguments on market fragmentation, etc. are well rehearsed in RAN1 and RAN2.
19	LG Electronics Inc.	We are okay to limit the number of RedCap UE types to "one or two" as suggested by Moderator, but we see that further narrowing down in terms of the number of UE types within this meeting would be very difficult to achieve. On whether the UE types should be per FR or not, we think it should be per FR at least at this stage. Maybe at the end of the WI phase, after the definition and the number of UE types becomes clear, then perhaps we can come back to this. Regarding UE capabilities, we suggest to refer to generic UE capabilities rather than only L1 capabilities. For instance, RAN2 already agreed that max number of DRBs, total L2 buffer size, PDCP SN length can be reduced for REDCAP UEs. As the definition on the RedCap UE type(s) is not clear yet, we suggest the following changes to make the objective more accommodating on the final definition of RedCap UE type(s). - Specify definition of one or two RedCap UE type(s) including set(s) of L1 capabilities for RedCap UE identification and for constraining the use of those RedCap L1 capabilities only for RedCap UEs, and preventing RedCap UEs from using capabilities not intended for RedCap UEs including at least carrier aggregation, dual connectivity and wider bandwidths. <u>- The existing UE capability framework is used; changes to capability signaling are specified only if necessary.</u>
20	Sony Europe B.V.	[SONY] - For the purposes of Redcap UE identification at initial access, support of one or two UE types is OK. - We support use of the existing UE capability framework, which will naturally lead to different capabilities for redcap devices, given that there are optional capabilities (e.g. 256QAM etc.)
21	Beijing Xiaomi Mobile Software	[Xiaomi] It is not clear that the intention is to specify the UE type per FR or not as some companies also mentioned. So we suggest to remove "one or two" in the main bullet or if we want to keep it we can add "per band" to clarify it.

4.2 Power Saving

- Specify support for the following UE power saving and battery lifetime enhancement for RedCap UEs [RAN2, RAN3, RAN4]:

- Extended DRX for RRC Inactive and Idle with eDRX cycles up to and beyond 10.24 s

- For extended DRX, the details of mechanisms and feasibility regarding maximum length of the extended DRX cycles for RRC Inactive and Idle need to be checked by SA2, CT1 and/or RAN4.

Moderator's summary after initial round:

Most companies are fine with these objectives.

Further questions based on additional suggestions:

Question 2-5: Are companies OK to modify the first sub-bullet as follows:

- Extended DRX for RRC Inactive and Idle with eDRX cycles up to ~~and beyond~~ 10.24 s, without using PTW and PH, and with common design between Idle and Inactive

Feedback Form 8:

Item	Company	Comments
1	Ericsson LM	[Ericsson] We are ok in principle – however, the modification results in changing the intention so whether it can be agreed depends on whether the later proposals are agreed. In particular, the extension beyond 10.24 seconds should be in (as proposed in the next revision in Question 2-6).
2	Guangdong OPPO Mobile Telecom.	[OPPO] We are fine with the modified objective.
3	Apple Hungary Kft.	[Apple] We were actually ok with the first provided objective wording, but if majority prefer this changed version, we are ok as well.
4	Qualcomm Incorporated	We are basically ok with the proposal but would propose to delete the last part: "Extended DRX for RRC Inactive and Idle with eDRX cycles up to 10.24 s, without using PTW and PH, and with common design between Idle and Inactive.
5	NTT DO-COMO INC.	We are fine with the modification
6	Facebook	We are ok with the modification.
7	vivo Mobile Communication Co.,	[vivo] We are fine with this bullet.

Item	Company	Comments
8	CATT	We agree with the update.
9	MediaTek Inc.	We are ok with this proposal so long as the later proposals on eDRX > 10.24s are also included.
10	Samsung Electronics Co., Ltd	We have same concern as what Ericsson expressed: we understand that the intention of the update is merely for the clarification on the case where the eDRX cycles is up to 10.24, but not to exclude the support of eDRX cycles beyond 10.24s which RAN2 concluded as feasible. Hence, the proposal should be updated accordingly.
11	Spreadtrum Communications	We are fine with the modified objectives.
12	Intel Corporation (UK) Ltd	We would be fine with the moderator's proposal to mention 10.24 seconds and without using PTW, PH, and common design for IDLE/INACTIVE. However, we should keep the sentence "the details of mechanisms and feasibility regarding maximum length of the extended DRX cycles for RRC Inactive and Idle need to be checked by SA2, CT1 and/or RAN4".
13	ZTE Corporation	We are fine with this modification
14	Nokia Corporation	It is not totally clear to us what is meant with the "common design". We agree with the updated objectives if it is clarified that Idle eDRX is configured by the CN and Inactive eDRX is configured by the RAN i.e. the configuration part is not exactly the same for RRC Inactive and Idle and "common design" does not apply to the configuration part. In our view the common design means that e.g. eDRX values for RRC Inactive and Idle are the same and this is ok for us.
15	Beijing Xiaomi Mobile Software	We are fine with this modification
16	Sony Europe B.V.	Agree with Ericsson. We are OK with this objective update provided the update in Question 2-6 is also adopted.
17	Huawei Tech.(UK) Co.. Ltd	This is ok as per the RAN2 conclusion.
18	SHARP Corporation	[Sharp] We are ok with the modification.
19	Deutsche Telekom AG	Why is it proposed to be restricted to 10.24s ? ... this does not make sense ...
20	Classon Consulting	OK

Question 2-6: Are companies OK to add the following bullet:

- Extended DRX for RRC Inactive and Idle with eDRX cycles up to 10485.76 s

Feedback Form 9:

Item	Company	Comments
1	Ericsson LM	[Ericsson] We agree with adding the bullet.
2	Guangdong OPPO Mobile Telecom.	[OPPO] We are fine with the modified objective.
3	Apple Hungary Kft.	[Apple] We are ok with this.
4	NTT DO- COMO INC.	We agree with the modification
5	Qualcomm Incorporated	With this reformulation, now the conditioning on feasibility assessment is lost. We are only ok with this proposal if the following modification is made: "Extended DRX for RRC Inactive and Idle with eDRX cycles up to 10485.76 s, the details of mechanisms and feasibility regarding maximum length of the extended DRX cycles for RRC Inactive and Idle need to be checked by SA2, CT1 and/or RAN4."
6	vivo Mobile Communication Co.,	[vivo] We think we should add this statement as recommended by RAN2 " <u>, unless RAN4 indicates such eDRX value requires UE to perform RRM on serving cell outside PTW</u> "
7	CATT	We agree with the update.
8	MediaTek Inc.	Extension of eDRX > 10.24s cannot be unilaterally implemented by RAN as it affects SA2 and CT1 specifications for Inactive mode. This impact needs to be included in the objective and not hidden away.
9	Samsung Electronics Co., Ltd	We are fine with the added bullet (please ignore the comment for the previous question.)
10	Spreadtrum Communications	We are fine with the modified objectives.

Item	Company	Comments
11	Intel Corporation (UK) Ltd	We would be fine with the moderator's proposal to mentioned 10485.76s for IDLE. For INACTIVE, the maximum value should be kept open since RAN2 has no conclusion on this. RAN2 agreement is " <i>SA2/CT1 must be consulted on the feasibility prior to the introduction of eDRX cycles longer than 10.24 seconds in RRC Inactive.</i> " In addition, we should still keep the text " the details of mechanisms and feasibility regarding maximum length of the extended DRX cycles for RRC Inactive and Idle need to be checked by SA2, CT1 and/or RAN4 ".
12	ZTE Corporation	We are ok with the value for RRC_IDLE. But for eDRX in RRC_INACTIVE, CT1 should be consulted on the feasibility of large eDRX cycles. So we suggest to revise it as: <u>- Extended DRX for RRC Idle with eDRX cycles up to 10485.76s;</u> <u>- Aim to support extended DRX for RRC Inactive with eDRX cycles up to 10485.76s, consulting CT1 about the feasibility.</u>
13	Nokia Corporation	Yes, we agree with this update.
14	Beijing Xiaomi Mobile Software	10485.76 s is ok for idle mode. But for the inactive mode, the upper bound should be confirmed by SA2/CT1.
15	Sony Europe B.V.	Agree with update
16	Huawei Tech.(UK) Co.. Ltd	We are supportive to add this bullet.
17	SHARP Corporation	[Sharp] We agree with the modification.
18	LG Electronics Inc.	We are okay with the proposed addition.
19	Deutsche Telekom AG	fine
20	Classon Consulting	OK

Question 2-7: Are companies OK to add the following bullet:

Idle eDRX is configured by the CN and Inactive eDRX is configured by the RAN

Feedback Form 10:

Item	Company	Comments
1	Ericsson LM	[Ericsson] The configuration may require coordination between RAN and CN thus we would not like to commit to a definite solution yet before understanding for example how the PTW would be used (e.g. shared between RAN and CN paging or not) and configured in detail.
2	Guangdong OPPO Mobile Telecom.	[OPPO] We are ok with this.
3	Apple Hungary Kft.	[Apple] We think this level of detail can be discussed in RAN2 WG, and it is too early to agree. The upper and lower bounds of eDRX for IDLE and INACTIVE are not concluded (and we prefer to discuss this in WG as well), and so agreeing to who configures which eDRX is too early to conclude. We do agree that RAN/gNB is anyway in-charge of configuring INACTIVE config, and so the decision might be not contested in RAN2 WG discussion. Nevertheless, this can be deferred to WG.
4	NTT DO- COMO INC.	We agree with Ericsson and Apple that this can be discussed in RAN2
5	Qualcomm Incorporated	We are ok with the Moderator's proposal. Also ok with discussing it and deciding in RAN2.
6	Facebook	We think this should be discussed in RAN2.
7	vivo Mobile Communication Co.,	[vivo] We are fine with this bullet.
8	CATT	During the SI phase, we didn't make any agreements about which node decides the eDRX configuration. Furthermore, we didn't reach consensus on how to configure the eDRX for idle/inactive, one common eDRX cycle or separate eDRX cycles for idle and inactive. Coordination between CN and RAN node may needed, so it should leave the decision about which node to configure the eDRX for idle and inactive to WG discussion.
9	MediaTek Inc.	The discussion on which node is responsible for the configuration of eDRX is a technical one, that needs to take place in the working groups. We therefore suggest to not include this bullet in the WI objectives.
10	Samsung Electronics Co., Ltd	We share the view with Ericsson that it can be discussed in the working group, and thus it should not be included in the WI objectives.
11	Spreadtrum Communications	We are OK with the adding.

Item	Company	Comments
12	Intel Corporation (UK) Ltd	We would be fine with the moderator's proposal.
13	ZTE Corporation	How to configure eDRX is supposed to be discussed during WI phase, we don't think it is right and necessary to make decision right now. So we suggest to remove this objective.
14	Nokia Corporation	We agree that this bullet should be added. And we see this bullet especially necessary if we include to the early objective "with common design between Idle and Inactive" to avoid any confusion in the objectives. We see that it is important to follow the same principles as in LTE i.e. core network configures eDRX in Idle and RAN configures eDRX in Inactive.
15	Beijing Xiaomi Mobile Software	It is too early to say that . We need more study on the solutions on who decides the edrx parameters. And the feasibility also need to be checked by SA2/CTA.
16	Huawei Tech.(UK) Co.. Ltd	This is OK to add.
17	Classon Consulting	OK

Question 2-8: Are companies OK to add the following bullet:

The applicable parts of eDRX mechanisms for LTE, including use of H-SFN, PH and PTW are expected to be re-used for RedCap UEs.

Feedback Form 11:

Item	Company	Comments
1	Ericsson LM	[Ericsson] We are ok in principle – however, for cycles up to 10.24 seconds, it was recommended to not use PTW etc. (as in revision related to Question 2-5).
2	Guangdong OPPO Mobile Telecom.	[OPPO] We are ok to add this.
3	Apple Hungary Kft.	[Apple] We are not sure if this level of details needs to be discussed in RANP. Its like we are trying to finish RAN2's power-saving using eDRX in the RANP 91e itself :-). The upper and (especially) lower bounds of eDRX are to be discussed before we can conclude what parts of LTE eDRX mechanisms are to be applied to NR. Also the aspect of emergency message reception needs to be discussed (again in RAN2 WG) as LTE eDRX devices are not expected to receive emergency broadcast. But this is not the case for RedCap. We are not ok to add this.
4	NTT DO-COMO INC.	We agree with Apple that this can be discussed in RAN2

Item	Company	Comments
5	Qualcomm Incorporated	Similar view as Ericsson. Better not to list what will be included.
6	Facebook	Share the view that this should be discussed in RAN2.
7	vivo Mobile Communication Co.,	[vivo] We are fine with this bullet.
8	MediaTek Inc.	We are ok with this bullet
9	Samsung Electronics Co., Ltd	We are fine with the proposal.
10	Spreadtrum Communications	We are OK with the adding.
11	Intel Corporation (UK) Ltd	We would be fine with the moderator's proposal.
12	ZTE Corporation	So far, this is the common understanding that PH/PTW will be reused for eDRX cycle >10.24s, so seems not necessary to list it in WID.
13	Nokia Corporation	We are fine with this additional bullet. We are also ok to include clarifying text that PTW is not used for eDRX cycles up to 10.24 s as recommended by RAN2 in the TR.
14	Beijing Xiaomi Mobile Software	We are ok in principle
15	Huawei Tech.(UK) Co.. Ltd	This is OK as per the RAN2 conclusion.
16	LG Electronics Inc.	We are okay with the proposed addition.
17	Classon Consulting	OK

Question 4: Feedback is invited on the above draft objectives from RP-210656.

Feedback Form 12:

Item	Company	Comments
1	Guangdong OPPO Mobile Telecom.	We support this draft objective.
2	Apple Hungary Kft.	[Apple] We are fine with the objectives stated above in 4.1.
3	NTT DO- COMO INC.	We support the draft objective
4	Spreadtrum Communi- cations	We are fine with the draft objective.
5	Intel Cor- poration (UK) Ltd	Support the proposed objectives.
6	Samsung Electron- ics Co., Ltd	We are fine with the draft objective.
7	Qualcomm Incorpo- rated	We think that the SA agreement on feasibility should be made an explicit precondition, e.g. as follows: "If found feasible, specify support for the following UE power saving and battery lifetime enhancement for RedCap UEs [RAN2, RAN3, RAN4]: ..." Other than that, we are ok with the proposal.
8	China Telecom- munica- tions	[China Telecom] We are fine with the draft objective.
9	ZTE Cor- poration	We are fine with the draft objective.

Item	Company	Comments
10	Nokia Corporation	<p>RAN2 already recommended in its study item conclusions that PTW is not used for eDRX cycles below and equal to 10.24 seconds. In our view this should be included to the objectives so that RAN2 does not need to restart the same discussion again. In our view the scope for eDRX cycle length should already be defined in the objectives rather than leaving it open and causing more work load in RAN2, SA2, CT1 and RAN4. In our view eDRX cycles in IDLE and INACTIVE should be up to e.g. 10485.76 seconds as recommended by RAN2. Furthermore, we see that it would be beneficial to clear indicate in the objectives, which network node configures eDRX to limit workload. We propose to follow the legacy systems i.e. IDLE eDRX configured by core network and INACTIVE DRX configured by RAN. Therefore, we propose the following objectives</p> <ul style="list-style-type: none"> • Specify for IDLE/INACTIVE eDRX cycles below and equal to 10.24 seconds so that PTW is not used • Specify eDRX cycles in IDLE and INACTIVE up to 10485.76 seconds. • Specify IDLE eDRX configured by core network • Specify INACTIVE eDRX configured by RAN
11	CATT	<p>We are in general fine with the objective. In addition, we would like to reflect the following RAN2 recommendations in the objective to further narrow down the scope.</p> <ul style="list-style-type: none"> • The applicable parts of eDRX mechanisms for LTE, including use of H-SFN, PH and PTW are expected to be re-used for RedCap UEs. • It is recommended that for eDRX cycles below and equal to 10.24 seconds PTW and PH is not used and that common design for handling eDRX cycle equal to 10.24 seconds in <i>RRCIDLE and RRCINACTIVE</i> is specified.
12	MediaTek Inc.	We are ok with this draft objective
13	Ericsson LM	We are ok with the draft objective.
14	Deutsche Telekom AG	Deutsche Telekom: seems OK
15	vivo Mobile Communication Co.,	<p>[vivo]</p> <p>During SI phase, the discussion is based on the assumption that UEs are not required to perform RRM on serving cell outside PTW. Thus, this part should be further discussed in RAN4 in WI phase.</p> <p>Thus, we prefer to re-word as RAN2 recommendation: <u>“Extended DRX for RRC Inactive and Idle with eDRX cycles up to and beyond 10.24 s , unless RAN4 indicates such eDRX value requires UE to perform RRM on serving cell outside PTW”</u></p>

Item	Company	Comments
16	Huawei Tech.(UK) Co.. Ltd	Agree, this is as per RAN2.
17	Sony Europe B.V.	[SONY] - Support proposed objectives
18	Beijing Xiaomi Mobile Software	[Xiaomi] We support the draft objective
19	LG Electronics Inc.	We are okay with the draft objectives on power saving.
20	China Unicom	[China Unicom] We are fine with the draft objective.

4.3 RRM Relaxations

- RRM relaxations for neighboring cells for stationary devices:

- Any specified solution should show clear power consumption gains on top of the existing RRM relaxation mechanisms specified in Rel-16.

- RAN4 should be consulted on the feasibility of any RRM relaxation methods.

- Enabling or disabling RRM relaxation should be under network's control.

Moderator's summary from initial round

Responses are widely varying. It would be important first to agree on which state(s) should be prioritized. The RAN2 recommendation was to prioritise RRC_Connected optimisations for fixed/immobile UEs. The moderator proposes the following objective in order to keep the workload reasonable in RAN2 (noting also the concerns expressed in some comments). Several companies also commented that the power consumption bullet was not needed.

Moderator's revised proposal:

- RRM relaxations for neighbouring cells for fixed/immobile RedCap devices:

- Specify RRM relaxations for RRC_CONNECTED based on Rel-16 RRM relaxation for RRC_IDLE/INACTIVE

- Enabling/disabling of RRM relaxation should be under the network's control by means of parameters provided to the UE by dedicated signalling.

- No RRM relaxations are specified for the serving cell.

Question 2-9: Comments are invited on the above Moderator’s Revised Proposal.

Feedback Form 13:

Item	Company	Comments
1	Ericsson LM	[Ericsson] We agree that it is desired to limit the workload in RAN2 regarding the RRM relaxation objective. However, it was not recommended to prioritize RRC-CONNECTED optimization – this prioritization was only about prioritizing fixed/immobile UEs in case RAN2 would specify anything for RRC-CONNECTED. On the contrary, at the end of the SI, there seemed to be more companies supporting RRC-IDLE and RRC-INACTIVE enhancements (on top of Rel-16 enhancements) and prioritizing these over RRC-CONNECTED. This we would support.
2	Guangdong OPPO Mobile Telecom.	[OPPO] In general we are fine with the revised proposal.
3	Apple Hungary Kft.	[Apple] Stating 'fixed/immobile' actually takes away other kinds of RedCap like slowly moving (which RAN2 discussed extensively). We think just adding the objective of RRM relaxations for NCells for RedCap devices is ok, and RAN2 can discuss diff relaxations based on the type of RedCap UE. We are not sure why this needs to be constricted to only fixed/immobile. Also, we are wondering on why the NW control of params is only by means of dedicated signaling to the UE (and not broadcast). We think just stating that it's under NW control is enough and RAN2 WG can device how the NW can control.
4	Qualcomm Incorporated	Similar to Ericsson, we would propose to not focus on RRC connected. Regarding "fixed/immobile", similar to Apple, we would propose to delete it. Can replace it with "stationary" which at least allows nomadic UEs to take advantage of RRM relaxations. The above suggestions can be captured as: <u>Specify</u> RRM relaxations for neighbouring cells for fixed/immobile <u>stationary</u> RedCap devices: - Specify RRM relaxations for RRC_CONNECTED based on Rel-16 RRM relaxation for RRC_IDLE/INACTIVE - Enabling/disabling of RRM relaxation should be under the network’s control by means of parameters provided to the UE by dedicated signalling. - No RRM relaxations are specified for the serving cell.
5	NTT DO-COMO INC.	We prefer not to prioritize RRC_CONNECTED only, but discuss RRC_IDLE/INACTIVE as well. However, if prioritization is necessary, we are fine with Moderator’s revised proposal
6	vivo Mobile Communication Co.,	[vivo] We are fine with this proposal. Besides, based on companies’reply in the first round, it seems that more companies support to specify RRM Relaxation in IDLE/INACTIVE/CONNECTED modes (I understand the original proposal means this). Thus, we support to also include the futher RRM relaxation for idle/inactive mode based on Rel-16 mechanism.

Item	Company	Comments
7	CATT	We share the same understanding with Ericsson that it was not recommended by RAN2 to prioritize RRC_CONNECTED optimization, but to prioritize fixed/immobile UEs in case RAN2 would specify anything for RRC_CONNECTED. And we also agree to prioritize the RRC_IDLE and RRC_INACTIVE enhancement over RRC_CONNECTED, considering the limited gain as well as work load. Besides, as commented earlier, for neighboring cell RRM relaxation, it is not accurate to only consider the fixed/immobile UEs, it should include the fixed or slightly moving devices.
8	Spreadtrum Communications	We share the view and observation from Apple and Qualcomm.
9	Intel Corporation (UK) Ltd	<p>RAN2 agreements “prioritize RRC_Connected optimisations for fixed/immobile UEs” does not preclude the support of IDLE/INACTIVE since that discussion focused on connected mode only.</p> <p>RAN2 had another discussion on the priority between IDLE/INACTIVE and CONNECTED, and no final conclusion on that. Therefore, as also indicated by others, IDLE/INACTIVE should be kept in the scope.</p> <p>In our view, RAN2’s main focus during the WI phase should be to specific the triggering, and RRM relaxation mechanism should be discussed in RAN4, i.e.</p> <p style="text-align: center;">·</p> <p style="text-align: center;">For neighbour cell RRM relaxation for Red-Cap UEs in RRCIDLE, RRCINACTIVE and RRC_CONNECTED, specify the triggering of RRM relaxations to support 2-level speed evaluation (i.e. stationary and low mobility); [RAN2]</p>
10	ZTE Corporation	<p>1. We show similar view as Ericsson, there is no recommendation to prioritize RRC_CONNECTED UEs;</p> <p>2. The signalling for enabling/disabling of RRM relaxation can also be provided in system information, i.e. for RRC_IDLE/INACTIVE UEs.</p> <p>3. We are fine to only consider fixed/immobile UEs for RRM relaxation in RRC_CONNECTED (to avoid performance impact).. But for RRCIDLE/RRC_INACTIVE, both fixed/immobile and low mobility UEs can be considered.</p> <p>So we suggest to revise the objective as:</p> <ul style="list-style-type: none"> - RRM relaxations for neighbouring cells for fixed/immobile RedCap devices: <ul style="list-style-type: none"> - Specify RRM relaxations for <u>fixed/immobile and low mobility RRC_IDLE/INACTIVE</u> based on Rel-16 RRM relaxation mechanism for RRC_IDLE/INACTIVE - Specify RRM relaxations for <u>fixed/immobile RRC_CONNECTED</u> if RAN4 confirms the feasibility of RRM relaxation methods in <u>RRC_CONNECTED</u>. - Enabling/disabling of RRM relaxation should be under the network’s control by means of parameters provided to the UE by dedicated signalling. - No RRM relaxations are specified for the serving cell.

Item	Company	Comments
11	Nokia Corporation	<p>We are ok with the modified RRM objectives from the moderator.</p> <p>Furthermore, in our view the updated objective proposal is aligned with the RAN2 recommendations as the RRM measurement relaxation recommendations are only made for RRC_CONNECTED. No recommendations are made for IDLE or Inactive, they have only been studied like also serving cell measurement relaxations were studied.</p> <p>RAN2 RRM measurement relaxation related recommendations from the TR are as follows; <i>“The study of UE power saving on RRM relaxation for stationary UEs can be summarized as follows:</i></p> <ul style="list-style-type: none"> - <i>RRM relaxation for RedCap UEs has been studied. The study includes the definition of the possible RRM relaxation triggers and the candidate RRM relaxation methods for stationary UEs in clauses 8.4.2 and 8.4.3.</i> - <i>It is recommended that enabling or disabling RRM relaxation should be under network’s control.</i> - <i>RAN4 should be consulted on feasibility of any RRM relaxation methods which are to be defined.</i> - <i>RRM relaxation has been studied for all the RRC states (RRC_IDLE, RRC_INACTIVE and RRC_CONNECTED) and both for neighbour cell and for serving cell measurements.</i> - <i>For RRC_CONNECTED, it is recommended that UEs which are fixed or immobile are considered with higher priority compared to UEs which are slightly moving.</i> - <i>Irrespective of RRC state, serving cell RRM relaxation for RedCap UEs is not recommended to be specified.”</i> <p>If despite the lack of RAN2 recommendations for Inactive and Idle RRM relaxations some work is done, then the following proposal Qualcomm is acceptable for us: <i>“for RRC_IDLE/INACTIVE</i></p> <ul style="list-style-type: none"> - <i>Enabling/disabling of RRM relaxation should be under the network’s control by means of parameters provided to the UE by dedicated signalling”</i>
12	MediaTek Inc.	<p>The revised proposal provides a clearer objective for RRM relaxation when compared to the earlier open-ended proposal. However, if this revised proposal is not found to be agreeable and companies want to consider both Idle mode and Connected mode relaxations in this WI, it is quite clear that this objective will not fit in the time allocated for RedCap (as RAN2 need to decide between 19 options listed in the TR).</p> <p>If the revised proposal cannot be agreed, the only way out is to task RAN2 to study RRM relaxations further with a deadline of RP#92-e to provide a clear recommendation based on technical merit. We can then decide at RP#92-e whether to pursue this objective (based on RAN2’s recommendations) or to drop the objective altogether.</p>
13	Beijing Xiaomi Mobile Software	<p>Do not agree with sentence 2. Form the output of SI, people want to prioritize RRM relaxation for idle/ inactive rather than RRC connected mode.</p> <p>For sentence 3, suggest to remove ”by dedicated sigalling”.For idle/inactive UE, the broadcast way is sufficient.</p>

Item	Company	Comments
14	Huawei Tech.(UK) Co.. Ltd	<p>The proposal seems to misinterpret the TR conclusion. The TR conclusion is that fixed/immobile UEs are prioritized for connected mode, but not that connected mode is prioritized over idle/inactive. Further, the TR conclusions states that “RAN4 confirmation” is needed, which is not an automatic step, and needs to be reflected in the objective text. The suggestion to base connected mode solutions on Rel-16 is not part of RAN2’s conclusions, and the technical discussions for RRC_IDLE/INACTIVE still have a couple of feasible options better left to the WG to choose among.</p> <p>Suggestion, where <u>underline</u> represents insertion: RRM relaxations for <u>neighbouring cells</u> for fixed/immobile RedCap devices, subject to confirmation by RAN4: - <u>Study further and down select RRM relaxations for RRC_IDLE/INACTIVE</u> - <u>Study further and down select Specify RRM relaxations for fixed/immobile RedCap devices</u> for RRC_CONNECTED based on Rel-16 RRM relaxation for RRC_IDLE/INACTIVE - Enabling/disabling of RRM relaxation should be under the network’s control by means of parameters provided to the UE by dedicated signalling. - No RRM relaxations are specified for the serving cell.</p>
15	LG Electronics Inc.	We are okay with the Moderator’s revised proposal.
16	Classon Consulting	Should not prioritize as per moderator.

Question 5: Feedback is invited on the above draft objectives from RP-210656.

Feedback Form 14:

Item	Company	Comments
1	Guangdong OPPO Mobile Telecom.	In general, we are ok with this draft objective. To make the scope clear, we suggest to explicitly mention that both RRC_Idle and RRC_Connected are included.
2	Apple Hungary Kft.	<p>[Apple] We are not very clear on the wording of “<u>Any specified solution should show clear power consumption gains</u>” in the objective. Clear gains is very subjective. It is agreed in RAN2 study that RRM relaxations is beneficial for RedCap using RedCap specific characteristics (low mobility/stationary etc..). We prefer the below wording for the objectives: - <u>RRM relaxations for neighboring cells for RedCap Devices:</u> - <u>Specify solutions using RRM relaxations for neighboring cells for RedCap UEs for power-saving purposes that can be in addition to the existing RRM relaxation mechanisms specified in Rel-16.</u> - <u>RAN4 should be consulted on the feasibility of any RRM relaxation methods.</u> - <u>Enabling or disabling RRM relaxation should be under network’s control.</u></p>
3	NTT DO-COMO INC.	We are fine with the draft objective

Item	Company	Comments
4	Spreadtrum Communications	We are fine with the draft objective.
5	Intel Corporation (UK) Ltd	<p>RRM relaxation can be split into the triggering of RRM relaxation and RRM relaxation methods, and these two can be handled separately, e.g. Rel-17 triggering of RRM relaxation can work together with Rel-16 RRM relaxation methods.</p> <p>Considering there is clear majority in RAN2 on introducing new triggering of RRM relaxation in order to support both stationary devices and low mobility devices, we would suggest adding it in the scope and without the need of RAN4 confirmation, i.e. to add</p> <p style="text-align: center;">For neighbour cell RRM relaxation for RedCap UEs in RRC_IDLE, RRC_INACTIVE and RRC_CONNECTED, specify the triggering of RRM relaxations to support 2-level speed evaluation (i.e. stationary and low mobility); [RAN2]</p> <p>For RRM relaxation methods, we agree it should be discussed/confirmed in RAN4.</p>
6	Samsung Electronics Co., Ltd	We are generally fine with the draft objective, but wonder whether we need the first sub-bullet 'Any specified solution should show clear power consumption gains on top of the existing RRM relaxation mechanisms specified in Rel-16', as it is the basic principle of the discussion in each working group. We suggest removing the first sub-bullet.
7	Qualcomm Incorporated	We are in general ok with the proposed objective, although agreeing with Apple and Samsung that the condition on power consumption gain is not necessary to mention, unless it would be otherwise unclear that the baseline for the comparison is Rel-16.
8	China Telecommunications	[China Telecom] We are fine with the draft objective.
9	ZTE Corporation	We are fine with the draft objective.
10	Nokia Corporation	<p>The proposed draft objectives do not mention which RRC state is considered for RRM relaxations. Since in Rel-16 RRM relaxations are already defined for UEs in IDLE and INACTIVE, in our view Rel-17 RedCap work item can be focused on CONNECTED only. In our view the existing evaluation parameters specified in Rel-16 can be re-used. Furthermore, to avoid significant negative system implications in our view no RRM relaxations should be specified for serving cell as already agreed in the RAN2 recommendation. Therefore, we propose to modify the following to be as follows:</p> <ul style="list-style-type: none"> Specify RRM relaxation for RRC_CONNECTED using REL16 RRM relaxation for IDLE/INACTIVE i.e. Network provides (low mobility, not-at-cell-edge) evaluation parameters to UE via dedicated signalling. No RRM relaxations are specified for serving cell.

Item	Company	Comments
11	CATT	<p>We are in general fine with the objective and would like to add "(i.e., fixed or slightly moving devices)" according to RAN2 agreements "Considering the mobility of a RedCap UE, the stationarity property would not be limited to fixed or immobile UEs, but UEs which are considered stationary can also have low mobility, i.e., be slightly moving." to make it clearer.</p> <p><u>- RRM relaxations for neighboring cells for stationary devices (i.e., fixed or slightly moving devices):</u></p>
12	MediaTek Inc.	<p>This objective is too open-ended to be acceptable for the WI phase. From the TR there are 19 options listed out for triggers and methods for RRM relaxations. If all 19 options are to be discussed and power-consumption gains need to be evaluated in the WI phase, then it is quite clear that this objective is simply an extension of the SI rather than a WI objective that can complete in the Rel-17 timeframe when considering the time available for RedCap discussions in RAN2 and RAN4. Similar to the other objectives in this WI, this objective needs to be refined further to indicate the trigger and method for RRM relaxation. We should task RAN2 to provide a clear recommendation on this topic, and decide at RAN#92-e on either having a clear WI objective (trigger and method for RRM relaxation) or drop this objective altogether.</p>
13	Ericsson LM	<p>We are ok with the draft objective. We would also be fine with narrowing down the scope for the RRM relaxation to only consider <i>RRCIDLE</i> and <i>RRC_INACTIVE</i>.</p>
14	NEC Corporation	<p>With regard to 1Rx support, according to RAN1 study, whether DL coverage recovery is required to support 1 Rx for bands where 4Rx is required for legacy UE depends on PSD of DL transmission. DL coverage recovery for 1 Rx RedCap UE would not be required for PSD=33dBm/MHz of DL transmission while DL coverage recovery would be required for PSD=24dBm/MHz of DL transmission. Note that DL coverage recovery would not be needed for 2Rx RedCap UE. It would be preferable to decide whether or not support of DL coverage recovery in Rel-17 is within the scope, in other words, whether or not to consider PSD=24dBm/MHz of DL transmission. In addition, only 33dBm/MHz was considered for 2.6GHz band in RAN1 study and there was no DL coverage issue for 1Rx RedCap UE. So "per band" may need to be considered.</p> <p>As RedCap UE with 2 Rx would not require DL coverage recovery even on a carrier with PSD =24dBm/MHz of DL transmission, different type (or early identification) may be required between 1Rx and 2Rx/4Rx on bands where 4Rx is required for legacy UE. And also different type or early identification between 1Rx and 2Rx/4Rx would be needed for access control.</p> <p>On the question from moderator, in case coverage recovery for Msg3 for RedCap UE is needed, early identification would be needed during Msg1. In this sense, we are OK to remove "or a later message". On the other hand, coverage recovery of Msg3 may not be needed depending on cell deployment. To make early identification configurable seems desirable for flexibility of deployments.</p>
15	Deutsche Telekom AG	<p>Needs to be discussed on a case-by-case basis</p>

Item	Company	Comments
16	vivo Mobile Commu- nication Co.,	[vivo] Firstly, we would like to make the scope clearer. Thus, it is better to revised as “RRM relaxations for neighboring cells for stationary devices <u>in idle/inactive/-connected mode</u> ”. Besides, we assume it is common understanding in RAN2 that the RRM relaxation methods should be discussed and decided in RAN4. Thus, we suggest to revised the second bullet as “ <u>Specify RRM measurement relaxation considering the alternatives discussed in the RedCap SI [RAN4]</u> ”. Finally, we agree with Apple and Samsung that there is no need to mention about the power saving gain here as the benefit has been observed already in the SI phase.
17	Huawei Tech.(UK) Co.. Ltd	Having RRM relaxations is fine, if the TU allocation is confirmed to be sufficient. However, during the RAN2 study phase, this part contains multiple candidate solutions and it is not crystal clear what to take forward. We don't see it as essential to have RRC connected mode relaxation, as in connected mode the network requires accurate measurement reporting for mobility control etc. For idle and inactive modes, we think further study may also be required to figure out which solutions could reach worthwhile gains compared with Rel-16 mechanism.
18	Sony Eu- rope B.V.	[SONY] - Support proposed objectives. We are OK for the RRM relaxations to consider RRC IDLE, RRC INACTIVE and RRC CONNECTED
19	Beijing Xiaomi Mobile Software	[Xiaomi] We are fine with the draft objective.
20	LG Elec- tronics Inc.	We are also not very clear on the meaning of “ <u>Any specified solution should show clear power consumption gains on top of the existing RRM relaxation mechanisms</u> ...“ in the objective. Given that RAN2 spent a lot of meeting time to discuss power saving scheme based on RRM relaxation leading to a conclusion that RAN2 see potential benefit of RRM relaxation for both time-domain and frequency-domain, directly saying in the objective that “ Specify time-domain and frequency-domain RRM relaxation method for neighbour cell ” is preferred.

5 Other comments

Moderator's summary after initial round

A few companies have raised the question of coverage enhancement.

Proposal: Coverage Enhancement solutions specified in the Coverage Enhancement WI are assumed to be applicable also to RedCap UEs.

Question 2-10: Comments are invited on this proposal.

Feedback Form 15:

Item	Company	Comments
1	Ericsson LM	[Ericsson] Presumably the CE solutions specified in the CE WI can be assumed to be applicable also to RedCap UEs without requiring that these CE solutions are mandatorily supported by RedCap UEs – perhaps this can be clarified.
2	Classon Consulting	We are fine to assume that the Rel-17 CE solutions are available by default to RedCap UEs (i.e., optional or mandatory), where exceptions can be discussed later on a case-by-case basis after we see what those features actually look like. The exception would be if there is some sort of incompatibility with RedCap UEs, where we would decide to either not support the solution or make a small compatibility modification such that it works directly with e.g. RedCap early identification. However if the incompatibility is too large we can decide that the feature is not supported. So, please add "by default" to the proposal.
3	Guangdong OPPO Mobile Telecom.	[OPPO] For this other issues, we would raise the question that some pending decision in the Note of RP-202933 should also be revisited. For the two bullets in Notes: " · The work in other WGs than RAN1 starts after RAN#91e. · The appropriate WI for handling of any potential coverage recovery aspects related to RedCap UEs devices will be considered at RAN#91e." In the end, the 2 bullets need to be updated. The second bullet would also means DL coverage recovery, which is not taken cared by CE WI. If no consensus, we are fine to not consider. Regarding the question listed by moderator, more relevant to UL coverage, we think the CE should be supported by RedCap, but we feel it would be good to discuss in capability study. In CE WI we are supportive for adding RedCap specific target of 3dB. Would also be acceptable to trigger that change of CE WI from this discussion.
4	Qualcomm Incorporated	We are ok with the Moderator's proposal. In addition, PDCCH repetition should also be made available to RedCap UEs although this is not a Coverage Enhancement WI objective.
5	NTT DO-COMO INC.	As commented to [91E][37][Coverage_Scope], we think this can be discussed in later part of the WI phase, as it is still unclear whether PUSCH/Msg3 enhancements to be specified in CovEnh WI can be applied to RedCap UEs without any adjustments or any adjustments for RedCap UEs are necessary.
6	vivo Mobile Communication Co.,	[vivo] We are fine with this proposal.
7	CATT	The same issue is under discussion in [91E][37][Coverage_Scope].

Item	Company	Comments
8	Spreadtrum Communications	For UL coverage, CE WI should be applied to Redcap UEs, in addition, further coordination between two WIs is needed. For DL coverage, from our perspective, the suitable coverage features can be considered for FR1 DL channels when 1 Rx applied.
9	Intel Corporation (UK) Ltd	We would be fine with the moderator's proposal. However, we would like to point out that there are some parallel discussions in CE_scope where some of the handling (e.g., identification of RedCap UE vs. support of Msg3 CE features prior to Msg3 transmission) is being proposed to be handled in RedCap WI.
10	ZTE Corporation	We are fine with the Moderator's Proposal.
11	MediaTek Inc.	We assume that all work done in other Rel-17 WIs are also applicable to RedCap UEs (unless otherwise stated). The discussion on whether features are optional or mandatory for RedCap needs to take place in the working groups. Therefore we agree with Ericsson that it is good to clarify that this proposal does not imply mandatory support of all CE features.
12	Beijing Xiaomi Mobile Software	We think the proposal is a little bit weak. we suggest to update the proposal as Proposal: Coverage Enhancement solutions specified in the Coverage Enhancement WI should be applicable to Redcap UEs
13	Huawei Tech.(UK) Co.. Ltd	This is OK for clarifying among Rel-17 WIs for coverage issues. Our understanding is that the Rel-15 and Rel-16 coverage features will be examined by RAN1 case-by-case, to check if any small changes are needed for RedCap. It would nevertheless be useful to guide RAN1 on that point, because the WID is not crystal clear about it. We would appreciate hearing companies' views regarding stating also a conclusion <u>that the Power Saving Enhancements WI solutions are assumed to be applicable also to RedCap UEs.</u>
14	SHARP Corporation	[Sharp] We are ok with the Moderator's proposal. As common understanding with Coverage scope topic, the techniques developed in the CovEnh WI can be applicable to RedCap UEs.
15	LG Electronics Inc.	We agree that the CE solution can be applied to RedCap UEs, but it is early to make it mandatory to RedCap UEs at the moment. So, we also think some clarification wording as suggested by Ericsson is useful.

Feedback Form 16:

Item	Company	Comments
1	Intel Corporation (UK) Ltd	<p>There is another outstanding item as captured in the notes in the latest version of the WID:</p> <p style="padding-left: 40px;"><i>The appropriate WI for handling of any potential coverage recovery aspects related to RedCap UEs devices will be considered at RAN#91e.</i></p> <p>Even if coverage recovery features are not explicitly defined for RedCap, the applicability, configuration, optionality of CE features need to be addressed specifically for RedCap UEs. While this can be addressed in either WI (RedCap or CE) and the resolution of these questions may likely have to wait until further progress is made in the WGs for both WIs, there should be clear guidance on this from RP.</p> <p>Towards this, we propose to revise the previous note for coverage recovery (quoted above) to the following version in the RedCap WID.</p> <p><i>Notes:</i></p> <ul style="list-style-type: none"> • <i>It is expected that PUSCH and Msg3 repetition-based enhancements, to be specified for CE UEs, can be supported for RedCap UEs. The applicability of the CE solutions and corresponding UE features for RedCap UEs are to be addressed during the WI phase in either of the WIs on RedCap or CE (FFS at RAN #92-E).</i>
2	Qualcomm Incorporated	We think that all the solutions should be available to RedCap UEs, therefore the applicability to RedCap doesn't require detailed discussions.
3	Samsung Electronics Polska	<p>[Samsung]</p> <p>For coverage recovery, we think might be better to clarify that the solutions specified in other WIs can be commonly applicable to both non-RedCap UEs and RedCap UEs.</p> <p>On the other hand, we are also open to include coverage recovery in Redcap WI, e.g., for DL.</p>
4	Deutsche Telekom AG	We will not agree on more than 20 MHz CBW or CA.

Item	Company	Comments
5	Huawei Tech.(UK) Co.. Ltd	<p>1. RAN2 discussed higher-layer complexity reduction, and stated that further evaluation in the normative phase is needed – see TR 38.875, section 7.1. These cost savings from RAN2 should not go to waste in RedCap, so RAN needs to set which of the considered reductions to look at, and we think these two are the most valuable:</p> <ul style="list-style-type: none"> • Reduction of the maximum number of DRBs which UE needs to mandatorily support. • Reduction of 18 bit SN size of PDCP and RLC. <p>2. It would be useful to clarify that the techniques being discussed in the power saving enhancements WI should also consider RedCap UEs. A conclusion from this email discussion would be sufficient (or a note in the power saving WID).</p> <p>3. Applicability of Rel-15 and Rel-16 coverage related features to RedCap needs to be determined, particularly for UL where there is the coverage bottleneck, and it would give clarity to RAN1 to state that task in the WID.</p>